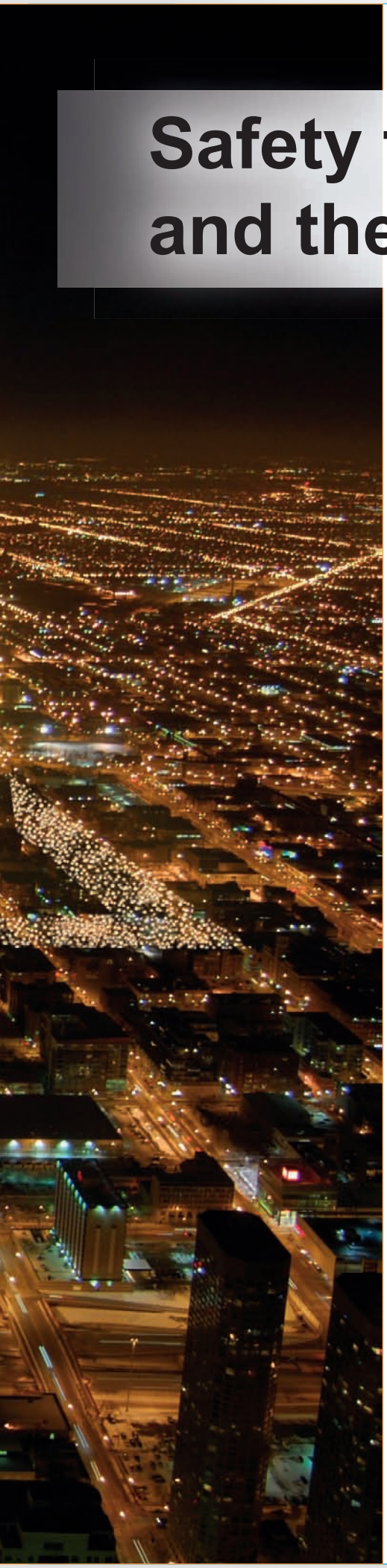
The complete Spectrum of Signaling Technology

Main catalogue · Edition 11

SHARING COMPETENCE

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

Safety for man, machine and the environment



Pfannenberg is your reliable and competent partner when it comes to visual and acoustic information, warning and emergency signals

Globally, hardly any other company in this field can advise you so comprehensively and supply you from one source like Pfannenberg can due to the fact that we have expanded our range by approx. 600 products. Besides our other products, we are particularly pleased to be able to present the complete range of SPECTRA lights, traffic lights and panel mounted indicators, which ideally supplement and complete our existing range of products. With these, we cover the complete industrial spectrum. We are in the position to supply you with all standard solutions from one source as well as countless custom solutions, if desired.

Pfannenberg's utmost priority is to know and really understand our customers' requirements in order to be in a position to tailor and optimise our products and services to suit your needs. That also applies to our new business sector, Add-On Services, which is particularly valuable in the signal technology sector. Our product specialists will be pleased to offer you comprehensive advice on your special requirements.

Following the concept of 'Sharing Competence' employee potentials unite to form products to suit needs: regular training, seminars and many years of experience put our employees in a position to conduct dialogue with customers professionally, in a goal-orientated manner and to achieve the best results and at a high level when solving tasks. Likewise, the experiences and knowledge gained are proactively made available and are in demand; hence, the organisational development at Pfannenberg is not only permanently promoted, but also shared.

Last but not least, energy efficiency also plays a large part in the newest generations of our devices. Ultimately, we feel obliged to remain true to our company motto: 'Safety for man, machine and the environment!'.

With best wishes

Andreas Pfannenberg
CEO

SHARING COMPETENCE

Reliable signaling devices – indispensable for machines, plants and buildings

‘Safety for man, machine and the environment’ is always priority at Pfannenberg GmbH. In order to ensure this, absolutely reliable signaling devices are indispensable.

Whether in factory buildings, on machines, aboard ships or on large structures, motorways, bridges and in tunnels – Pfannenberg signals warn everywhere of danger, fire, accidents or technical defect. For decades, Pfannenberg has been reliably protecting the most precious commodity of all - human life. Early detection of failures and the associated alarm signals are also indispensable for a trouble-free production process. Usually, priority is to minimise process disruptions and dangerous situations, which require an alarm. Unfortunately, this can never be completely avoided and it is therefore, important to take precautions.

As a result, not only will the risk of an accident be reduced, but unnecessary downtime or interruptions will be minimised, thus guaranteeing continuity and preventing unnecessary costs.

A signal device is not just an accessory for production equipment, machines or buildings, which serves to fulfill applicable regulations. Over and above that, it can also help to optimise company processes and to avert danger. Accordingly, functional reliability is extremely important in an emergency. The motto ‘not just any old device, but the right device’ should be the motto when choosing the right signaling device. Pfannenberg is proud to support its customers in selecting the right signaling device to suit their needs.
Benefit from our competence.

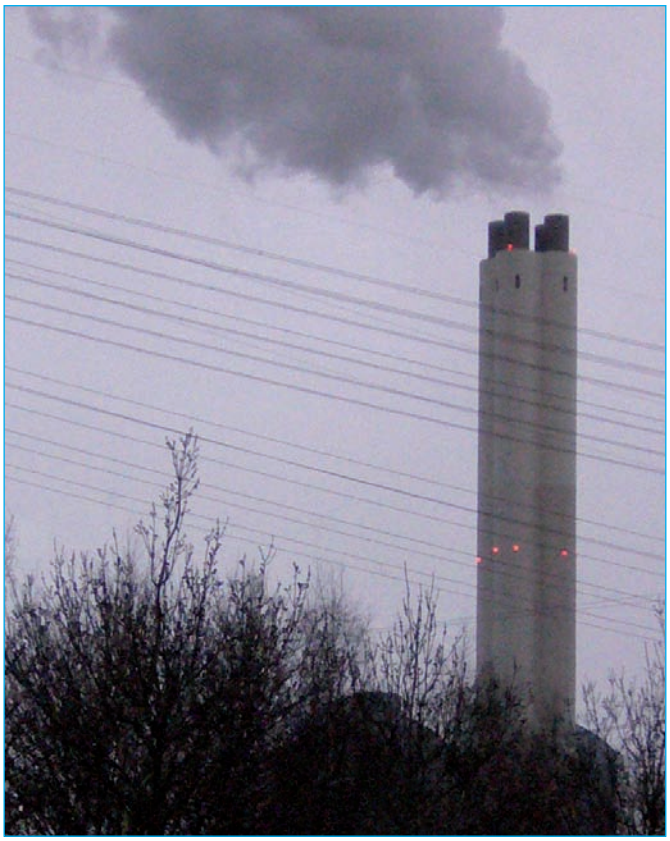


Photo: ©cliric/aboutpixel.de

5 good reasons to choose Pfannenberg

Absolute safety

The Pfannenberg Group's signaling technology is innovative, modern and durable. It offers absolutely secure alarm ability.

Photo: ©Marit Peters/PIXELIO

All-round care

Pfannenberg has organised sales in 42 countries on all 5 continents, thus ensuring optimal support. Whether it's about on-site service, comprehensive application advice or the creation of individual solutions, Pfannenberg offers its customers top support around the clock and around the world in the respective national language.

Reliability and innovation

The Pfannenberg Group's corporate values are reliable parameters for all customers: highest efficiency in all business processes, energy-saving products and maintenance-free solutions go hand-in-hand with environmental and social consciousness, as well as fairness in dealing with business partners and employees.
Pfannenberg is a family-owned company in the second generation. It has a long-standing tradition of outstanding innovative product developments, such as shock-resistant and energy-efficient flashing LED lights, wall-penetrating sounders, self-monitoring alarm signals for machines and cost-optimised rotating mirror lights.

Individual advice

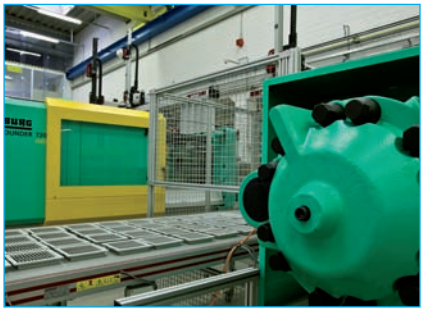
The Pfannenberg Group offers its customers the necessary competence for individual solutions in the most diverse branches of industry (examples):

• Machine safety	– Function-monitored flashing lights
• Renewable energies	– Voice alarms in bio-gas combined heating and power plants
• Building equipment	– Obstruction lights
• Fire prevention	– Acoustic alarms in gas-fired power stations
• Art illumination	– Illumination of the Eiffel Tower with 20,000 flashing lights

Photo: ©JuwelTop/PIXELIO

Production around the world

The Pfannenberg Group is constantly optimising its production in order to directly serve customers all over the world on a local basis and to establish a strong network. Pfannenberg links its production in Germany, Italy, USA and China optimally to plastics processing, state-of-the-art sheet metal working and VdS-approved manufacturing.
Our own environmental simulation laboratory enables the manufacturing of 'tested' products for the most extreme application conditions, naturally also with VdS and UL approval.



Plastic injection moulding plant, Pfannenberg, Hamburg

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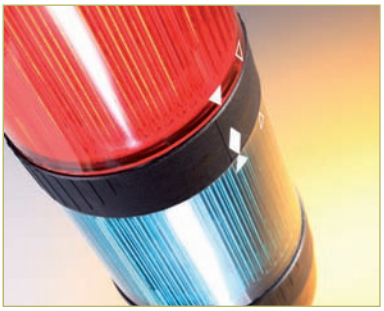
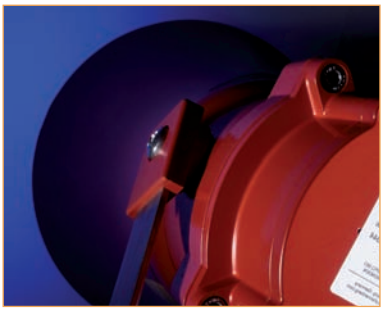
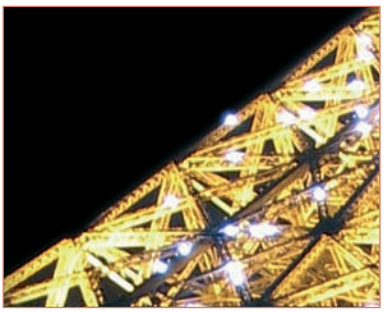






New products

Safety-related lights

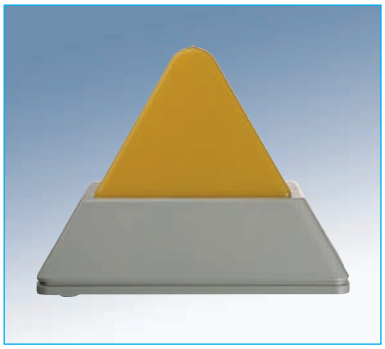
Visual signaling devices suitable for use in SIL 1 and SIL 2 safety circuits in both the industrial process and plants, as well as machine tool industry according to the new machinery directive 2006/42EG.

Safety-related sounders

Audible signaling devices suitable for use in SIL 1 and SIL 2 safety circuits in both the industrial process and plants, as well as machine tool industry according to the new machinery directive 2006/42EG.

DS 5-DN

Sounder DS 5-DN with adjustable sound level. Individual sound levels for day and night in one device.



LED Continuous light PD 2100-LED-M

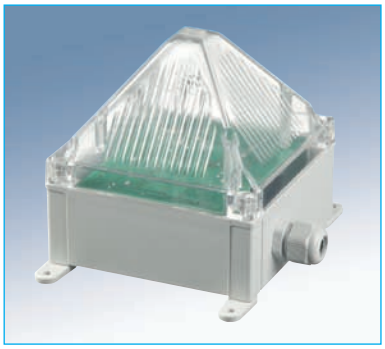
Continuous LED light with integrated function monitoring to ensure safety. 4 separate channels ensure uncompromising safety. If one channel fails, an alarm signal is generated.

PD 2100-LED-M 114

Loudspeaker PS 50B

High-performance loudspeaker with a sound level up to 125 dB (A) for excellent transmission of speech, music, and tones.

PS 50B 150



Quadro A-DMX

The successful flashing light for light art applications has been complemented with a new model, which can be completely controlled by means of a DMX-Bus system. Each individual light is therewith individually controllable.

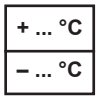
Quadro A-DMX 260

Marking of aviation obstacles

Pfannenberg offers a complete assortment of aviation obstacle marking lighting from 10 cd to 20,000 cd for both day and night identification. Further detailed information can be found in our special brochure, which can be requested by referencing the following order number:

Article number: 075000145

Pictograms

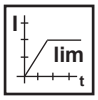


Operating temperature range. Highest and lowest temperature values ensured by the technical data.

Protection system specification according to DIN EN 60529. General information on the protection of electrical equipment against contact, foreign particles and water. Devices with IP 54 can be used outdoors.

Impact-proof housing. Protection system specification according to DIN EN 50102.

Activation input with opto-coupler 24 V DC / 2 mA.



Equipment with initial current limitation.

Optional flash rate (standard: 60 flashes/min.).

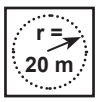
Protective cage made of rustproof metal. Active protection against contact and sabotage, plus operation under ‘tough‘ conditions.

External flash monitoring for visual alarms. The flash is detected and monitored via a fibre-optic cable. In the case of a malfunction, an alarm is given in the form of a ’normally closed function’ (floating contact).

Volume control. For the optimal adaptation of the signal to the surroundings and the avoidance of startled reactions.

Optional brightness, e.g. 3 Joules.

External tone selection. For controlling various types of tones in a device



Reception range of the signaling device, within which the signal is adequately perceived.

Synchronous operation of several signaling devices. Light pulses or tones are rendered in absolute synchronisation.

Noise level reduction by means of external switch.

Light sensor. Automatic adjustment to the ambient light.

Approvals and test symbols

Germanischer Lloyd sets standards in technology, quality and safety for shipping and industry. Germanischer Lloyd is additionally a leading certifying body in the fields of wind power, environmental protection, the oil and gas industry and building technology.

C UL US
LISTED

The Underwriters Laboratories test and register products in accordance with the requirements of the North American market. The approvals are valid for the USA and Canada.

VdS-Zulassung
VdS Schadenverhütung GmbH

The Verband der Sachversicherer (VdS) [= Association of Material Insurers] tests and certifies components for facilities dealing with damage prevention. The VdS guidelines contain requirements for components used for protection against fire and burglary.

GOST

GOST certification applies to products tested in accordance with the requirements and standards of the Russian Federation. The GOST standards cover over 20 industries.

Russian Maritime Register of Shipping (RS)

The Russian Maritime Register of Shipping sets the standards for technology, quality and safety for shipping and industry in the Russian Federation. It additionally functions as a certifying body, for example in the fields of defence, the oil and gas industry and building technology.

PTB

The ‘Physikalish-Technische Bundesanstalt’ (PTB) [= Federal Physical/Technical Institute] is a material testing and calibrating body. It is subdivided into several laboratories and, among other things, tests and approves technical equipment for potentially explosive areas. The existing CENELEC standards form the basis. The PTB is the authorised EU testing body for the Federal Republic of Germany.

Bundesamt für Wehrtechnik und Beschaffung

The ‘Bundesamt für Wehrtechnik und Beschaffung’ (BWB) [= Federal Office of Military Equipment and Procurement] administers and catalogues the technical equipment of the armed forces. Affiliated to it are technical defence authorities and arsenals, in which type testing is carried out in accordance with VG standards. These materials are listed in the SAK catalogue.

Products marked with the Ex test symbol and test number are approved for use in potentially explosive areas (further details from page 194 onward).

The AS-i (Actuator Sensor Interface) is an inexpensive, fast bus system for the transmission of data and energy that reduces cabling and saves on I/O cards and terminal strips. AS-Interface products conform to the EN 50295 and IEC 62026-2 specifications.

The ‘International Civil Aviation Organization’ sets standards for technology, quality and safety in international air traffic.
The ‚Allgemeine Verwaltungsvorschrift zur Kennzeichnung von Luftfahrthindernissen‘ (AVV) [= General Administrative Rules for the Identification of Aviation Obstacles] sets the standards for technology, quality and safety in air traffic in Germany.

Schweizerische Eidgenossenschaft

The Bundesamt für Verkehr (Federal Ministry of Transport) governs public transportation in Switzerland. It covers transport by rail and cable car, freight trains, buses and ships.

EN 54-3

The European standard for the approval of acoustic alarms in fire protection facilities.

EN 54-23

The European standard for the approval of visual alarms in fire protection facilities.

Protection system

IP protection system

The protection system for devices in accordance with DIN EN 60529 (DIN VDE 0470 IEC 60529) indicates suitability for various environmental conditions.

1st digit	Protection against foreign particles	2nd digit	Protection against water
0	no protection	0	no protection
1	large foreign matter (Ø from 50 mm)	1	vertically dripping water
2	medium-sized foreign matter (Ø from 12.5 mm, length up to 80 mm)	2	water dripping at an angle (up to 15°)
3	small foreign matter (Ø from 2.5 mm)	3	falling spray water up to 60° from the vertical
4	foreign matter in the form of grains (Ø from 1 mm)	4	spray water from all sides
5	dust deposits in non-damaging quantities	4k	spray water from all sides under increased pressure; applies only to road vehicles
6	no entry of dust	5	Water stream (jets) from any angle
		6	strong water stream (jets) (flooding)
		6k	strong water stream (jets) under increased pressure (flooding); applies only to road vehicles
		7	temporary immersion
		8	permanent immersion
		9k	high pressure water/steam cleaning; applies only to road vehicles

Comparison of NEMA and IEC protection systems – classification

The ‘National Electrical Manufacturers Association’ (NEMA) sets standards and norms in the USA.

NEMA protection system	Protection	IEC protection system
1	falling dirt	IP 10
2	dripping water and falling dirt	IP 11
3	wind-blown dust, rain and hail; no damage due to external ice formation	IP 54
3 R	rain and hail; no damage due to external ice formation	IP 14
3 S	wind-blown dust, rain and hail; also usable in the case of external ice formation	IP 54
4	wind-blown dust, rain, spray water and water streams; no damage due to external ice formation	IP 56
4 X	wind-blown dust, rain, spray water and water streams; no damage due to external ice formation, protection against corrosion	
5	dust, falling dirt, dripping non-corrosive fluids	IP 52
6	water streams, temporary immersion; no damage due to external ice formation	IP 67
6 P	water streams, longer periods of immersion	IP 67
12 and 12 K	swirling dust, falling dirt, dripping non-corrosive fluids	IP 52
13	dust, spray water, oil, non-corrosive fluids	IP 54

Please note: IP and NEMA codes are not directly, but rather only approximately, comparable

Life cycle – Maintenance-free

Life cycle

The life cycle of Pfannenberg signaling devices is defined as follows:

Xenon flashing lights

When the light emission from the flash tube has decreased by 30% after a certain number of flashes. The tube is still not defective, but has become darker (can only be measured with electronic measuring instruments). On account of the special Pfannenberg capacitors and flash tubes, as well as many years of experience in flashing light technology, Pfannenberg lights have a very long life cycle (light emission still 70% after up to 12 million flashes).

LED lights

LEDs have a very long life cycle of more than 50,000 hours. Like flash tubes, LEDs are not defective after reaching the end of their service life, but rather the light output is reduced by a certain proportion. Thanks to the careful dimensioning of the LED lights, taking into account all environmental influences, Pfannenberg lights attain a much longer life cycle.

Maintenance-free

We guarantee a very long, completely maintenance-free service life for sounders. This is due to the fact that no mechanically wearing parts are used.

Pfannenberg on the Internet

Make use of our large offering of online information. At **www.pfannenberg.com**, just click ‘Products’ in the menu bar. This will open a sub-menu on the left-hand side with all product categories. With a few clicks you can find all of the important information that you require. Our special service to you: the download area!

With a mouse click you can conveniently download data sheets or design drawings to your PC and print them out.

www.pfannenberg.com

Pfannenberg signaling technology protects people

The field of signaling technology is essentially made up of three product sectors. People are warned by purely visual alarms and, on the other hand, by purely acoustic alarms. The third sector, which is growing strong, is the combination of visual and acoustic signals.

This is the most reliable way of informing operators or users. Due to their extreme sturdiness and the associated durability and freedom from maintenance, Pfannenberg signaling devices are frequently found in extreme applications, whether it be in the toughest of environmental conditions or in demanding mounting locations.

Note: Like in other electronic devices, a greatly increased current can flow for a very short moment when flashing beacons switch on. Many devices featuring initial current limitation are available in the Pfannenberg range for special requirements; we will be pleased to help you select the right device.

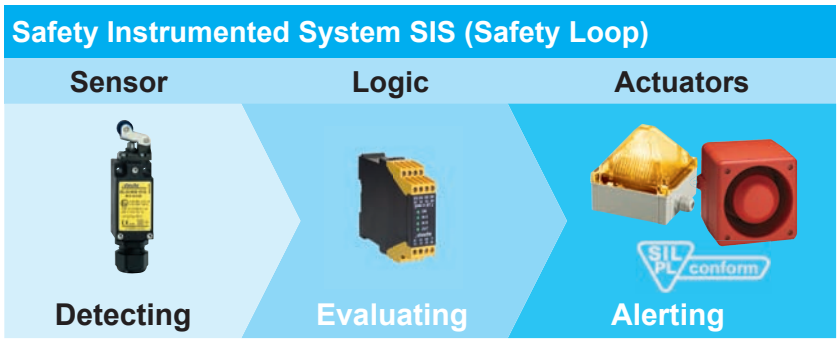
On the following pages you will find further valuable information on the optimum selection and use of Pfannenberg signaling devices for machine safety, building technology, obstruction lighting, automation technology, fire alarms and much more.

SIL/PL-Compliant Signaling Technology

With the new Machinery Directive, which will apply Europe-wide from 2010 onwards, there will be a change in the requirements for machine safety. More than ever before, certification and market opportunities depend on safety-related products. The new SIL/PL-conform alarm devices from Pfannenberg give machine and plant manufacturers more planning safety; the acceptance process is simplified and accelerated.

The goal of the new standards is risk minimization in the operation of machines to avoid harm to persons. Naturally, the availability of the machine and plant is also increased as a result, which on the other hand has a positive effect on the TCO-evaluation, with immediate effect, probability considerations will henceforth also play a role in the determination of component safety. **SIL** (Safety Integrity Level) and **PL** (Performance Level) have become central terms in the categorisation of risks and safety.

In many cases, purely constructional measures on the machines don‘t go far enough to minimize risk. **In order to keep the existing residual risk of a machine or a plant low, reliable alarms are required, which draw attention to hazards through visual or acoustic warning signals.** For example, as a start-up warning or in muting operation, while protective functions have been disabled. Alerting of personnel in case of gas or chemical leaks requires 100% operational reliability of the signaling devices.



Causes of work accidents at machines

The statistics on the cause of work accidents show a clear picture: Human error is responsible for half of all accidents. These have to be reduced further by means of secure alarm raising.

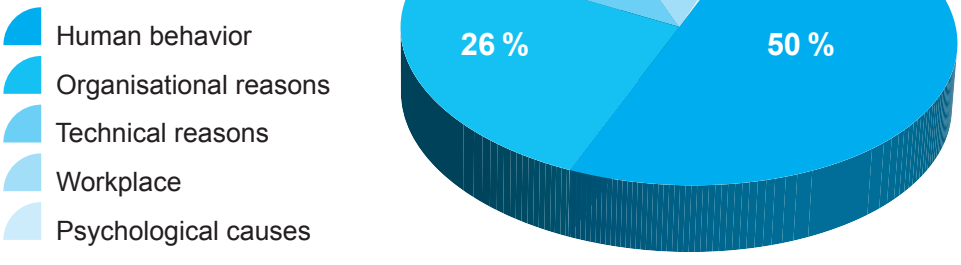


Diagram from safety-network.de

The New Machinery Directive 2006/42/EC

The transition period for the new Machinery Directive 2006/42/EC ends on 1 January 2010. It has already been signed on 17 May 2006 and published on 9 June 2006 in the official gazette of the European Union (Abl. L 157).

Two new safety standards are coming into effect with the Machinery Directive. Firstly, DIN EN ISO 13849-1, which replaces the standard DIN EN 954-1 of the old Machinery Directive 98/37/EG. The other is DIN EN 62061.

The goal of these new safety standards is risk minimization in the operation of machines. Therefore, the requirements with regard to certification of products for manufacturers of plants and machines were made more stringent. Now, probability considerations are also taken as inputs in determining the safety of components.

Planning security and market opportunities of manufacturers of machines and plants are thus supported by a safety-related visual and acoustic alarm system from Pfannenberg.

SIL/PL Gradation

Allocation of the level after a risk analysis. What is calculated here is the probability of failure of the system.

Average probability of a dangerous failure per hour.

PFH_D	Performance Level DIN EN ISO 13849-1	Safety Integrity Level DIN EN 62061
10^{-4}	PL a	---
10^{-5}	PL b	SIL 1
$3 \cdot 10^{-5}$	PL c	
10^{-6}	PL d	SIL 2
10^{-7}	PL e	SIL 3
10^{-8}	---	SIL 4
10^{-9}		

Safety from the beginning: SIL/PL-conform signaling by Pfannenberg

As with all chains, the safety chain is only as strong as its weakest link!

This integral view of safety functions is the foundation of the respective norms from process and systems engineering, as well as mechanical engineering.

Visual and audible warning devices are, as the definition clearly states, devices, which warn people about acute dangers. Therefore, these need to be implemented into safety chains of many applications. This is the link of the change that reaches people!

The integration of visual and audible warning devices in the safety chain is required by norm in many applications. For example, machines that are hard to view as a whole must be equipped with start-up alarms according to SIL 1 and respectively, PLc. Machines are defined as hard to view when they have a length of 7m or more.

Further applications for SIL-capable signaling devices are, amongst others
- muting indication (i.e. during safety function bypassed by the safety-related controller)
- excess rotation speed warning
- machine stop delay warning

Applications in process and plant safety (Control Technology/PCS), e.g. in case of
- leaks / gas warning
- high-pressure / overfilling

Functional safety in process automation normally based on the statutory order of hazardous incidents. The statutory order refers to the design of safety-relevant devices in EN 61508 and EN 61511 respectively. They define the safety steps which describe the measures to control risks of equipment.

Among others, the VDMA (German Association of Machinery Manufacturers) and the ZVEI (German Electrical and Electronics Industry Association) inform intensively about the implementation of safety standards.

SIL compliant signaling devices by Pfannenberg can be found on pages 116, 118 and 146.

Visual signaling devices by Pfannenberg

Our comprehensive range includes:
- xenon flashing lights
- halogen blinking and continuous lights
- blinking and continuous lights with filament lamps
- LED multifunction lights
- rotating mirror lights
- panel mount blinking and continuous indicators
- combination lights
- traffic light lights
- signal towers
- visual signaling devices for the Ex area
- SIL conform visual signaling devices

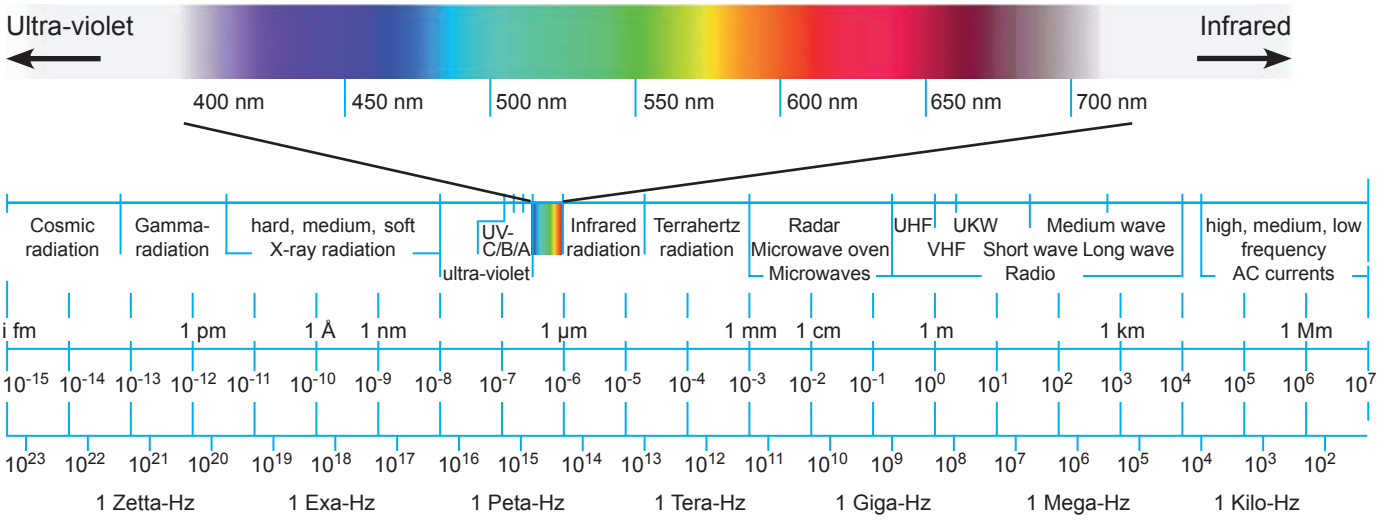
A large proportion of our signaling devices are provided with the following features, which make their use in special applications possible, such as in safety-relevant applications:
- synchronisation of several lights
- redundant structure
- integrated function monitoring
- limitation of initial current

Basic principles of optics

Light moves as electromagnetic wave, which are distinguished from one another by their wavelength. The wavelengths of that part of the electromagnetic spectrum, which are visible to the human eye lie between 380 nm and 780 nm and are called the visible spectrum.

The visible spectrum itself is in turn made up of different electromagnetic waves that generate the perception of different colours in our eyes. The limits of the visible spectrum are represented by infrared and ultra-violet light.

The spectrum visible to the human eye (light)



Types of light generation

There are several ways of generating light in signaling technology.

Filament lamp

In the filament lamp, an electric conductor (filament) is heated up by an electric current to the point where it glows and is perceived as a source of light. In order to protect the tungsten filament against the oxygen in the air and to prolong its service life, it is shielded by a vacuum in a glass bulb. The power of a filament lamp is expressed in Watts and is calculated as follows:

Power (P) = Voltage (U) • Current (I)

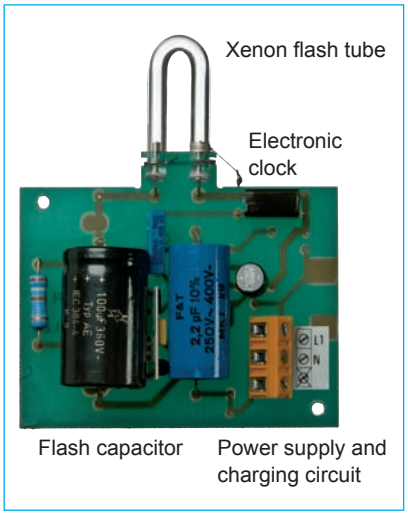
Although this type of light generation is still being used, it is being displaced more and more in the market due to its very limited service life and poor light production.

Halogen lamp

The glass bulb of a halogen lamp is filled with halogen bromine, which virtually doubles the service life of this lamp compared to the ‚normal' filament lamp, as well as increases the light production and allows the bulb to be operated at higher temperatures. The light output of a halogen lamp remains virtually constant throughout its service life.

LED Lamp

A light-emitting diode is an electronic semiconductor. If current flows through the diode in the conducting direction, it emits light. The light energy is released in the form of photons. Light diodes are not temperature radiators. They are insensitive to impacts and vibration and consume little current. The service life of an LED is described as the time period over which the light yield decreases to half of its initial value and is usually more than 50,000 hours. Since LEDs are available in all normal colours, the use of colour filters is not necessary. LED lamps are available in exchangeable versions with a fitting or as permanently installed LED arrays.



Gas discharge lamps

The energy stored in the capacitor discharges in the gas-filled glass tube and forms a light arc. Xenon gas is predominantly used in signal technology. The flash energy per individual flash is calculated according to the following equation:

$$E = 1/2 \cdot C \cdot U^2$$

E = Flash energy (Joules)
C = Capacity of flash capacitor (Farads)
U = Charging voltage (Volts)

The electrode material is subjected to a very large load during the discharge. Although very hard metals such as tungsten are used for the electrode, a certain amount of the metal is removed depending on the load and is deposited as a dark film on the inside of the flash tube. The advantage of this technology is the high signaling effect due to the concentrated light pulse.

The most important light variables in signaling technology are:

- light intensity
- luminous flux
- illumination intensity

Light intensity is measured in Candela [cd].
The light intensity is the radiation power of a light source per dihedral angle, weighted with the spectral sensitivity of the eye. The directional dependence of the luminous flux is represented. This is particularly important in signal technology, since it is not about illuminating a room, but rather about the directed transmission of light to the observer.

light intensity [cd] = luminous flux [lm] / dihedral angle [sr]

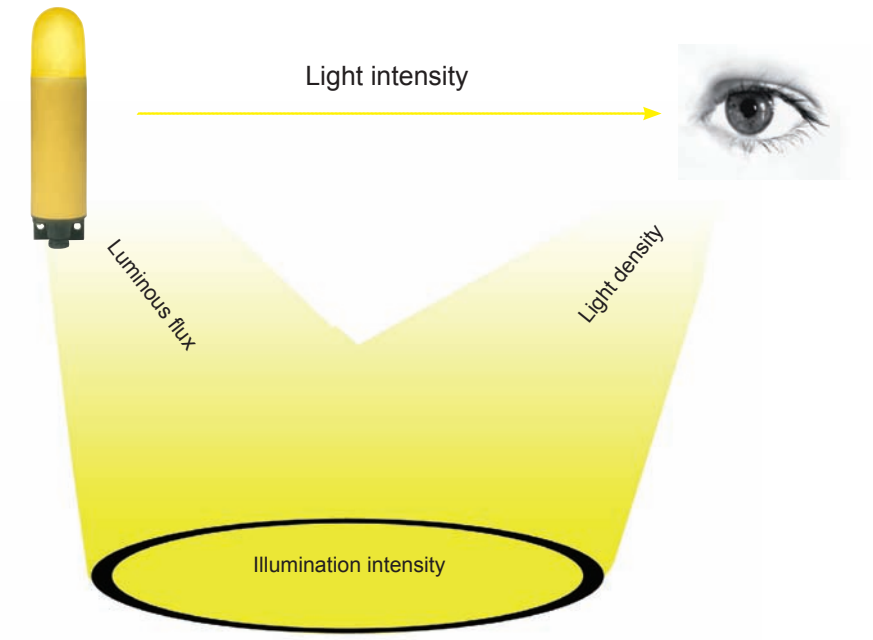
For example, the light intensity of a household candle is around 1 cd.

Luminous flux Φ is expressed in Lumen [lm].
The luminous flux is a measure of the entire visible radiation that is radiated in all directions from a source of light and, as opposed to light intensity, is not directionally dependent.

Illumination intensity is expressed in Lux [lx].
The illumination intensity describes the amount of the luminous flux that strikes a given area. It is the quotient of luminous flux and area.

illumination intensity [lx] = luminous flux [lm] / area A (m^2)

The illumination intensity is inversely proportional to the square of the distance. A doubling of the distance therefore results in the illumination intensity being reduced to one quarter.



Types of beacon

Visual signaling takes place by means of colour, light intensity and lighting duration. Four types of beacons with different signaling effects are essentially offered in signal technology;

Continuous lights – lowest signaling effect

The light intensity of the continuous light changes with the power of the lamp and the use of different colours and types of lenses. This type of beacon is normally used to display a status and serves to a lesser extent as a means of an alarm.

Blinking lights – increased signaling effect

The observer's attention is increased by means of switching the lamp on and off with a blinking frequency of normally 1 to 2 Hz. This type of beacon is used, for example, as a warning signal.

Rotating mirror lights – high signaling effect

A rotating light cone is generated by means of diverting the light using the internal rotating mirror. Higher attention is gained at faster rotary speeds. Smooth lenses are used for these beacons in order to exploit the light effect to its fullest and to avoid scattering effects. As opposed to flashing beacons, the dazzling effect is reduced with rotating mirror beacons.

Flashing lights – highest signaling effect

The charged capacitor discharges its energy into the gas-filled glass tube and forms a light arc. This very short and very intensive light effect generates the highest signal attention. Among other things, this type of beacon is used as a top priority alarm.

Meaning of the colours in visual signaling

The signal colours red, amber, yellow, green, blue and clear are mainly used in signal technology.
Different lamp colours convey different messages to the observer in accordance with EN 60078, EN 981 and DIN VDE 0199.

Colour	Process status (as per IEC 73)	Process data (nach IEC 73)	Meaning / message category	Purpose	User reaction (as per DIN VDE 0199)	Example application
red	emergency	limit value exceeded	• danger • abnormal status • act immediately • urgent rescue or protection measure	• emergency • alarm • stop • prohibited • failure	immediate reaction	• stop sign • prohibiting sign • emergency stop devices
yellow / amber	abnormal	warning limit reached	• caution • be prepared • act if necessary	• attention required • change of status • intervention	monitor and/or intervene	indication of dangers, such as: fire, explosion, radiation, chemical influences, obstructions etc.
green	normal	within normal range	• everything ok • normal status • safe • no danger • danger is pastr • first aid	• return to normal process • continue	no action required	• identification of escape routes and emergency exits • first aid and rescue stations
blue	specified meaning	specified meaning	• display of necessity for specified action • command sign • notice • machine-specific	• action • protection • extraordinary attention • safety-relevant regulation or precaution with priority	specified action	• obligation to wear personal protective equipment • location of a telephone • etc.
white / clear	neutral		not assigned any particular meaning			
other	neutral					

Light permeability of coloured lenses

Depending on the respective light source and the various lens colours, the following percentage of light typically penetrates through:

Colour	Filament lamp	Halogen lamp	Xenon lamp
clear	100%	100%	100%
yellow	95%	94%	93%
amber	70%	70%	70%
red	17%	27%	23%
green	12%	15%	25%
blue	15%	20%	24%

This reduction in the light intensity must be taken into consideration when selecting the right signaling device!

Due to the narrow spectrum of LED light sources, only a small reduction in the light is to be expected if the colour of the lens corresponds to the colour of the LED.

Planning visual signaling

EN 54-23 for Europe and NFPA 72 for the USA offer a tangible basis for the design of visual signaling:

The table below is based on the following calculation equation and can also be used for other room sizes or distances:

$$d = \sqrt{I_{Eff} / E}$$

d is the distance between the observer and the alarm device in metres [m]
I_{eff} is the effective light intensity in Candela [cd]
E is the illumination intensity in Lux [lx]

The illumination intensity E must not fall below 0.4 lx at any place within the defined signal reception area.

Examples of the signaling devices to be used, depending on the room size

maximum room size (m x m)	minimum light intensity (effective intensity [cd])		
	1 light/room	2 lights/room	3 lights/room (synchronised)
6 x 6	15	not permitted	not permitted
12 x 12	60	30	15
18 x 18	135	95	30
24 x 24	240	135	60

Due to the complexity when considering visual signaling, we recommend checking the efficiency of the alarm on-site by using a representative group of people. In doing so, a ‘worst case’ scenario must always be performed based on the environmental conditions.

Perception of the brightness of light for warnings and alarms

A few tips to assist you in selecting the right visual signaling devices:
Doubling the distance reduces the light power by 75% to 1/4 of its strength. If the distance is quadrupled, the light power is reduced to 1/16.
Visual alarms are ideal when there is a direct (unobstructed) line of sight between the beacon and the observer.
Reflected light can be perceived inadequately.

In an alarm area (dangerous condition, immediate action), the beacon will also be perceived without direct visual contact provided that **the light intensity of the alarm device is 10 times brighter than the ambient light.**
In a warning area (critical condition, intervene), the signal will be perceived adequately via direct visual contact or reflection provided that **the light intensity of the warning device is 5 times brighter than the ambient light.**

Optical and electronic monitoring

Monitoring of visual alarm devices plays a very important role, especially in the case of safety-relevant applications. Monitoring is offered in two different technical versions.

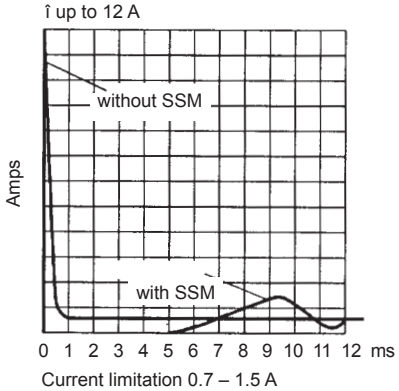
One method is to monitor the correct function of a flashing light by opto-electronic means. The light flash from the flashing light is fed via an optical fibre to a phototransistor, which converts the optical impulse to an electrical impulse. The optical fibre is located in the housing of the flashing light and directed downwards, which excludes false triggering due to the effect of daylight. Additionally, any flashing light with a 1 Hz flash rate can be retrofitted with an external flash monitor. The downstream circuitry evaluates the pulse and its regular repetition.

As soon as the operating voltage is applied, the evaluation relay closes the error contact. If the operating voltage fails, the relay opens immediately. This method of operation represents the fail-safe normally-closed circuit function and guarantees an alarm even if the operating voltage fails. On the other hand, the error message contact serves the continuative alarming, e.g. in an error message line, or the direct blocking of further machine processes. It is possible to relay the error alarm as a normally-closed function. The second method of electronic monitoring is to integrate a flash monitor in the processor of the flashing beacon. In this case the regular charging and discharging of the flashing beacon capacitor is monitored. If one status is not present, an error message is relayed via a floating, normally-closed contact.

Inrush current limitation

Visual alarm devices can draw a greatly increased initial current for a very short period of time. This is due to the circuit-related input capacity. This can lead an overload of the relay contacts at the moment when power is turned on and to the premature triggering of overcurrent circuit breakers. For special requirements, Pfannenberg can supply you with visual alarm devices that are factory fitted with an initial current limiter. Pfannenberg also offers external current limiting modules, so-called soft-start modules (SSM), for retrofitting or supplementing visual signaling devices.

Example of the current curve with and without a soft-start module



Current limitation 0.7 – 1.5 A

Audible signaling devices by Pfannenberg

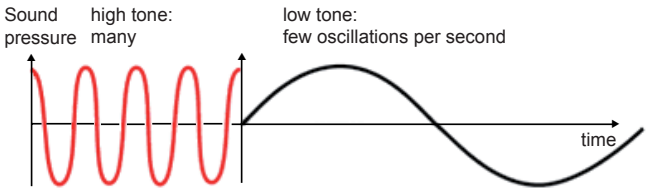
Our comprehensive range includes:
- electronic multi-tone sounders
- electronic multi-tone sirens and horns
- programmable voice sounders (also in synchronised versions)
- loudspeakers
- combined signaling devices
- buzzers and panel mounted buzzers
- acoustic signaling devices for the Ex area
- SIL conform audible signaling devices

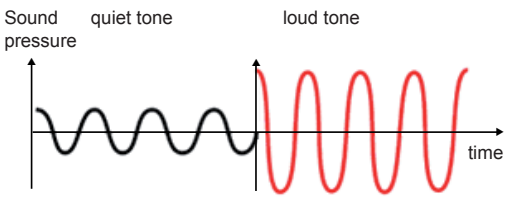
Basic principles of acoustics

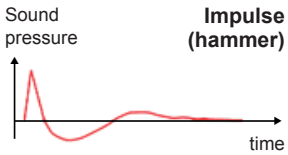
A source of sound causes the air to oscillate, resulting in alternating compression and relaxation of the air. This pressure wave propagates itself in the form of a wave and causes the eardrum to oscillate, triggering the process of hearing.
The sound pressure of oscillation is measured in microbars (µbar). The number of oscillations per second is called the frequency. Its unit of measurement is Hertz (Hz).

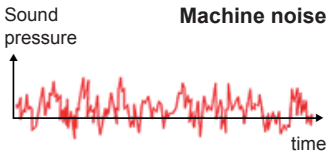
Different types of sound

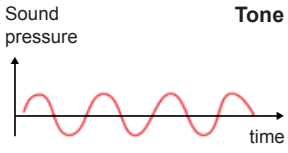
- a harmonic oscillation produces a tone
- a sound represents a mixture of tones
- noise is the name given to a mixture of numerous tones, rapidly changing frequencies and rapidly changing sound volumes
- a bang is produced by a sudden beginning of a mechanical oscillation of very short duration and great loudness

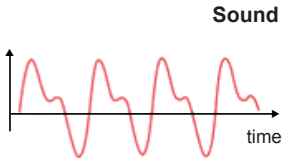












Properties of sound waves:
- the number of vibrations per unit of time = frequency
- range of the oscillation = amplitude

A large number of audio samples of different tones are available at **www.pfannenberg.com/service**.

Frequency range and sound pressure level

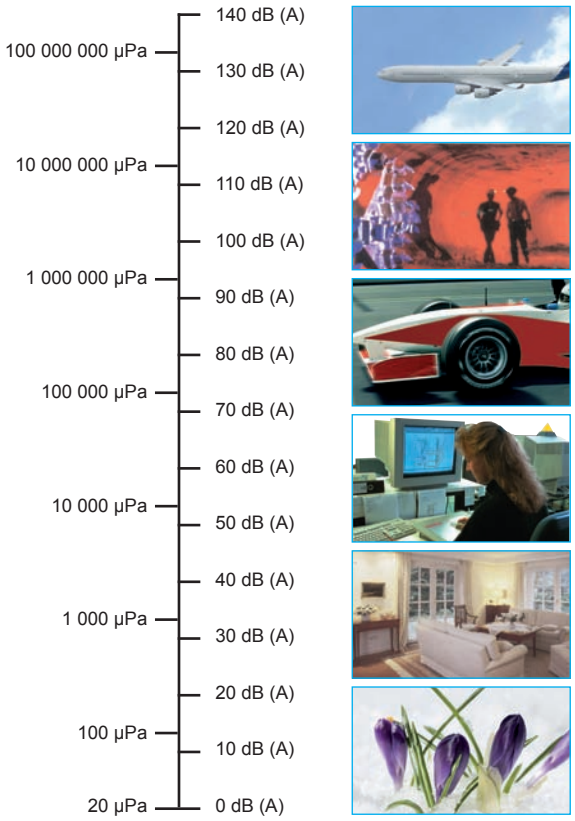
The range of human hearing is from 20 to 20,000 Hz. Deeper sounds (infrasound) and higher sounds (ultrasound) cannot be heard. The human ear is most sensitive to sound between 500 Hz and 3 kHz. With regard to volume, a sound pressure of 2/10,000 = 0.0002 µbar is just barely audible.

This limit value is called ‘hearing threshold pressure’.
A sound pressure of 200 µbar and above causes pain.
This is known as the pain threshold.

In order to make the hearing range more manageable in terms of numbers, the ratio of the actual measured sound pressure to the hearing threshold pressure is converted to a logarithm. This logarithmic relationship is known as the sound pressure level and is expressed in decibels (dB).

The equation is:

$$Lp = 20 \times \log \frac{\text{measured sound pressure in µbar}}{\text{hearing threshold pressure in µbar}} \text{ dB}$$



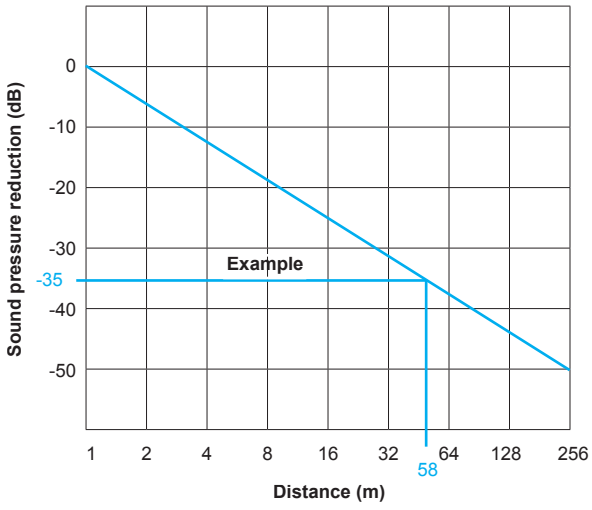
Basic principles of acoustic audibility

The loudness of a sounder is expressed in dB (A) and measured at a distance of 1 metre (USA 10 feet). The smallest increase in the sound level that the human ear can detect is 3 dB. An increase of 6 dB is equivalent to a doubling of the sound pressure. An increase of around 10 dB is perceived as being twice as loud.

Lower frequencies (at the same sound level) are perceived to be quieter. This is all the more pronounced at lower sound levels.
Alarm signals can be better heard when the difference between the frequency of the ambient noise and that of the sounder is greater. Interfering factors are, for example, damping, fog, obstructions, wind speed and direction, rain and air humidity.

A doubling of the distance to the source of the sound is equivalent to a reduction in the sound level of around 6 dB, e.g. there is a sound pressure level reduction of 35 dB at a distance of 58 m.

Reduction in the sound pressure level in relation to the distance between the sounder and the listener’s ear



Types of sound generation

Sound capsule – electromagnetic sound generation

In the sound capsule, anchors connected to the membrane are pre-magnetised by a permanent magnet. When a voltage is applied, the membrane is stimulated to oscillate, generating sound waves that are perceived as an audible tone. Despite its relatively simple and compact structure, the sound capsule has a relatively high efficiency level. For that reason this technology is often used in appliances with small dimensions.

Loudspeaker – electro-dynamic sound generation

The electro-dynamic loudspeaker consists of a membrane connected to a central oscillating coil. This coil is located within the magnetic field of a permanent magnet. If the voltage of the signal to be transmitted is applied to this coil, an alternating electromagnetic field is generated that causes the membrane to move and, hence, to generate sound pressure.
Various membranes (smaller or larger, softer or harder) and different coils and permanent magnets are used, depending on the frequency range. Electrodynamic loudspeakers are ideally suited for generating high sound pressure.

Horn loudspeaker – electro-dynamic sound generation

The membrane in a horn loudspeaker acts on a very small space – the pressure chamber. The velocity of the air particles is increased in this pressure chamber due to its small cross-sectional size. This principle increases efficiency considerably in comparison to other designs. Due to the high sound pressure, which can be attained and the high frequency range that can be transmitted, horn loudspeakers are ideal for the transmission of sound in large areas. Horn loudspeakers are usually insensitive to weather and are very robust.

Piezo-electric effect

At the heart of a piezo loudspeaker is a crystal. When a voltage is applied to this crystal, it deforms as a result and is thus set in motion. Piezo loudspeakers essentially transmit only higher frequency ranges and are not suitable for penetrating through obstructions such as walls. The advantage of these systems lies in their high impedance and, therefore, low power consumption.

Planning audible signaling

In order to determine the acoustic alarm, it is important to know the 'starting value' (existing ambient noise level) and the 'target value' to be calculated.
According to the EN ISO 7731 standard (replacement for EN 457), a sounder should have a minimum sound level of 65 dB (A).

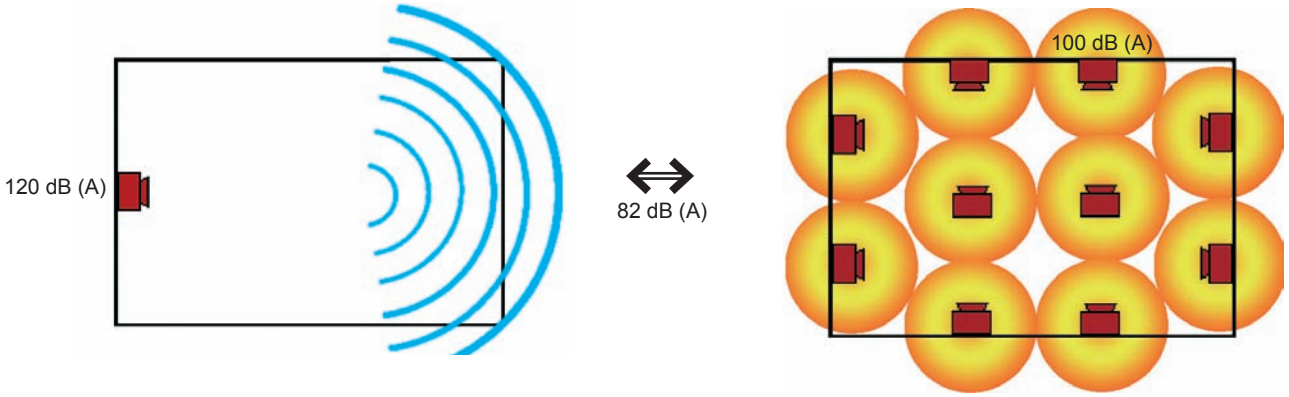
Standard	Minimum difference to the ambient noise level	Application
EN ISO 7731	at least 15 dB (A)	Public areas and workplaces
DIN VDE 0833 EN 60849	at least 10 dB (A)	Fire alarm (in fire alarm systems) Evacuation signal (in alarm systems)

From a required sound level of 110 dB (A) upwards, it is recommended to use visual signaling devices in addition to acoustic alarms.

Example calculation

There are various possibilities of achieving 82 dB (A) for an area of 50 x 30 m:

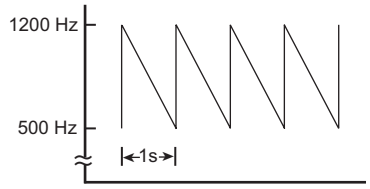
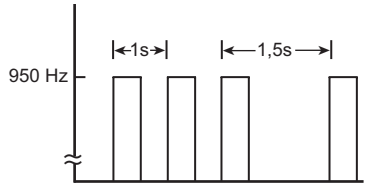
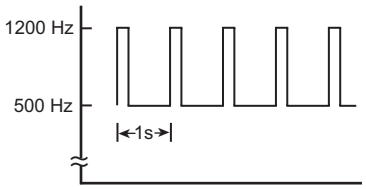
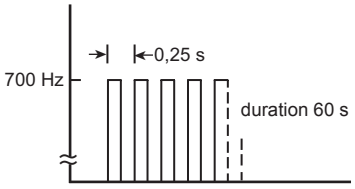
1 x 120 dB (A) or 10 x 100 dB (A) sounders are required.
Sound transmission area of a 100 dB (A) sounder in order to achieve 82 dB (A) = 200 m^2
Sound transmission area of a 120 dB (A) sounder in order to achieve 82 dB (A) = 20,000 m^2



The type of signaling (number of sounders) used is essentially determined by the geometric properties of the room, the shape of any obstructions and the maximum permissible sound pressure level of the sounder. When using a sounder with, for example, 120 dB (A), it must be ensured that people cannot be in the near vicinity of the sounder. If this is not possible, a divided installation should to be chosen.

The meaning of different tones

Pfannenberg sounders can generate up to 45 different tones. All tones can selected individually and must be adapted to suit the respective environmental conditions. Therefore, some of the pre-installed tones have a pre-defined meaning.

Standard		
DIN 33404	Acoustic alarm signal for workplaces in cases of fire, gas, explosion or radiation danger	
ISO 8201	Emergency evacuation signal	
NFS 32-001	Fire alarm in France	
SS 031711	Emergency signal in Sweden	

A large number of audio samples of different tones are available at **www.pfannenberg.com/service**.

Monitoring: standby current

There are two ways of monitoring the standby current electronically using a terminal resistor in order to monitor acoustic signaling devices:

- measurement of the current below the lower nominal voltage limit of the device, or
- measurement of the standby current by reversing the supply voltage poles

Inrush current limitation

Acoustic alarm devices can draw a strongly increased initial current for a very short period of time. This is caused by the circuit-related input capacity. For special requirements, acoustic alarm devices are available with an initial current limiter.

Pfannenberg on the Internet

Make use of our large quantity of online information. At **www.pfannenberg.com**, just click ‘Service’ in the menu bar. This will open a sub-menu on the left-hand side with various categories. Important information with just a few clicks away.

Our special service to you: the audio samples! Click here and you can conveniently listen to various tones or download them to your PC.

www.pfannenberg.com

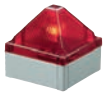
A flash says more than a thousand words!

Visual signaling devices ensure safety at first sight

Regardless of whether you use flashing lights or continuous lights – Pfannenberg's visual signaling devices are ‚eye-catchers' that can save lives in every respect. They ensure any process status can be displayed in a timely manner. Thanks to their unmistakable demand for action, they offer the best prerequisites for running trouble-free production processes.

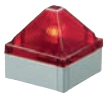
Benefit from top quality standards and a unique complete range.

All visual signaling devices at a glance

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Flash energy	Protection system	Dimensions (HxWxD) mm	Approvals / standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	Flashing Lights														
	PMF 2030						30 Joules	IP 55	direct mounting 185 x Ø 177		●				36
	PMF 2020						7 Joules			●	●			●	38
	PMF 2015						7 Joules				●				
	ABL / ABS						15 Joules	IP 54	without bracket 242 x Ø 80	●	●			●	40
	P 400 STR						15 Joules	IP 65	220 x Ø 140		○				42
	P 400 STS						15 Joules				○				
	Quadro F12						13 Joules	IP 66 IP 67 IK 08	130 x 130 x 130		●				44
	Quadro S						13 Joules				●				
	PB 2010						10 Joules	IP 55	128 x 166.2 x 111.2	●	●			●	46
	PMB 2010						5 Joules			●	●			●	48
	PB 2005						5 Joules			●	●			●	50
	PMB 010						10 Joules	IP 67	230.4 x 170.6						52
	PMB 005						5 Joules								
	WBL / WBS						5 Joules	IP 54	200 x Ø 54	●	●			●	54
	WBL-PX						5 Joules	IP 54	200 x Ø 54						
	WBLR						5 Joules	IP 65	144 x 120 x 85	●	●		○	●	56
	WBSR									●	●		●	●	
	P 300 STR						5 Joules	IP 65	150 x Ø 100		○				58
	P 300 STS						5 Joules				○				
	P 300 STF						5 Joules				○				
	PL 105						5 Joules	IP 56	83 x 86 x 86		●	●			60
	KBL						5 Joules	IP 54	190 x Ø 80		●			●	62
	DWBL / DWBS						2,5 Joules	IP 54	200 x Ø 54	●	●			●	64
	P 100 STR						1 Joule	IP 65	65.5 x Ø 60		○				66
	P 200 STR						1 Joule	IP 65	80 x Ø 60		○				66

[1] with a clear lens

● available
○ in preparation

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Light power	Protection system	Dimensions (HxWxD) mm	Approvals / standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	Blinking Lights														
	P 400 FLF						40 W	IP 65	220 x Ø 140		○				68
	P 400 FLH						35 / 40 W				○				
	P 300 FLF						25 W	IP 65	150 x Ø 100		○				70
	P 300 FLH						20 / 25 W				○				
	P 200 FLF						5 W	IP 65	80 x Ø 60		○				72
	P 100 FLF						5 W	IP 65	65.5 x Ø 60		○				72
	LED Lights														
	PMF-LED Flex						30 cd	IP 55	direct mounting 185 x Ø 177		●				74
	P 400 LDA						30 cd	IP 65	220 x Ø 140		○				76
	P 300 LDA						20 cd	IP 65	150 x Ø 100		○				76
	Quadro-LED Flex						9 cd	IP 66 IK 08	130 x 130 x 130		●				78
	PD 2100-LED						5 cd	IP 55	128 x 166.2 x 111.2		●				80
	PMBL1						5 cd	IP 67	230.4 x 170.6						82
	PL 105-LED						5 cd	IP 56	83 x 86 x 86		●				84
	P 200 LDA						5 cd	IP 65	80 x Ø 60		○				86
	P 100 LDA						5 cd	IP 65	65.5 x Ø 60		○				86
	Quadro-LED-TL						80 cd	IP 66 IK 08	130 x 130 x 396						88

[1] with a clear lens

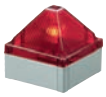
● available
○ in preparation

All visual signaling devices at a glance

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Light power / light intensity	Protection system	Dimensions (HxWxD) mm	Approvals / standards					Page
		2,5	5	10	25	50				GL	GOST	UL	VdS	RS	
	LED Lights														
	P 450 TLA						60 cd	IP 65	177 x Ø 140		○				90
	P 350 TLA						45 cd	IP 65	140 x Ø 100		○				90
	P 22 D						–	IP 65	52 x Ø 29						92
	P 22 DFS						–	IP 65	52 x Ø 29						92
	Continuous Lights														
	P 400 SLF						40 W	IP 65	220 x Ø140		○				94
	P 400 SLH						35 / 40 W				○				
	P 300 SLF						15 W	IP 65	150 x Ø 100		○				96
	P 300 SLH						20 / 25 W				○				
	KDL						25 W	IP 55	190 x Ø 80		●				98
	PD 2100						15 W	IP 55	128 x 166.2 x 111.2		●				98
	P 200 SLF						5 W	IP 65	80 x Ø 60		○				100
	P 100 SLF						5 W	IP 65	65.5 x Ø 60		○				100
	P 450 TSB						25 W	IP 65	177 x Ø 140		○				102
	P 450 TDB						2 x 15 W				○				
	P 350 TSB						15 W	IP 65	140 x Ø 100		○				102
	Rotating Mirror Lights														
	P 400 RTH						35 / 40 W	IP 65	220 x Ø 140		○				104
	P 300 RTH						20 / 25 W	IP 65	150 x Ø 100		○				104

[1] with a clear lens

● available
○ in preparation

	Type	Maximum signal reception range as per EN 54-23 in metres (m) [1]					Flash energy / light intensity	Protection system	Dimensions (HxWxD) mm	Approvals / standards					Page
		2.5	5	10	25	50				GL	GOST	UL	VdS	RS	
	Function-monitored Lights														
	**Quadro S-M-Flex**						13 Joules	IP 66 IP 67 IK 08	130 x 130 x 130		●				106
	**WBL-M / WBS-M**						5 Joules	IP 54	242 x Ø 80	●	●			●	108
	**PMF 2015-M**						7 Joules	IP 55	direct mounting 185 x Ø 177		●				110
	**POL 32-M**						32 cd	IP 68	240 x Ø 114						112
	POL 10-M						10 cd								
	POL 10-M-R						10 cd								
	POL 10-M-RA						10 cd								
	**PD 2100-M-AS-i (LED)**						5 cd	IP 55	128 x 166.2 x 111.2		●				114
	PD 2100-LED-M						5 cd	IP 55	128 x 166.2 x 111.2		●				114
	Safety-related Lights														
	**Quadro F12-SIL**						10 Joules	IP 66 IP 67 IK 08	130 x 130 x 130		●				116
	**PMF 2015-SIL**						10 Joules	IP 55	direct mounting 185 x Ø 177		●				118

[1] with a clear lens

● available
○ in preparation

Further information can be found on the Internet:
www.pfannenberg.com · **www.pfannenberg-spareparts.com**
Keep up to date. Subscribe to our newsletter now:
newsletter.pfannenberg.com

All-round flashing lights 30 Joules
PMF 2030

- secure 360° alarm for large distances (indoors or outdoors)
- extremely reliable and durable due to the use of state-of-the-art electronic components – no replacement of mechanical or electrical wearing parts necessary
- reliable performance even under the toughest working and production conditions, e.g. possible voltage fluctuations, high ambient temperatures up to + 55 °C, high relative humidity up to 90%
- mounting-friendly; large variety of mounting methods
- bracket-mounting using solid stainless steel bracket or direct mounting with enclosed flat seal
- maximum flash energy 30 Joules
- good light bundling is achieved in the horizontal plane thanks to the lens in the form of a fresnel lens and the special xenon flash tube
- very good perceptibility over great distances; low power consumption

Range as per EN 54

Protection system

Operating temperature

Electrical data		PMF 2030			
Rated voltage		230 V AC			
Rated frequency		50 Hz / 60 Hz			
Operating range		195 V – 253 V			
Nominal current consumption	at 30 J	1 Hz: 450 mA	0.75 Hz: 380 mA	0.5 Hz: 310 mA	0.1 Hz: 150 mA
	at 20 J	1 Hz: 400 mA	0.75 Hz: 340 mA	0.5 Hz: 290 mA	0.1 Hz: 140 mA

Mechanical data		PMF 2030
Light source		xenon flash tube
Flash rate		1 Hz = 60 flashes/min., see flash frequency table
Flash energy		max. 30 Joules, switchable to 20 Joules
Light intensity (DIN 5037)	clear lens	1500 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
Beam angle	vertical	approx. 16°
	horizontal	360°
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)
Cable entry for bracket mounting		M20 x 1.5
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with cable end sleeves
Weight	bracket mounting	1.25 kg
	direct mounting	0.75 kg

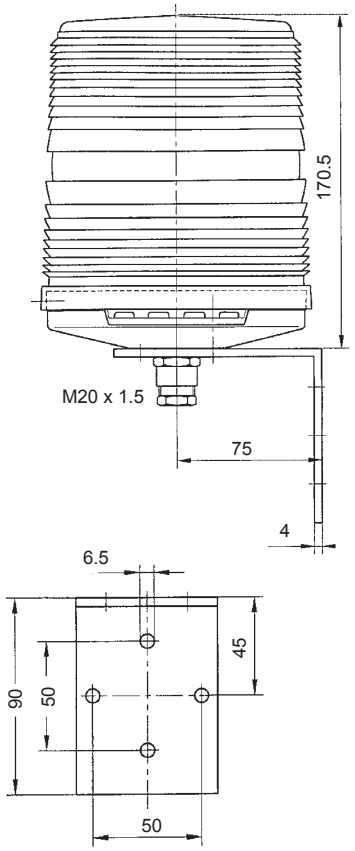
Flash frequencies

S1				Flash energy	Flash frequency
1	2	3	4		
OFF	OFF	OFF	OFF	30 Joules	1 Hz
ON	OFF	OFF	OFF		0.75 Hz
OFF	ON	OFF	OFF		0.5 Hz
ON	ON	OFF	OFF		0.1 Hz

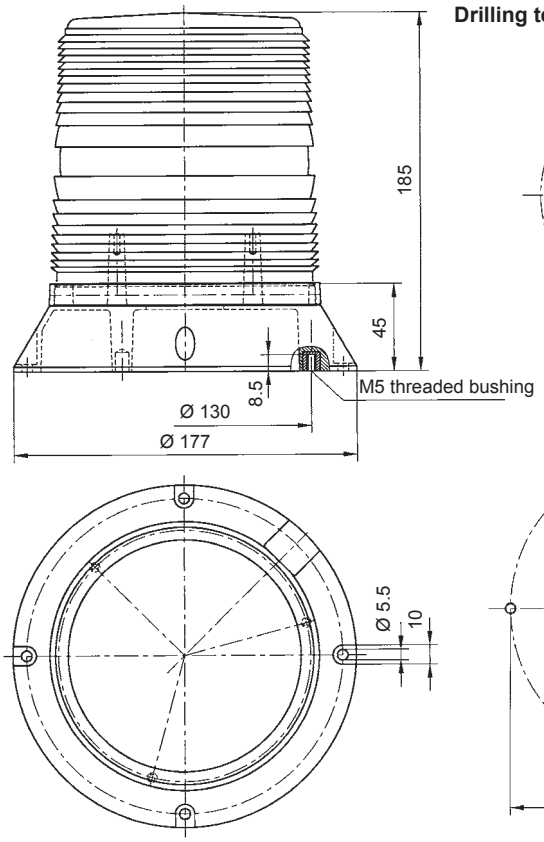
S1				Flash energy	Flash frequency
1	2	3	4		
OFF	OFF	ON	OFF	20 Joules	1 Hz
ON	OFF	ON	OFF		0.75 Hz
OFF	ON	ON	OFF		0.5 Hz
ON	ON	ON	OFF		0.1 Hz

Dimensions

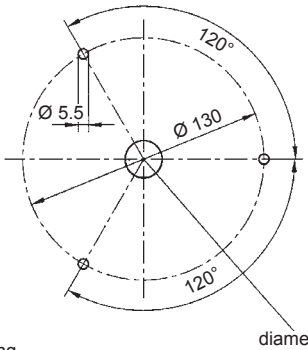
Bracket mounting



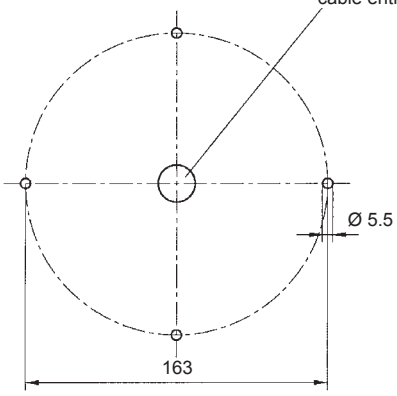
Direct mounting



Drilling template 1 (for M5 threaded bushing)



Drilling template 2



Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

Ordering details

Article numbers		PMF 2030 direct mounting	PMF 2030 bracket mounting
Lens colour	**Rated voltage**	230 V AC	230 V AC
amber		210 10 10 4 000	210 10 10 4 010
red		210 10 10 5 000	210 10 10 5 010

Article numbers for other colours and voltages on request

Options / accessories

GOST

See page 120 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

All-round flashing lights 14 Joules
PMF 2020 / PMF 2015

- extremely bright due to 14 Joules total flash energy of the impulse group and light bundling with fesnel lens, low power consumption (energy-saving)
- choice of three different flash combinations with fast flash rate (PMF 2015: two flash combinations)
- extremely reliable and durable due to the use of state-of-the-art electronic components – no replacement of mechanical or electrical wearing parts necessary
- large variety of mounting methods – direct or using a bracket
- exchangeable due to broadly used drilling template
- extremely reliable and durable: fit it and forget it!
- especially suitable for cranes and floor conveyors
- highest mechanical stability, shock tested as per DIN EN 60069-2-29 (PMF 2020, GL approval is standard)
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

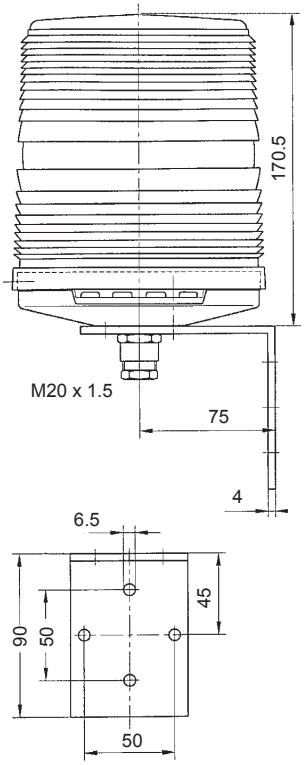
Operating temperature

Electrical data		PMF 2020				PMF 2015			
Rated voltage		230 V AC	110 V AC	24 V DC	12 V DC	230 V AC	110 V AC	24 V DC	12 V DC
Rated frequency		50 Hz / 60 Hz	50 Hz / 60 Hz			50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range		195 – 253 V	90 – 135 V	18 – 30 V	11 – 15 V	195 – 253 V	90 – 135 V	18 – 30 V	11 – 15 V
Nominal current consumption	4 flashes	0.08 A	0.14 A	0.75 A	1.1 A	0.07 A	0.14 A	0.6 A	1.1 A
	2 flashes	0.09 A	0.15 A	0.8 A	1.15 A	0.08 A	0.16 A	0.65 A	1.2 A
	single flash	0.14 A	0.23 A	1.0 A	1.35 A				

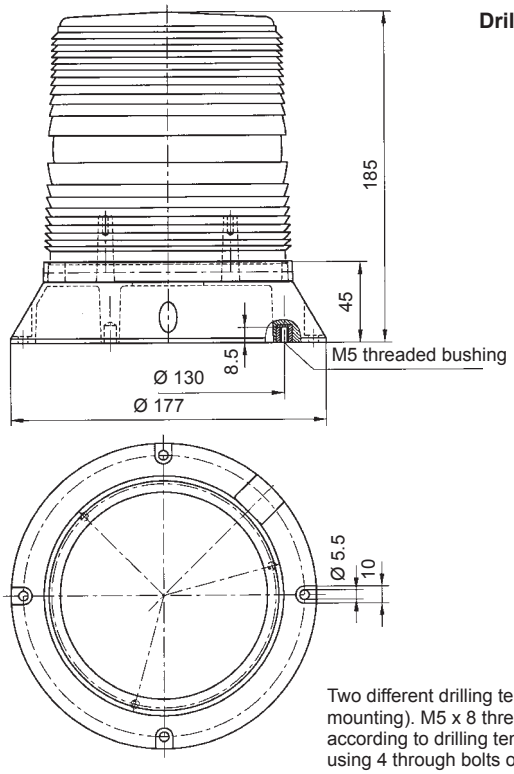
Mechanical data		PMF 2020	PMF 2015
Operating mode		quad, double, single flash	quad, double flash
Flash energy of the main flash		7 Joules (12 V: 5 Joules)	7 Joules
Light intensity (DIN 5037)	clear lens	200 cd	
Lens colours		clear, amber, red, green, blue	
Lens type		lens with fresnel characteristic	
Beam angle	vertical	approx. 16°	
	horizontal	360°	
Operating temperature		- 30 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55 (vertical mounting)	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Material	lens	polycarbonate (PC)	
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)	
Cable entry for bracket mounting		M20 x 1.5	M20 x 1.5 for cables 6.5 - 13.5 mm
Connecting terminals		single wire 0.5 = 2.5 mm^2, fine wire 0.5 = 1.5 mm^2, with cable end sleeves	
Weight	bracket mounting	AC: 1.1 kg / DC: 1.2 kg	
	direct mounting	AC: 0.6 kg / DC: 0.7 kg	

Dimensions

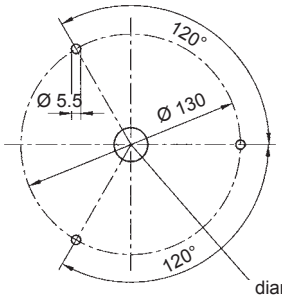
Bracket mounting



Direct mounting

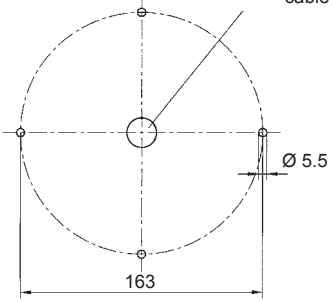


Drilling template 1 (for M5 threaded bushing)



diameter variable depending on cable entry

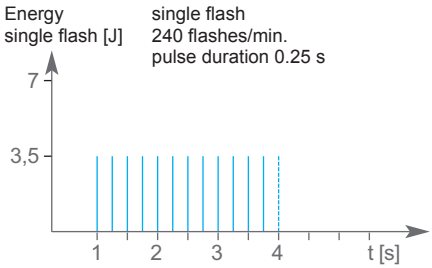
Drilling template 2



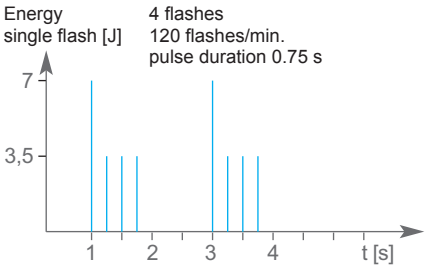
Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

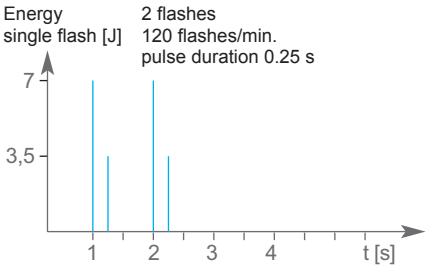
Flash rate

PMF 2020



PMF 2020 / PMF 2015





Ordering details

Article numbers		PMF 2020 direct mounting GL		PMF 2020 bracket mounting GL		PMF 2015 direct mounting		PMF 2015 bracket mounting	
Lens colour	**Rated voltage**	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	24 V DC
amber		21009104001	21009804001	21009104011	21009804011	21007104000	21007804000	21007104010	21007804010
red		21009105001	21009805001	21009105011	21009805011	21007105000	21007805000	21007105010	21007805010

Article numbers for other colours and voltages on request

Options / accessories

GOST

GL

See page 120 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing alarm lights 15 Joules ABL/ABS

- the powerful flashing light in a metal housing
- designed for alarm functions outdoors and in large halls and plants
- also available with GL approval
- housing and fixing bracket made of sturdy anodised aluminium
- aggressive environmental conditions or driving rain cannot damage the light
- impact-proof lens
- ideally suited for tough industrial environments
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

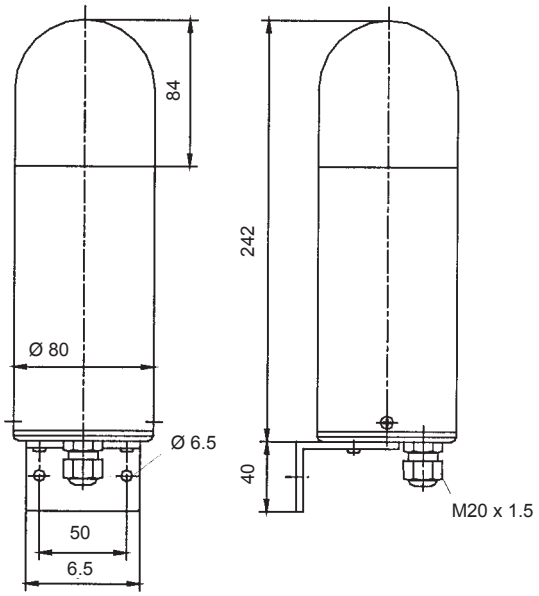
Operating temperature

Electrical data AC	ABL					
Rated voltage	230 V AC	127 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	108 V – 140 V	95 V – 127 V	40 V – 54 V	35 V – 50 V	20 V – 30 V
Nominal current consumption	0.18 A	0.25 A	0.33 A	0.69 A	0.78 A	1.29 A

Electrical data DC	ABS				
Rated voltage	60 V DC	48 V DC	36 V DC	24 V DC	12 V DC
Operating range	50 V – 72 V	40 V – 60 V	29 V – 43 V	18 V – 30 V	10 V – 15 V
Nominal current consumption	0.26 A	0.35 A	0.55 A	0.70 A	1.50 A

Mechanical data		ABL	ABS
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		15 Joules	
Light intensity (DIN 5037)	clear lens	214 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 30 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 54 (vertical mounting)	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Material	lens	polycarbonate (PC)	
	housing	aluminium (Al Mg Si 1), yellow anodised	
	base	polycarbonate (PC) with fibre glass	
Cable entry		M20 x 1.5	
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with cable end sleeves	
Weight	AC version	650 g	
	DC version		800 g

Dimensions



Ordering details

Article numbers		ABL		ABS
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 01 10 3 000	210 01 16 3 000	210 01 80 3 000
amber		210 01 10 4 000	210 01 16 4 000	210 01 80 4 000
red		210 01 10 5 000	210 01 16 5 000	210 01 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 042

GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
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DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series flashing lights 15 Joules
P 400 STR / P 400 STS (∅ 140 mm)

- powerful flashing alarm light for universal use
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side (2 x) or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- attracts maximum attention due to adjustable flash rates
- also available in a synchronised version (STS)

Range as per EN 54

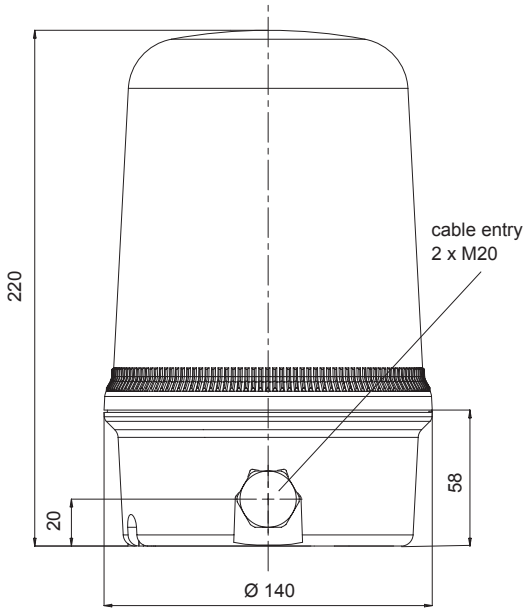
Protection system

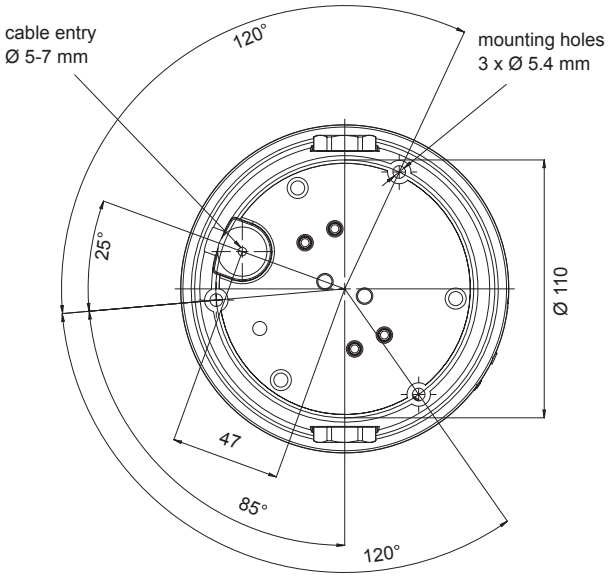
Operating temperature

Electrical data	P 400 STR			P 400 STS		
Rated voltage	230 V AC	115 V AC	24 V AC/DC	230 V AC	115 V AC	24 V AC/DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz / DC	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz / DC
Operating range	207 V – 253 V	100 V – 130 V	20 V – 28 V	207 V – 253 V	100 V – 130 V	20 V – 28 V
Nominal current consumption	225 mA	400 mA	870 mA	225 mA	400 mA	870 mA

Mechanical data		P 400 STR	P 400 STS
Operating mode		3 flashing modes selectable on the device	synchronised flashing light
Light source		xenon flash tube	xenon flash tube
Flash energy	mode 1	double flash 15 J + 10 J @ 0.75 Hz	15 Joules @ 1 Hz
	mode 2	single flash 15J @ 1 Hz	
	mode 3	triple flash 15 J + 10 J + 10 J @ 0.5 Hz	
Light intensity (DIN 5037)	clear lens	165 cd	
Lens colours		clear, yellow, amber, red, green, blue	
Lens type		prismatic	
Operating temperature		- 25 °C ... + 50 °C	
Relative humidity		90% @ + 20 °C	
Protection system according to EN 60529		IP 65	
Service life of the flash tube		light emission still 70% after 5,000,000 flashes	
Material		polycarbonate (PC)	
Design		bayonet with anti-tamper locking screw	
Mounting		surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry		1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries (sideways)	
Connecting terminals		screw terminals 1.5 mm²	
Weight	AC version	632 g	
	DC version	696 g	

Dimensions





Ordering details

Article numbers		P 400 STR			P 400 STS		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V AC/DC	230 V AC	115 V AC	24 V AC/DC
yellow		213 44 10 3 000	213 44 15 3 000	213 44 40 3 000	213 45 10 3 000	213 45 15 3 000	213 45 40 3 000
amber		213 44 10 4 000	213 44 15 4 000	213 44 40 4 000	213 45 10 4 000	213 45 15 4 000	213 45 40 4 000
red		213 44 10 5 000	213 44 15 5 000	213 44 40 5 000	213 45 10 5 000	213 45 15 5 000	213 45 40 5 000

Article numbers for other colours and voltages on request

Options / accessories

Wall bracket
Article number:
213 94 00 0 000

Tubular stand 145 mm
Article number:
213 95 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
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References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing lights 13 Joules
Quadro F12 / Quadro S

Quadro F12
- industrial successor to the legendary Eiffel Tower light
- design adapted to suit industrial requirements; mounted via concealed interior holes or external lugs; fast, flexible and secure
- outstanding mechanical strength with IP 66, IP 67 and IK 08;
- whether in the open air, in a hailstorm or when high pressure cleaning systems are used, the Quadro stays sealed and signals reliably

Quadro S
- automatic synchronised flashing light
- a maximum of 10 flashing lights can be operated parallel and synchronously an unlimited time period; i.e. the flashes of all lights are generated simultaneously

Range as per EN 54

Protection system

Protection system

Impact-proof housing

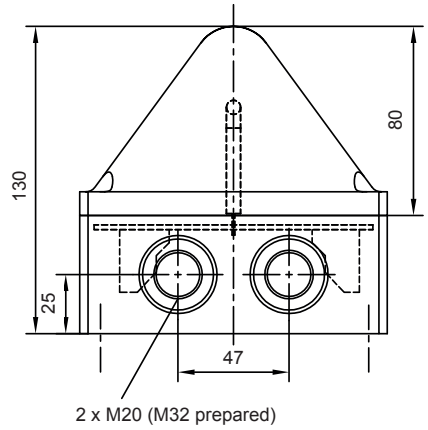
Operating temperature

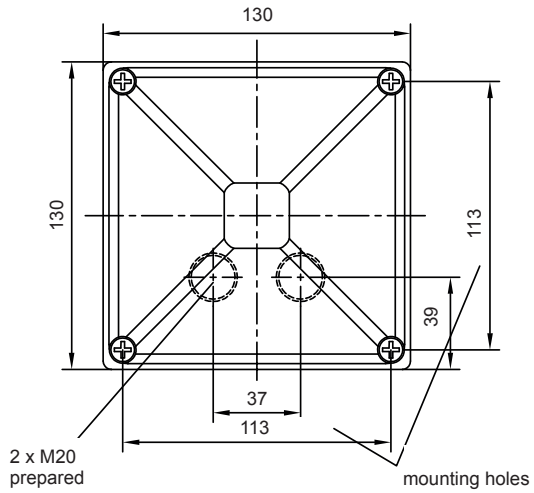
Electrical data	Quadro F12			Quadro S
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		50 Hz / 60 Hz
Operating range	195 V – 253 V	95 V – 127 V	18 V – 30 V	195 V – 253 V
Nominal current consumption	250 mA	340 mA	700 mA	250 mA
Initial current limited to	< 7 A / 150 µs	< 7 A / 150 µs	< 5 A / 2 ms	< 1 A / 50 ms

Mechanical data		Quadro F12	Quadro S
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		13 Joules	
Light intensity (DIN 5037)	clear lens	140 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		100%	
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary	
Impact resistance as per EN 50102		IK 08	
Protection class		II	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 12,000,000 flashes	
Material	lens	polycarbonate (PC)	
	housing	polycarbonate (PC), RAL 7035	
Cable entry		2 x M20 bottom side / 2 x M20/M32 sideways	2 x M20 sideways
Connecting terminals		cage clamp terminal 0.08 - 2.5 mm²	
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5	
	internal holes	113 x 113 mm	
Weight		600 g	

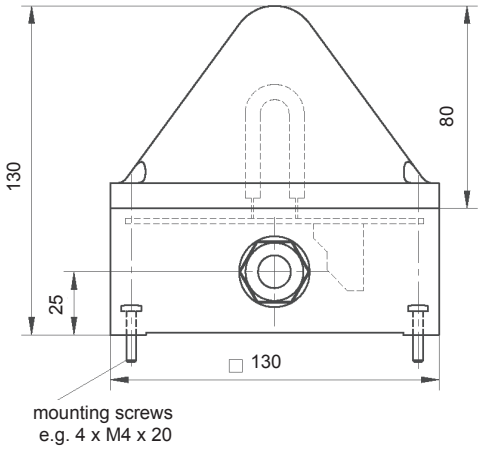
Dimensions

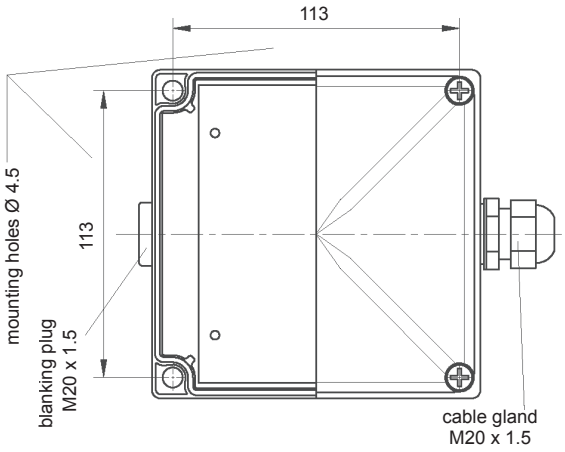
Quadro F12





Quadro S





Additional mounting possible via external lugs (included).

Ordering details

Article numbers		Quadro F12			Quadro S
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC
clear		210 41 10 1 000	210 41 16 1 000	210 41 80 1 000	210 42 10 1 000
yellow		210 41 10 3 000	210 41 16 3 000	210 41 80 3 000	210 42 10 3 000
amber		210 41 10 4 000	210 41 16 4 000	210 41 80 4 000	210 42 10 4 000
red		210 41 10 5 000	210 41 16 5 000	210 41 80 5 000	210 42 10 5 000

Article numbers for other colours and voltages on request

Options / accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing light 10 Joules
PB 2010

A beautiful classic flashing light for indoors and outdoors

- high reliability and long service life due to full on-board electronics
- large variety of mounting methods – cable entry at the side or through the base of the housing
- extremely safe and reliable
- increased dispersion of light due to micro-prisms in the surface of the lens
- capable of being integrated in any application thanks to the pyramid design
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

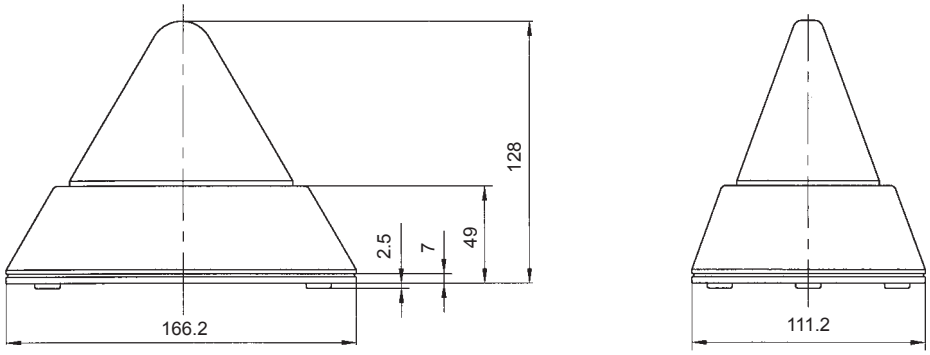
Operating temperature

Electrical data AC	PB 2010			
Rated voltage	230 V AC	110 V AC	42 V AC	24 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	90 V – 135 V	35 V – 50 V	20 V – 30 V
Nominal current consumption	0.14 A	0.23 A	0.72 A	1.50 A

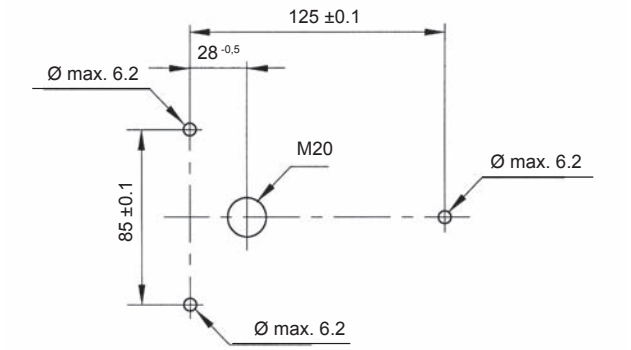
Electrical data DC	PB 2010					
Rated voltage	80 V DC	60 V DC	48 V DC	36 V DC	24 V DC	12 V DC
Operating range	64 V – 96 V	50 V – 72 V	40 V – 60 V	36 V – 45 V	18 V – 30 V	10 V – 15 V
Nominal current consumption	0.18 A	0.21 A	0.30 A	0.45 A	0.56 A	1.21 A

Mechanical data		PB 2010
Flash rate		1 Hz = 60 flashes/min.
Flash energy		10 Joules
Light intensity (DIN 5037)	clear lens	118 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	ABS, light grey, similar to RAL 7035 (optionally graphite grey RAL 7024)
	base	ABS, light grey, similar to RAL 7035 (optionally graphite grey RAL 7024)
Cable entry		M20 x 1.5, either at the side or underneath
Connecting terminals		screw terminals 1.5 mm^2
Weight	AC version	340 g
	DC version	400 g

Dimensions



Mounting holes



Ordering details

Article numbers		PB 2010		
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 30 10 3 000	210 30 16 3 000	210 30 80 3 000
amber		210 30 10 4 000	210 30 16 4 000	210 30 80 4 000
red		210 30 10 5 000	210 30 16 5 000	210 30 80 5 000

Article numbers		PB 2010 with GL approval	
Lens colour	Rated voltage	230 V AC	24 V DC
yellow		210 30 10 3 001	210 30 80 3 001
amber		210 30 10 4 001	210 30 80 4 001
red		210 30 10 5 001	210 30 80 5 001

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 040

GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Multiple flashing light 5 Joules
PMB 2010

A beautiful classic flashing light for indoors and outdoors

- high reliability and long service life due to full on-board electronics
- large variety of mounting methods – cable entry at the side or through the base of the housing
- extremely safe and reliable
- choice of three different flash combinations with fast flash rate – draws increased attention
- various flash combinations can be controlled externally (for 24 V DC)
- very bright due to up to 10 Joules total flash energy of the pulse group
- increased dispersion of light due to micro-prisms in the surface of the lens
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

Operating temperature

Electrical data	PMB 2010			
Rated voltage	230 V AC	110 V AC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	195 V – 253 V	90 V – 135 V	18 V – 30 V	40 V – 60 V
Nominal current consumption	see flash rate table			

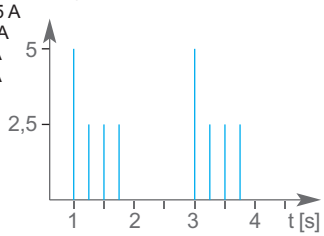
Mechanical data		PMB 2010		
Operating mode		quad flash	double flash	single flash
Flash rate		120 flashes/min.	120 flashes/min.	240 flashes/min.
Total flash energy		up to 10 Joules		
Light intensity (DIN 5037)	clear lens	44 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 30 °C ... + 55 °C		
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		90%		
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 8,000,000 flashes		
Material	lens	polycarbonate (PC)		
	housing and base	ABS, light grey, similar to RAL 7035 (optionally graphite grey RAL 7024)		
Cable entry		M20 x 1.5, either at the side or underneath		
Connecting terminals		screw terminals 1.5 mm²		
Weight	AC version	305 g		
	DC version	360 g		

Flash rate

Quad flash

Current consumption
230V AC: 0.055 A
110V AC: 0.13 A
48V DC: 0.22 A
24V DC: 0.45 A

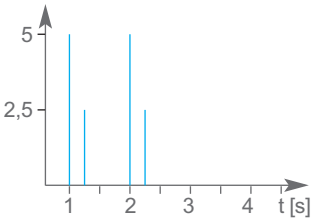
Energy single flash [J]



Double flash

Current consumption
230V AC: 0.06 A
110V AC: 0.14 A
48V DC: 0.25 A
24V DC: 0.5 A

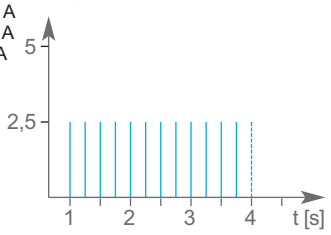
Energy single flash [J]



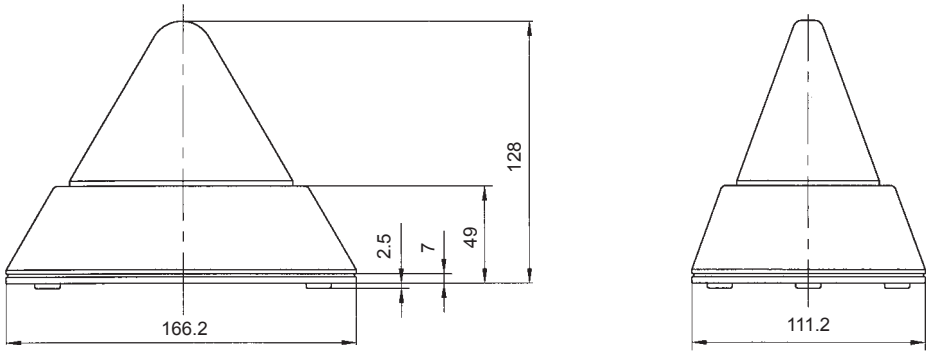
Single flash

Current consumption
230V AC: 0.09 A
110V AC: 0.22 A
48V DC: 0.35 A
24V DC: 0.7 A

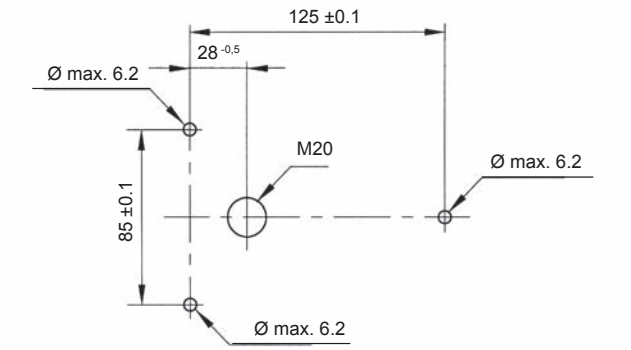
Energy single flash [J]



Dimensions



Mounting holes



Ordering details

Article numbers		PMB 2010	
Lens colour	Rated voltage	230 V AC	24 V DC
yellow		210 06 10 3 000	210 06 80 3 000
amber		210 06 10 4 000	210 06 80 4 000
red		210 06 10 5 000	210 06 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 040

GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing light 5 Joules
PB 2005

A beautiful classic flashing light for indoors and outdoors

- high reliability and long service life due to full on-board electronics
- large variety of mounting methods – cable entry at the side or through the base of the housing
- extremely safe and reliable
- increased dispersion of light due to micro-prisms in the surface of the lens
- capable of being integrated in any application thanks to the pyramid design
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

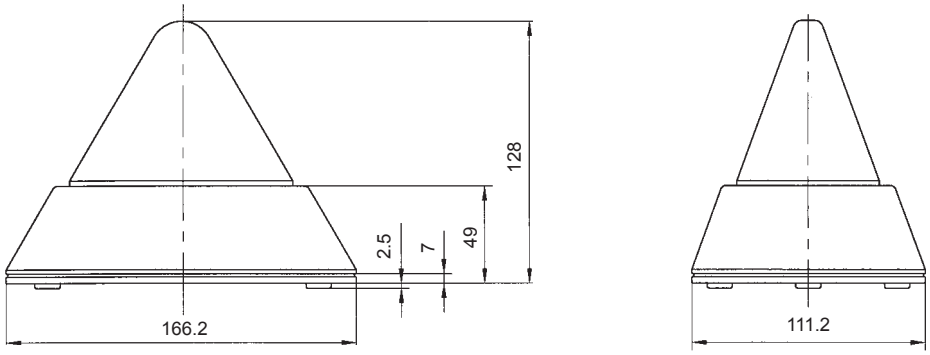
Operating temperature

Electrical data AC	PB 2005						
Rated voltage	230 V AC	127 V AC	110 V AC	48 V AC	42 V AC	24 V AC	12 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	110 – 148 V	90 V – 135 V	40 V – 54 V	35 V – 50 V	20 V – 30 V	9 V – 15 V
Nominal current consumption	0.070 A	0.115 A	0.100 A	0.470 A	0.500 A	0.770 A	0.990 A

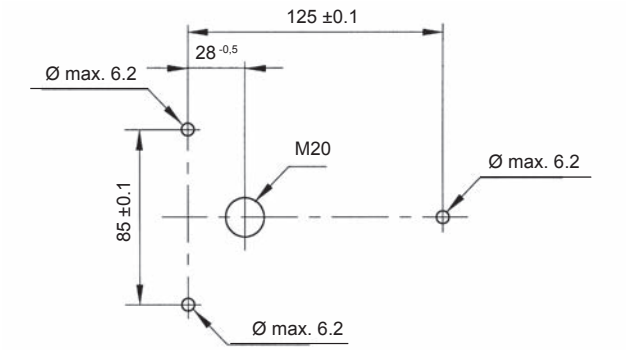
Electrical data DC	PB 2005				
Rated voltage	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	64 V – 96 V	50 V – 72 V	40 V – 60 V	18 V – 30 V	10 V – 15 V
Nominal current consumption	0.11 A	0.13 A	0.18 A	0.25 A	0.60 A

Mechanical data		PB 2005
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 Joules
Light intensity (DIN 5037)	clear lens	44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	ABS, light grey, similar to RAL 7035 (optionally graphite grey RAL 7024)
	base	ABS, light grey, similar to RAL 7035 (optionally graphite grey RAL 7024)
Cable entry		M20 x 1.5, either at the side or underneath
Connecting terminals		screw terminals 1.5 mm²
Weight	AC version	275 g
	DC version	310 g

Dimensions



Mounting holes



Ordering details

Article numbers		PB 2005		
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 25 10 3 000	210 25 16 3 000	210 25 80 3 000
amber		210 25 10 4 000	210 25 16 4 000	210 25 80 4 000
red		210 25 10 5 000	210 25 16 5 000	210 25 80 5 000

Article numbers		PB 2005 with GL approval	
Lens colour	Rated voltage	230 V AC	24 V DC
yellow		210 25 10 3 001	210 25 80 3 001
amber		210 25 10 4 001	210 25 80 4 001
red		210 25 10 5 001	210 25 80 5 001

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 040

GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

MARINE series flashing lights 10 / 5 Joules
PMB 010 / PMB 005

- very sturdy beacons especially for outdoor use
- with stainless steel protective cage as standard
- extreme resistance to vibration and shock due to additional mechanical securing of the flash tube
- lights can be operated in synchronised or alternating mode

PMB 010

Range as per EN 54

PMB 005

Range as per EN 54

Protection system

Protection system

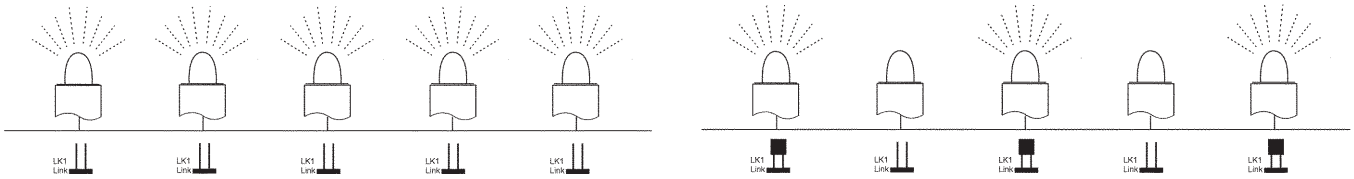
Operating temperature

Electrical data	PMB 010				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	42 V – 54 V	20 V – 28 V	10 V – 14 V
Nominal current consumption	125 mA	250 mA	340 mA	660 mA	1145 mA
Electrical data	**PMB 005**				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	42 V – 54 V	20 V – 28 V	10 V – 14 V
Nominal current consumption	55 mA	140 mA	180 mA	300 mA	550 mA

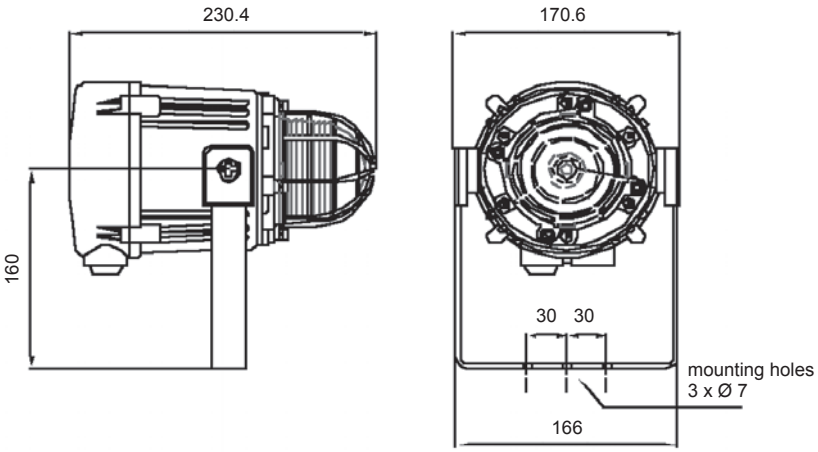
Mechanical data		PMB 010	PMB 005
Operating mode		automatic synchronised flash or alternating mode (see illustration on page 53)	
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		10 Joules	5 Joules
Light intensity (DIN 5037)	clear lens	118 cd	44 cd
Lens colours		clear, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Material	lens	borosilicate glass	
	protective cage	stainless steel	
	housing	UL 94 VO & 5VA classified ABS	
Housing colour		grey (RAL 7038)	
Cable entry		2 x M20 (with 1 blanking plug)	
Connecting terminals		0.5 – 4.0 mm²	
Weight		1.48 kg	

Operating modes

Synchronised flash	Alternating mode



Dimensions



Ordering details

Article numbers		PMB 010			PMB 005		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 06 10 3 000	213 06 15 3 000	213 06 80 3 000	213 05 10 3 000	213 05 15 3 000	213 05 80 3 000
amber		213 06 10 4 000	213 06 15 4 000	213 06 80 4 000	213 05 10 4 000	213 05 15 4 000	213 05 80 4 000
red		213 06 10 5 000	213 06 15 5 000	213 06 80 5 000	213 05 10 5 000	213 05 15 5 000	213 05 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

See page 120 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing warning lights 5 Joules
WBL/WBS / WBL-PX

- the classics of flashing lights
- sturdy metal housing
- universally usable
- also available with GL approval
- housing and fixing bracket made of sturdy anodised aluminium
- aggressive environmental conditions or driving rain cannot damage the light
- impact-proof lens
- ideally suited for tough industrial environments
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

Operating temperature

WBL-PX

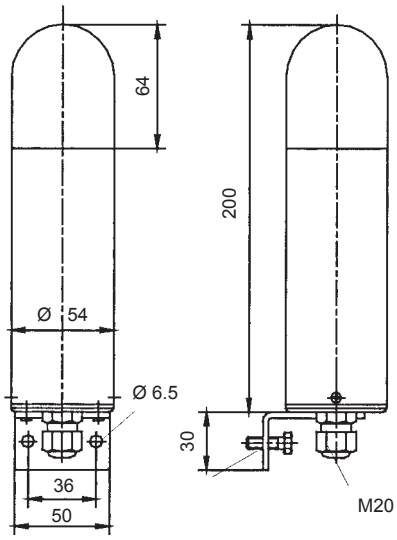
Electrical data AC	WBL				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	90 V – 135 V	40 V – 54 V	35 V – 50 V	20 V – 30 V
Nominal current consumption	0.07 A	0.10 A	0.47 A	0.50 A	0.77 A

Electrical data DC	WBS					
Rated voltage	110 V DC	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	88 V – 132 V	64 V – 96 V	50 V – 72 V	40 V – 60 V	18 V – 35 V	10 V – 15 V
Nominal current consumption	0.09 A	0.11 A	0.13 A	0.18 A	0.25 A	0.60 A

Electrical data	WBL-PX
Rated voltage	230 V AC
Rated frequency	50 Hz / 60 Hz
Operating range	185 V – 255 V
Nominal current consumption	0.055 A
Initial current limited to	≤ 6 A / 110 µs

Mechanical data		WBL	WBS	WBL-PX
Flash rate		1 Hz = 60 flashes/min.		
Flash energy		5 Joules		
Light intensity (DIN 5037)	clear lens	44 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 30 °C ... + 55 °C		
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		90%		
Protection system according to EN 60529		IP 54 (vertical mounting)		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 8,000,000 flashes		
Material	lens	polycarbonate (PC)		
	housing	aluminium (Al Mg Si 1), yellow anodised		
	base	polycarbonate (PC) with fibre glass		
Cable entry		M20 x 1.5		
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with wire end ferrules DIN 46228/1		
Weight	AC version	260 g		260 g
	DC version		300 g	

Dimensions



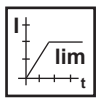
Ordering details

Article numbers		WBL		WBS	
Lens colour	Rated voltage	230 V AC	110 V AC	60 V DC	24 V DC
yellow		210 03 10 3 000	210 03 16 3 000	210 03 65 3 000	210 03 80 3 000
amber		210 03 10 4 000	210 03 16 4 000	210 03 65 4 000	210 03 80 4 000
red		210 03 10 5 000	210 03 16 5 000	210 03 65 5 000	210 03 80 5 000

Article numbers		WBL-PX
Lens colour	Rated voltage	230 V AC
yellow		210 03 10 3 175

Article numbers for other colours and voltages on request

Options / accessories



Article number:
287 10 50 0 041



GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing warning lights 5 Joules WBLR/WBSR

- visual alarm in compact plastic housing
- especially suitable for outdoor applications due to high protection system
- mounting via concealed interior holes
- safe mounting without breaching IP protection
- flash tube additionally secured by a steel clamp

Range as per EN 54

Protection system

Operating temperature

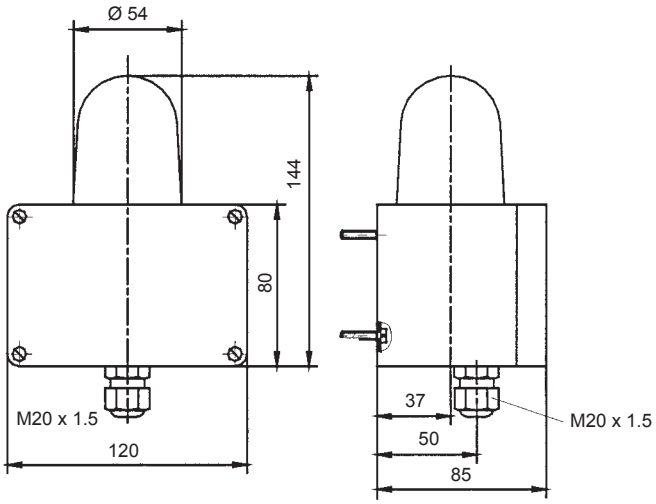
24 V DC, 48 V DC

Electrical data AC	WBLR				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	90 V – 135 V	40 V – 54 V	35 V – 50 V	20 V – 30 V
Nominal current consumption	0.07 A	0.10 A	0.47 A	0.50 A	0.77 A

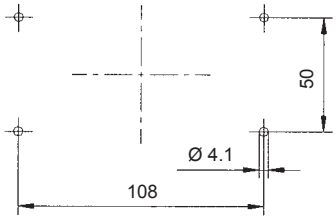
Electrical data DC	WBSR					
Rated voltage	110 V DC	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	88 V – 132 V	64 V – 96 V	50 V – 72 V	40 V – 60 V	18 V – 35 V	10 V – 15 V
Nominal current consumption	0.09 A	0.11 A	0.13 A	0.18 A	0.25 A	0.60 A

Mechanical data		WBLR	WBSR
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		5 Joules	
Light intensity (DIN 5037)	clear lens	44 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 30 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 65	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Material	lens	polycarbonate	
	housing	ABS, light grey, similar to RAL 7035	
Cable entry		M20 x 1.5	
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with wire end ferrules DIN 46228/1	
Weight	AC version	290 g	
	DC version	300 g	

Dimensions



Mounting holes



Ordering details

Article numbers		WBLR		WBSR
Lens colour	**Rated voltage**	230 V AC	110 V AC	24 V DC
yellow		210 04 10 3 000	210 04 16 3 000	210 04 80 3 000
amber		210 04 10 4 000	210 04 16 4 000	210 04 80 4 000
red		210 04 10 5 000	210 04 16 5 000	210 04 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 043

GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series flashing lights 5 Joules
P 300 STR / P 300 STS / P 300 STF (∅ 100 mm)

- flashing warning light for universal use
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- also available in a synchronised version (STS) or with adjustable flash frequency (STF)

Range as per EN 54

Protection system

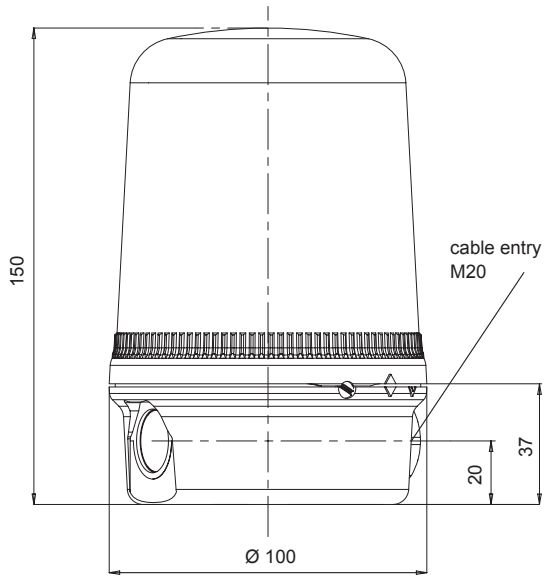
Operating temperature

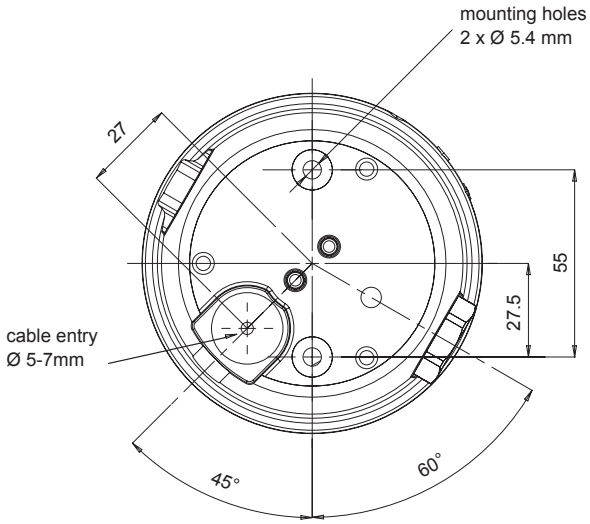
Electrical data AC	P 300 STR		P 300 STS	
Rated voltage	230 V AC	115 V AC	230 V AC	115 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	207 V – 253 V	100 V – 130 V	207 V – 253 V	100 V – 130 V
Nominal current consumption	35 mA	70 mA	35 mA	70 mA

Electrical data AC/DC	P 300 STR	P 300 STS	P 300 STF	
Rated voltage	24 V AC/DC	24 V AC/DC	12 V AC/DC	24 V AC/DC
Operating range	20 V – 28 V	20 V – 28 V	10 V – 15 V	20 V – 28 V
Nominal current consumption	250 mA / 300 mA	250 mA / 300 mA	500 mA / 600 mA	250 mA / 300 mA

Mechanical data		P 300 STR	P 300 STS	P 300 STF
Operating mode		flashing light	synchronised flashing light	multi-frequency flashing light
Light source		xenon flash tube	xenon flash tube	xenon flash tube
Flash energy		5 Joules @ 1 Hz	5 Joules @ 1 Hz	5 Joules @ 1 Hz or 2 Hz
Light intensity (DIN 5037)	clear lens	40 cd		
Lens colours		clear, yellow, amber, red, green, blue		
Lens type		prismatic		
Operating temperature		- 25 °C ... + 50 °C		
Relative humidity		90% @ + 20 °C		
Protection system according to EN 60529		IP 65		
Service life of the flash tube		light emission still 70% after 5,000,000 flashes		
Material		polycarbonate (PC), UL 94 VO f1		
Design		bayonet with anti-tamper locking screw		
Mounting		surface mounting (wall bracket and tubular stand available as accessories)		
Cable entry		1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry (sideways)		
Connecting terminals		screw terminals 1.5 mm²		
Weight	AC version	300 g		325 g
	DC version	325 g		325 g

Dimensions





Ordering details

Article numbers AC		P 300 STR		P 300 STS	
Lens colour	Rated voltage	230 V AC	115 V AC	230 V AC	115 V AC
yellow		213 34 10 3 000	213 34 15 3 000	213 35 10 3 000	213 35 15 3 000
amber		213 34 10 4 000	213 34 15 4 000	213 35 10 4 000	213 35 15 4 000
red		213 34 10 5 000	213 34 15 5 000	213 35 10 5 000	213 35 15 5 000

Article numbers AC/DC		P 300 STR	P 300 STS	P 300 STF	
Lens colour	Rated voltage	24 V AC/DC	24 V AC/DC	12 V AC/DC	24 V AC/DC
yellow		213 34 40 3 000	213 35 40 3 000	213 36 41 3 000	213 36 40 3 000
amber		213 34 40 4 000	213 35 40 4 000	213 36 41 4 000	213 36 40 4 000
red		213 34 40 5 000	213 35 40 5 000	213 36 41 5 000	213 36 40 5 000

Article numbers for other colours and voltages on request

Options / accessories

Wall bracket
Article number:
213 92 00 0 000

Tubular stand 140 mm
Article number:
213 93 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 122/123 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842 **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Compact flashing light 5 Joules
PL 105

- the small flashing light fits many applications without being too bulky
- mounting methods: internal hole mounting or via external lugs
- impact-proof lens
- pole-reversal protection in the DC version

Also available

- as a continuous light/blinking light with LED, externally switchable via voltage input (see page 84)
- housing colours: red, white (available as an option)

Range as per EN 54

Protection system

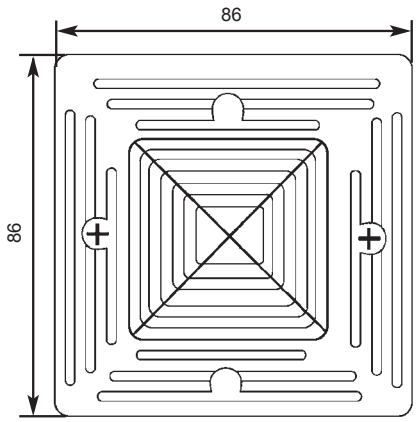
Operating temperature

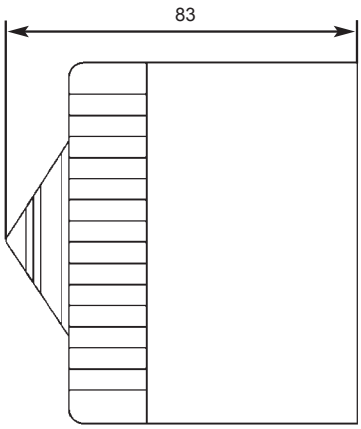
Electrical data	PL 105	
Rated voltage	230 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	
Operating range	207 V – 253 V	20 V – 28 V
Nominal current consumption	35 mA	250 mA

Mechanical data		PL 105
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 Joules
Light intensity (DIN 5037)	clear lens	48 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		max. 90%
Protection system according to EN 60529		IP 56
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 5,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	ABS, flame retardant, UL 94 VO
Cable entry	without lugs	1 disruption (M20) prepared
	with lugs	1 disruption on back, 2 disruptions on side (M20), prepared
Connecting terminals		screw terminals 0.5 = 2.5 mm²
Weight		200 g

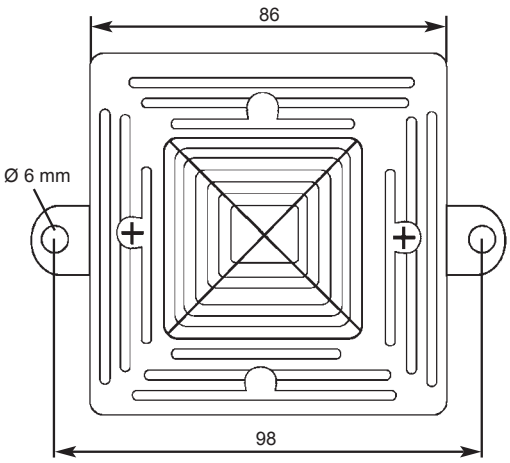
Dimensions

PL105 without lugs





PL105 with lugs



Ordering details

Article numbers		PL105 without lugs (red)		PL105 with lugs (red)	
Lens colour	Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC
yellow		213 01 10 3 000	213 01 80 3 000	213 01 10 3 010	213 01 80 3 010
amber		213 01 10 4 000	213 01 80 4 000	213 01 10 4 010	213 01 80 4 010
red		213 01 10 5 000	213 01 80 5 000	213 01 10 5 010	213 01 80 5 010

Article numbers		PL105 UL with lugs (red)
Lens colour	Rated voltage	110 V AC
yellow		213 01 16 3 002
amber		213 01 16 4 002
red		213 01 16 5 002

Article numbers for other colours and voltages on request

Options / accessories

GOST

See page 120 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842 **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing warning light 5 Joules
KBL

- stable metal housing with impact-proof lens
- sturdy construction, hence suitable for many industrial applications
- extremely resistant to vibration and shock due to additional protection of the endangered components

Range as per EN 54

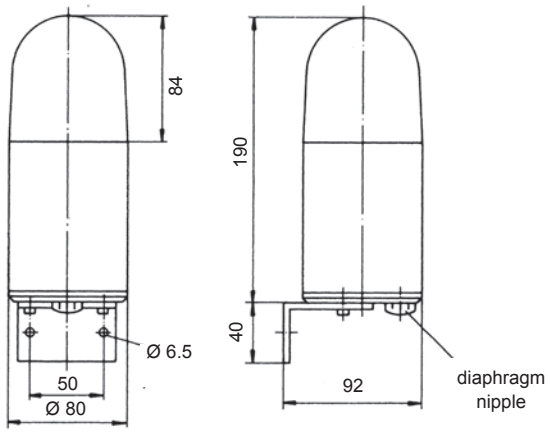
Protection system

Operating temperature

Electrical data AC	KBL				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	90 V – 135 V	40 V – 54 V	35 V – 50 V	20 V – 30 V
Nominal current consumption	0.07 A	0.10 A	0.47 A	0.50 A	0.77 A
Electrical data DC	**KBL**				
Rated voltage	80 V DC	60 V DC	48 V DC	24 V DC	12 V DC
Operating range	64 V – 96 V	50 V – 72 V	40 V – 60 V	18 V – 35 V	10 V – 15 V
Nominal current consumption	0.11 A	0.13 A	0.18 A	0.25 A	0.60 A

Mechanical data		KBL
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 Joules
Light intensity (DIN 5037)	clear lens	44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	aluminium (Al Mg Si 1), yellow
	base	polycarbonate (PC) with fibre glass
Cable entry		M20 x 1.5 push through grommet
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with wire end ferrules DIN 46228/1
Weight	AC version	260 g
	DC version	300 g

Dimensions



Ordering details

Article numbers		KBL	
Lens colour	Rated voltage	230 V AC	24 V DC
yellow		210 02 10 3 000	210 02 80 3 000
amber		210 02 10 4 000	210 02 80 4 000
red		210 02 10 5 000	210 02 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 042

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing warning lights 2.5 Joules DWBL/DWBS

- flashing light for direct installation at the workstation
- no dazzle – but secure alarm function
- also available with GL approval
- housing and fixing bracket made of sturdy anodised aluminium
- impact-proof lens
- flash tube additionally secured by a steel clamp

Range as per EN 54

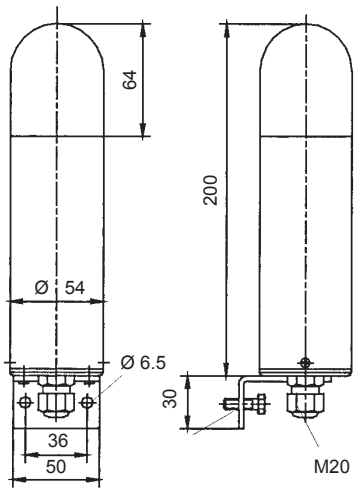
Protection system

Operating temperature

Electrical data AC	DWBL				
Rated voltage	230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	185 V – 255 V	90 V – 135 V	40 V – 54 V	35 V – 50 V	20 V – 30 V
Nominal current consumption	0.04 A	0.05 A	0.26 A	0.29 A	0.50 A
Electrical data DC	**DWBS**				
Rated voltage	12 V DC	24 V DC	48 V DC	60 V DC	80 V DC
Operating range	10 V – 15 V	18 V – 30 V	40 V – 60 V	50 V – 72 V	64 V – 96 V
Nominal current consumption	0.27 A	0.15 A	0.10 A	0.07 A	0.067 A

Mechanical data		DWBL	DWBS
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		2.5 Joules	
Light intensity (DIN 5037)	clear lens	8 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 30 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 54 (vertical mounting)	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Material	lens	polycarbonate (PC)	
	housing	aluminium (Al Mg Si 1), yellow anodised	
	base	polycarbonate (PC) with fibre glass	
Cable entry		M20 x 1.5	
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with cable end sleeves	
Weight	AC version	270 g	
	DC version		300 g

Dimensions



Ordering details

Article numbers		DWBL		DWBS
Lens colour	Rated voltage	230 V AC	110 V AC	24 V DC
yellow		210 05 10 3 000	210 05 16 3 000	210 05 80 3 000
amber		210 05 10 4 000	210 05 16 4 000	210 05 80 4 000
red		210 05 10 5 000	210 05 16 5 000	210 05 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Article number:
287 10 50 0 041

GOST

GL

See pages 120/121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series compact flashing lights 1 Joules P 200 STR / P 100 STR (Ø 60 mm)

- compact flashing light series, also for use where space is limited
- large variety of mounting methods due to modular design principle:
  - panel-mounted devices with convenient plug contact (P 100)
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position

Range as per EN 54

Protection system

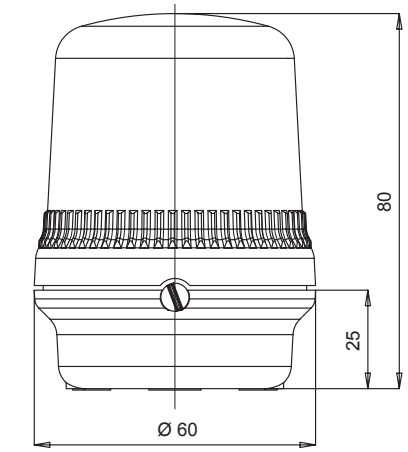
Operating temperature

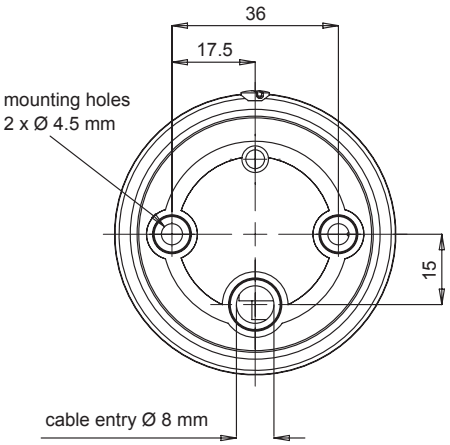
Electrical data	P 200 STR			P 100 STR		
Rated voltage	230 V AC	115 V AC	12 / 24 V AC/DC	230 V AC	115 V AC	12 / 24 V AC/DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz / DC	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz / DC
Operating range	207 V – 253 V	100 V – 130 V	10 V – 30 V	207 V – 253 V	100 V – 130 V	10 V – 30 V
Nominal current consumption	20 mA	30 mA	135 mA @ 24 V DC	20 mA	30 mA	135 mA @ 24 V DC

Mechanical data		P 200 STR	P 100 STR
Operating mode		flashing light	
Light source		xenon flash tube	
Flash energy		1 Joules @ 0.75 Hz	
Light intensity (DIN 5037)	clear lens	1 cd	
Lens colours		clear, yellow, amber, red, green, blue	
Lens type		prismatic	
Operating temperature		- 25 °C ... + 50 °C	
Relative humidity		90% @ + 20 °C	
Protection system according to EN 60529		IP 65	
Service life of the flash tube		light emission still 70% after 5,000,000 flashes	
Material		polycarbonate (PC), UL 94 VO f1	
Design		bayonet with anti-tamper locking screw	
Mounting		surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 27.5 mm (PG29)
Connecting terminals		screw terminals 1.5 mm²	screw terminals 1.5 mm², pluggable
Weight	AC version	89 g	105 g
	DC version	84 g	100 g

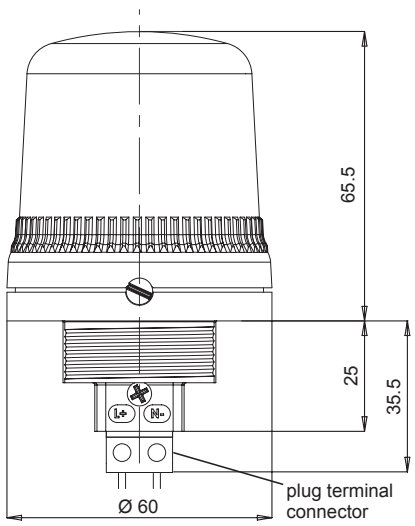
Dimensions

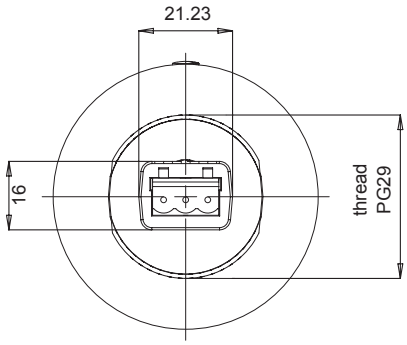
P 200 STR



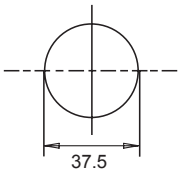


P 100 STR





Panel cut-out



Ordering details

Article numbers		P 200 STR			P 100 STR		
Lens colour	**Rated voltage**	230 V AC	115 V AC	12/24 V AC/DC	230 V AC	115 V AC	12/24 V AC/DC
yellow		213 24 10 3 000	213 24 15 3 000	213 24 89 3 000	213 14 10 3 000	213 14 15 3 000	213 14 89 3 000
amber		213 24 10 4 000	213 24 15 4 000	213 24 89 4 000	213 14 10 4 000	213 14 15 4 000	213 14 89 4 000
red		213 24 10 5 000	213 24 15 5 000	213 24 89 5 000	213 14 10 5 000	213 14 15 5 000	213 14 89 5 000

Article numbers for other colours on request

Options / accessories

Wall bracket — only for P 200 STR
Article number: **213 90 00 0 000**

Tubular stand 137 mm — only for P 200 STR
Article number: **213 91 00 0 000**

Wall holder — only in combination with tubular stand
Article number: **282 50 20 0 000**

See pages 122/123 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series blinking lights 40 Watt
P 400 FLF / P 400 FLH (∅ 140 mm)

P 400 FLF

Range as per EN 54

P 400 FLH

Range as per EN 54

Protection system

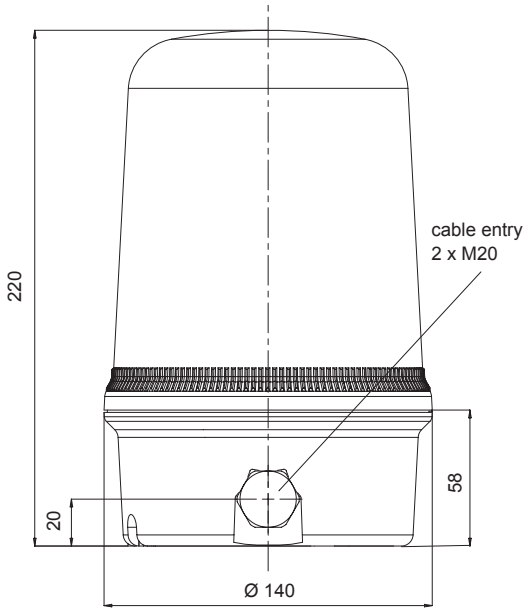
Operating temperature

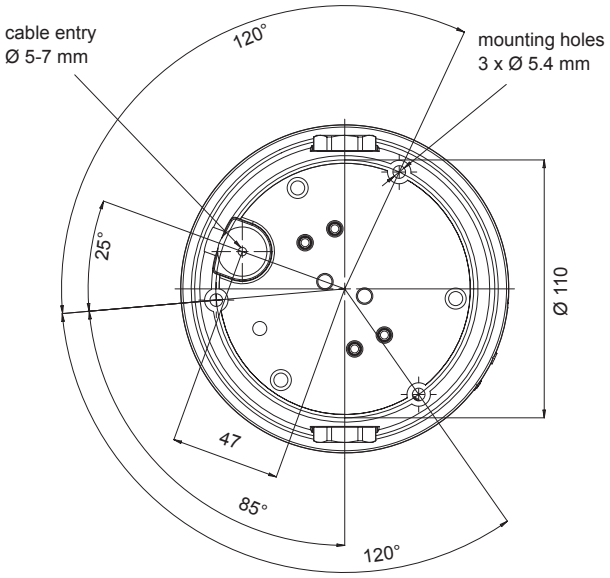
- powerful blinking light for universal use
- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- standard with on-site selectable blink frequency

Electrical data	P 400 FLF			P 400 FLH		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	207 V – 253 V	100 V – 130 V	20 V – 28 V	207 V – 253 V	100 V – 130 V	20 V – 28 V
Nominal current consumption	118 mA	340 mA	1.14 A	178 mA	321 mA	2.05 A
Capacity of light source	40 W	40 W	40 W	40 W	40 W	35 W

Mechanical data	P 400 FLF	P 400 FLH
Operating mode	blinking light	halogen blinking light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power adjustable on the device	40 W @ 0.5 Hz / 1 Hz / 2 Hz	35 W / 40 W @ 0.5 Hz / 1 Hz / 2 Hz
	3 blink frequencies – adjustable during installation	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	535 g	

Dimensions





Ordering details

Article numbers		P 400 FLF			P 400 FLH		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 41 10 3 000	213 41 15 3 000	213 41 80 3 000	213 43 10 3 000	213 43 15 3 000	213 43 80 3 000
amber		213 41 10 4 000	213 41 15 4 000	213 41 80 4 000	213 43 10 4 000	213 43 15 4 000	213 43 80 4 000
red		213 41 10 5 000	213 41 15 5 000	213 41 80 5 000	213 43 10 5 000	213 43 15 5 000	213 43 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Wall bracket
Article number:
213 94 00 0 000

Tubular stand 145 mm
Article number:
213 95 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000


Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series blinking lights 25 Watt
P 300 FLF / P 300 FLH (∅ 100 mm)

P 300 FLF P 300 FLH

Range as per EN 54

Range as per EN 54

Protection system

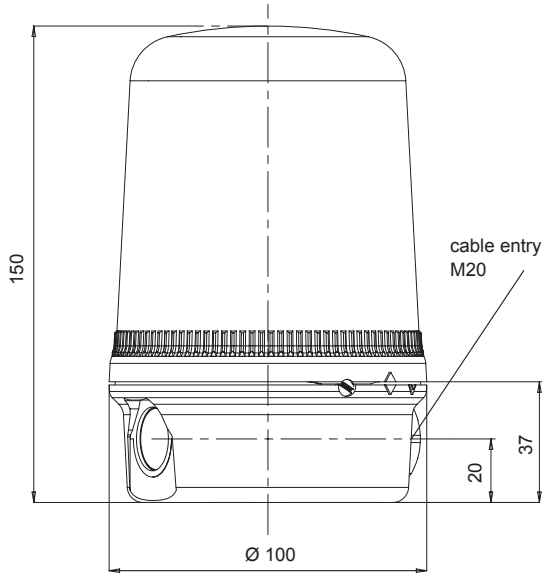
Operating temperature

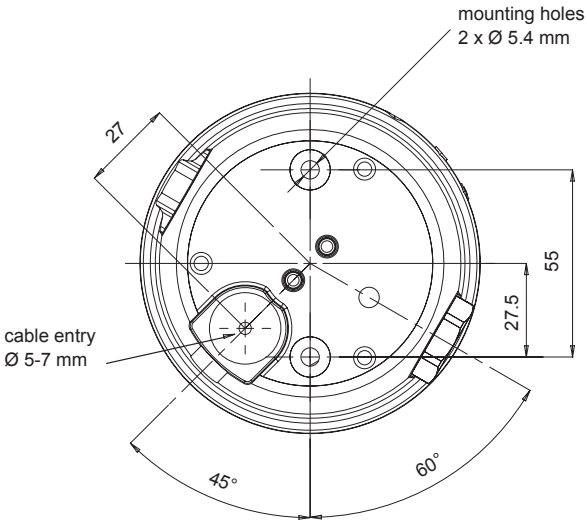
- blinking light for universal use
- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- electronic components mechanically protected for highest mounting security
- with on-site selectable blink frequency as standard

Electrical data	P 300 FLF			P 300 FLH		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	207 V – 253 V	100 V – 130 V	20 V – 28 V	207 V – 253 V	100 V – 130 V	20 V – 28 V
Nominal current consumption	130 mA	255 mA	1.1 A	116 mA	208 mA	1 A
Capacity of light source	25 W	25 W	25 W	25 W	25 W	20 W

Mechanical data	P 300 FLF	P 300 FLH
Operating mode	blinking light	halogen blinking light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power adjustable on the device	25 W @ 0.5 Hz / 1 Hz / 2 Hz 3 blink frequencies – adjustable during installation	20 W / 25 W @ 0.5 Hz / 1 Hz / 2 Hz 3 blink frequencies – adjustable during installation
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	283 g	279 g

Dimensions





Ordering details

Article numbers		P 300 FLF			P 300 FLH		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 31 10 3 000	213 31 15 3 000	213 31 80 3 000	213 33 10 3 000	213 33 15 3 000	213 33 80 3 000
amber		213 31 10 4 000	213 31 15 4 000	213 31 80 4 000	213 33 10 4 000	213 33 15 4 000	213 33 80 4 000
red		213 31 10 5 000	213 31 15 5 000	213 31 80 5 000	213 33 10 5 000	213 33 15 5 000	213 33 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Wall bracket
Article number:
213 92 00 0 000

Tubular stand 140 mm
Article number:
213 93 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000


Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of blinking lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series compact blinking lights 5 Watt
P 200 FLF / P 100 FLF (Ø 60 mm)

- compact blinking light series, also for use where space is limited
- large variety of mounting methods due to modular design principle:
  - panel-mounted devices with convenient plug contact (P 100)
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position

Range as per EN 54

Protection system

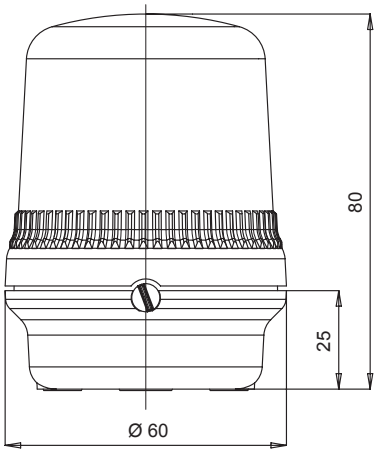
Operating temperature

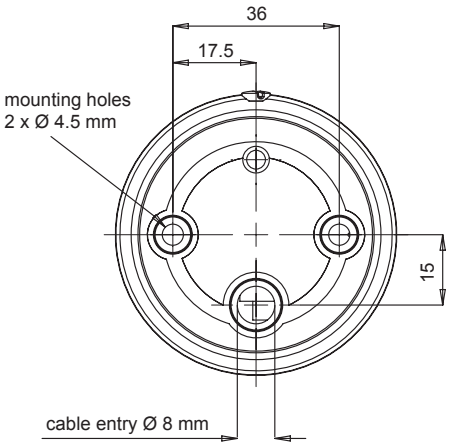
Electrical data	P 200 FLF			P 100 FLF		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	207 V – 253 V	100 V – 130 V	10 V – 30 V	207 V – 253 V	100 V – 130 V	20 V – 28 V
Nominal current consumption	25 mA	35 mA	250 mA	25 mA	35 mA	250 mA

Mechanical data	P 200 FLF	P 100 FLF
Operating mode	blinking light	
Light source	filament lamp BA9s	
Light power	5 W @ 1 Hz	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 37.5 mm (PG29)
Connecting terminals	screw terminals 1.5 mm²	screw terminals 1.5 mm², pluggable
Weight	79 g	93 g

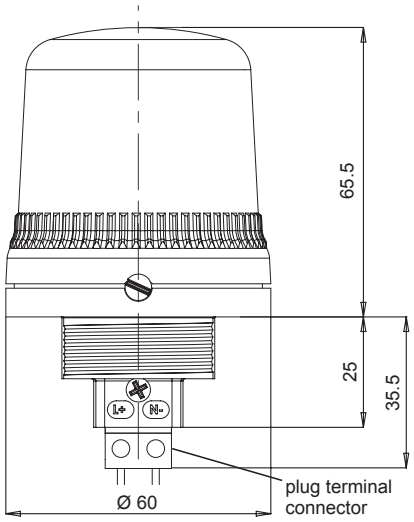
Dimensions

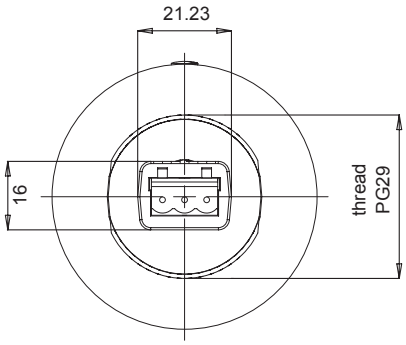
P 200 FLF



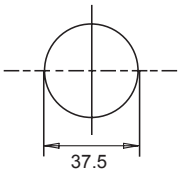


P 100 FLF





Panel cut-out



Ordering details

Article numbers		P 200 FLF			P 100 FLF		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow		213 21 10 3 000	213 21 15 3 000	213 21 80 3 000	213 11 10 3 000	213 11 15 3 000	213 11 80 3 000
amber		213 21 10 4 000	213 21 15 4 000	213 21 80 4 000	213 11 10 4 000	213 11 15 4 000	213 11 80 4 000
red		213 21 10 5 000	213 21 15 5 000	213 21 80 5 000	213 11 10 5 000	213 11 15 5 000	213 11 80 5 000

Article numbers for other colours on request

Options / accessories

Wall bracket only for P 200 FLF
Article number:
213 90 00 0 000

Tubular stand 137 mm only for P 200 FLF
Article number:
213 91 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of blinking lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED multifunction light
PMF-LED Flex

r = 9 m
Range as per EN 54

IP 55
Protection system

+ 55 °C
- 30 °C
Operating temperature

Multifunction light with the brightest LED technology

- rotating mirror effect, extremely low power consumption
- highly insensitive to vibration
- maintenance-free service life exceeding 50,000 hrs
- externally selectable operating mode - one device for 4 different alarms:
  - continuous light
  - blinking light
  - flashing light
  - rotating beacon effect without susceptible mechanics
- inexpensive and flexible; wide range power supplies as standard
- 24 V AC/DC devices as standard with soft-start module
- can be operated directly via 24 V transistor PLC output, no additional relay control necessary
- long-life replacement for conventional rotating mirror lights

Electrical data		PMF-LED Flex				
Rated voltage		115 V AC	230 V AC	230 V DC	24 V AC/DC	
Operating range		95 V – 253 V AC		100 V – 350 V DC	10 V – 60 V DC	15 V – 40 V AC
Current consumption	continuous light-mode	90 mA	60 mA	55 mA	DC: 250 mA	

Mechanical data		PMF-LED Flex			
Operating mode		continuous light	blinking light	flashing light	rotating all-round light
Flash frequency – main flash			1.5 Hz	1 Hz	2.5 Hz
Light source		8 x 2 LEDs (3 chip version)			
Light intensity (DIN 5037)	clear lens	30 cd			
Lens colours		amber, red, green, blue			
Lens type		lens with fresnel characteristic			
Beam angle	vertical	approx. 16°			
	horizontal	360°			
Operating temperature		- 30 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		90%			
Protection system according to EN 60529		IP 55 (vertical mounting)			
Duty cycle		100%			
Service life of light source		> 50.000 hrs			
Material	lens	polycarbonate (PC)			
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)			
Cable entry	bracket mounting	M20 x 1.5			
Connecting terminals		spring-type terminal 0.08 - 2.5 mm²			
Weight		direct mounting: 620 g / bracket mounting: 900 g			

Operating mode

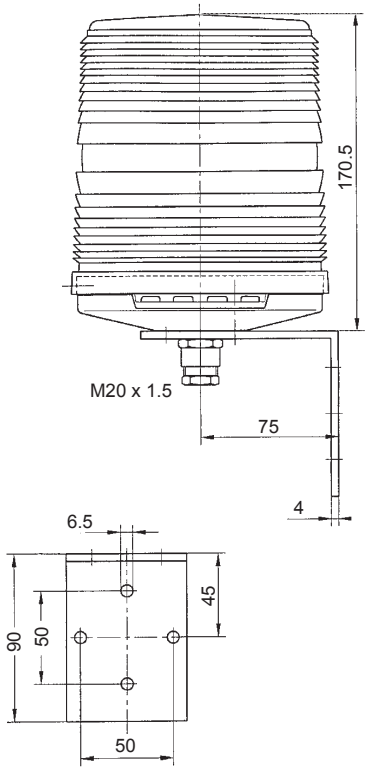
S1			Selection via internal DIP switch	
1	2	3		
OFF	OFF	OFF	OFF	
OFF	OFF	ON	all-round light	2.5 Hz
OFF	ON	OFF	continuous light	
OFF	ON	ON	blinking light	1.5 Hz
ON	OFF	OFF	flashing light	1 Hz
ON	OFF	ON	all-round light	2.5 Hz
ON	ON	OFF	continuous light	
ON	ON	ON	blinking light	1.5 Hz

S1 -	X1 -				Selection via external control	
1	1	2	3	4		
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N	+/L			OFF (standby)	
OFF	-/N	+/L		+/L	all-round light	2.5 Hz
OFF	-/N	+/L	+/L		continuous light	
OFF	-/N	+/L	+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N	+/L		+/L	all-round light	2.5 Hz
ON	-/N	+/L	+/L		continuous light	
ON	-/N	+/L	+/L	+/L	blinking light	1.5 Hz

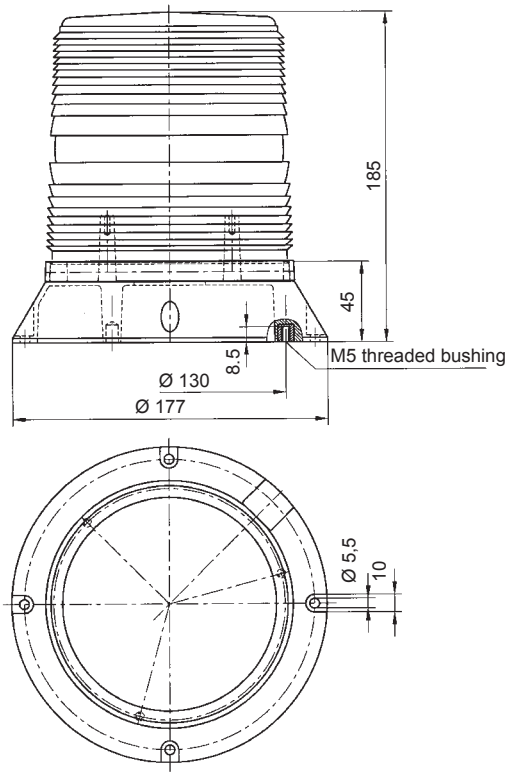
S1 -	X1 -				Selection via BAV option (24 V AC/DC only)	
1	1	2	3	4		
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N			+/L	all-round light	2.5 Hz
OFF	-/N		+/L		continuous light	
OFF	-/N		+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N			+/L	all-round light	2.5 Hz
ON	-/N		+/L		continuous light	
ON	-/N		+/L	+/L	blinking light	1.5 Hz

Dimensions

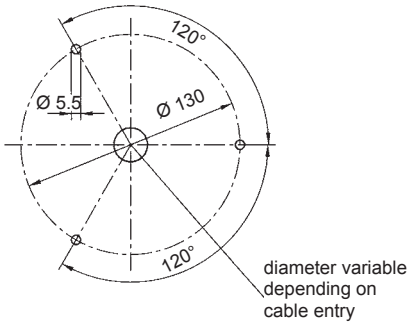
Bracket mounting



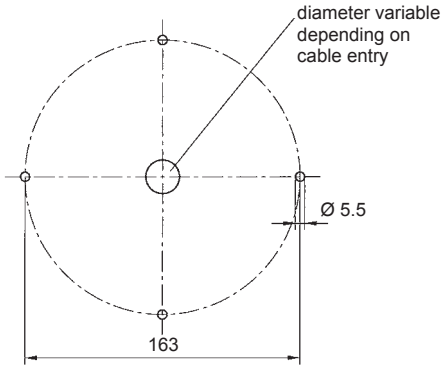
Direct mounting



Drilling template 1 for M5 threaded bushing



Drilling template 2



Ordering details

Article numbers		PMF-LED Flex direct mounting		PMF-LED Flex bracket mounting	
Lens colour	**Rated voltage**	230 V	24 V AC/DC	230 V	24 V AC/DC
amber		211 51 64 4 006	211 51 63 4 006	211 51 64 4 007	211 51 63 4 007
red		211 51 64 5 006	211 51 63 5 006	211 51 64 5 007	211 51 63 5 007

Article numbers for other colours on request

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series LED multifunction lights
P 400 LDA (∅ 140 mm) / P 300 LDA (∅ 100 mm)

P 400 LDA P 300 LDA

r = 9 m — Range as per EN 54

r = 7 m — Range as per EN 54

IP 65 — Protection system

+ 50 °C / - 25 °C — Operating temperature

- LED multifunction lights for extreme requirements
- energy-saving and durable thanks to the use of maintenance-free LED technology
- as standard with on-site selectable signalling mode (9 different modes)
- externally switchable signaling mode (for DC versions only)
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens

Electrical data	P 400 LDA			P 300 LDA	
Rated voltage	115 V AC	230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Operating range	100 V – 130 V	207 V – 253 V	10 V – 50 V	90 V – 253 V	10 V – 50 V
Nominal current consumption	140 mA	70 mA	400 mA @ 24 V DC	90 mA @ 115 V AC 50 mA @ 230 V AC	130 mA @ 24 V DC

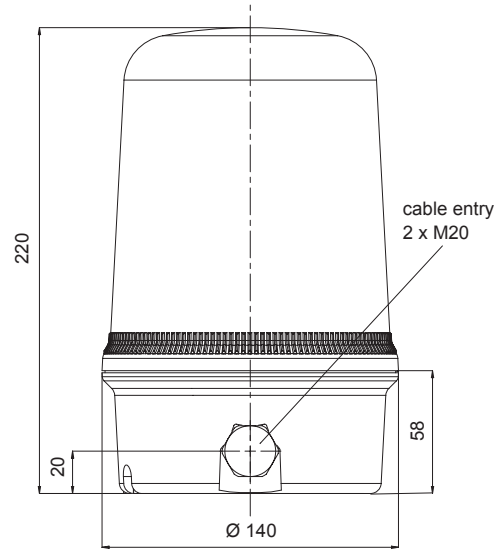
Mechanical data		P 400 LDA	P 300 LDA
Operating mode		LED multifunction light with 9 internally selectable operating modes	
Light source		high output LED array	
Light intensity (DIN 5037)	clear lens	30 cd	20 cd
Lens colours		yellow, amber, red, green, blue	
Lens type		prismatic	
Operating temperature		- 25 °C ... + 50 °C	
Relative humidity		90% @ + 20 °C	
Protection system according to EN 60529		IP 65	
Service life of light source		> 50.000 hrs	
Material		polycarbonate (PC), UL 94 VO f1	
Design		bayonet with anti-tamper locking screw	
Mounting		surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry		1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways	
Connecting terminals		screw terminals 1.5 mm²	
Weight	AC version	595 g	285 g
	DC version	845 g	285 g

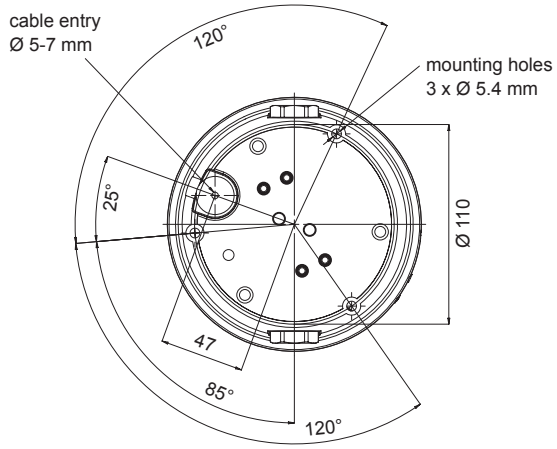
Operating modes Stage 1: internally selectable, stages 2 & 3 externally controllable (DC lights only)

	P 400 LDA			P 300 LDA	
Mode	**Stage 1**	**Stage 2 (DC only)**	**Stage 3 (DC only)**	**Stage 1**	**Stage 2 (DC only)**
1	all LEDs on	alternating flash 2 Hz	double flash 2 Hz	all LEDs on	alternating flash 2 Hz
2	rotation: slow “on”	alternating flash 2 Hz	all LEDs on	rotation: slow “on”	alternating flash 2 Hz
3	single flash 2Hz	rotation: fast “off”	all LEDs on	single flash 2 Hz	rotation: fast “off”
4	rotation: fast “on”	single flash 2 Hz	all LEDs on	rotation: fast “on”	single flash 2 Hz
5	rotation: slow “off”	double flash 1 Hz	all LEDs on	rotation: slow “off”	double flash 1 Hz
6	double flash 1 Hz	rotation: fast “off”	all LEDs on	double flash 1 Hz	rotation: fast “off”
7	rotation: fast “off”	double flash 2 Hz	all LEDs on	rotation: fast “off”	double flash 2 Hz
8	double flash 2 Hz	alternating flash 2 Hz	double flash 2 Hz	alternating flash 2 Hz	all LEDs on
9	alternating flash 2 Hz	rotation: fast “off”	alternating flash 2 Hz	rotation: fast “off”	all LEDs on

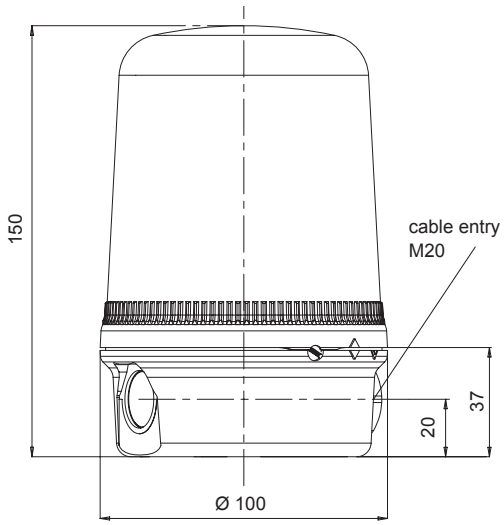
Dimensions

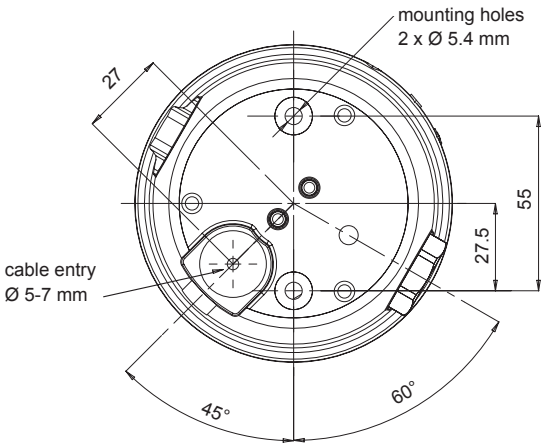
P 400 LDA





P 300 LDA





Ordering details

Article numbers		P 400 LDA			P 300 LDA	
Lens colour	**Rated voltage**	230 V AC	115 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
yellow		213 48 10 3 000	213 48 15 3 000	213 48 90 3 000	213 38 17 3 000	213 38 90 3 000
amber		213 48 10 4 000	213 48 15 4 000	213 48 90 4 000	213 38 17 4 000	213 38 90 4 000
red		213 48 10 5 000	213 48 16 5 000	213 48 90 5 000	213 38 17 5 000	213 38 90 5 000

Article numbers for other colours on request

Options / accessories

Wall bracket for P 400
Article number: **213 94 00 0 000**

Wall bracket for P 300
Article number: **213 92 00 0 000**

Tubular stand 145 mm for P 400
Article number: **213 95 00 0 000**

Tubular stand 140 mm for P 300
Article number: **213 93 00 0 000**

Wall holder only in combination with tubular stand
Article number: **282 50 20 0 000**

See pages 122/123 for further information

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED multifunction light Quadro-LED Flex

- designed for tough requirements under industrial conditions
- suitable for indoor and outdoor use
- extremely insensitive to shock and vibration
- internally and externally selectable operating mode as standard - one device for 4 different alarms:
  – continuous light
  – blinking light
  – flashing light
  – rotating light (non-wearing)
- 24 V AC/DC devices as standard with soft-start module
- can be operated directly via 24 V transistor PLC output, no additional relay control necessary
- inexpensive and flexible; wide range power supplies as standard

r = 5 m	IP 66	IP 67	IK 08	+ 55 °C / - 30 °C
Range as per EN 54	Protection system	Protection system	Impact-proof housing	Operating temperature

Electrical data		Quadro-LED Flex			
Rated voltage		115 / 230 V AC/DC		24 V AC/DC	
Rated frequency		50 Hz / 60 Hz / DC		50 Hz / 60 Hz / DC	
Operating range	AC	95 V – 253 V		15 V – 40 V	
	DC	100 V – 350 V		10 V – 60 V	
Current consumption in continuous light mode	AC	115 V: < 90 mA	230 V: 60 mA	24 V: 420 mA	
	DC	120 V: < 55 mA	220 V: 35 mA	24 V: 250 mA	

Mechanical data		Quadro-LED Flex			
Operating mode (internally and externally selectable)		continuous light	blinking light	flashing light	rotating all-round light
Light alternation frequency			1.5 Hz	1 Hz	2.5 Hz
Light source		LED; 8 x 2 LEDs (3 chip version)			
Light intensity (DIN 5037)	clear lens	9 cd			
Lens colours		clear, white, yellow, amber, red, green, blue			
Operating temperature		- 30 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary			
Impact resistance as per EN 50102		IK 08			
Protection class		II			
Service life of light source		≥ 50.000 hrs			
Material	lens	polycarbonate (PC)			
	housing	polycarbonate (PC), grey RAL 7035			
Cable entry		2 x M20/M32 sideways, 2 x M20 bottom side			
Connecting terminals		spring-type terminal 0.08 – 2.5 mm²			
Weight		500 g			

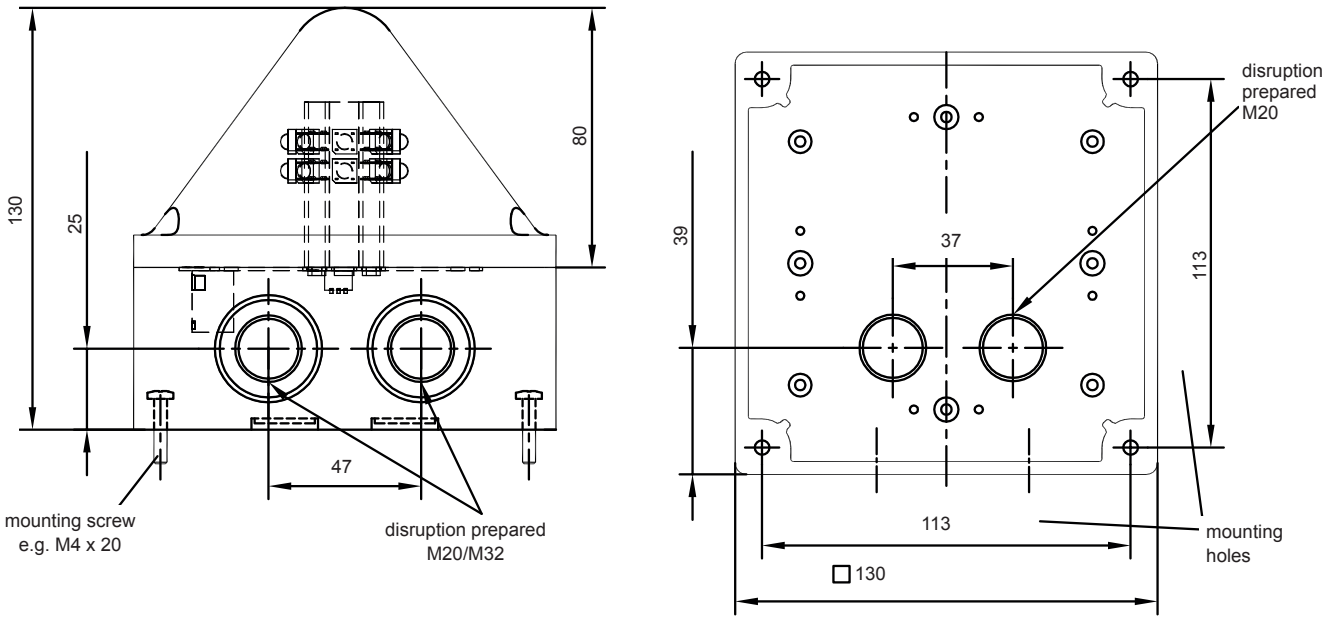
Operating modes

S1			Selection via internal DIP switch	
1	2	3		
OFF	OFF	OFF	OFF	
OFF	OFF	ON	all-round light	2.5 Hz
OFF	ON	OFF	continuous light	
OFF	ON	ON	blinking light	1.5 Hz
ON	OFF	OFF	flashing light	1 Hz
ON	OFF	ON	all-round light	2.5 Hz
ON	ON	OFF	continuous light	
ON	ON	ON	blinking light	1.5 Hz

S1 - 1	X1 - 1	2	3	4	Selection via external control	
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N	+/L			OFF (standby)	
OFF	-/N	+/L		+/L	all-round light	2.5 Hz
OFF	-/N	+/L	+/L		continuous light	
OFF	-/N	+/L	+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N	+/L		+/L	all-round light	2.5 Hz
ON	-/N	+/L	+/L		continuous light	
ON	-/N	+/L	+/L	+/L	blinking light	1.5 Hz

S1 - 1	X1 - 1	2	3	4	Selection via BAV option (24 V AC/DC only)	
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N			+/L	all-round light	2.5 Hz
OFF	-/N		+/L		continuous light	
OFF	-/N		+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N			+/L	all-round light	2.5 Hz
ON	-/N		+/L		continuous light	
ON	-/N		+/L	+/L	blinking light	1.5 Hz

Dimensions



Additional mounting possible via external lugs (included).

Ordering details

Article numbers		Quadro-LED Flex	
Lens colour	**Rated voltage**	230 V AC/DC	24 V AC/DC
yellow		211 04 64 3 000	211 04 63 3 000
amber		211 04 64 4 000	211 04 63 4 000
red		211 04 64 5 000	211 04 63 5 000

Article numbers for other colours on request

Options / accessories

GOST

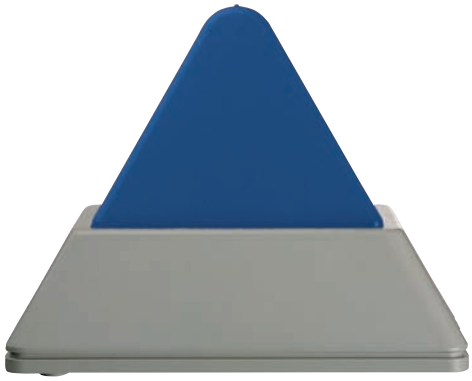
Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED Continuous light
PD 2100-LED



Machine lights in an elegant pyramid design, equipped with LED light source for extremely long service life (> 50,000 hrs)

- vibration/shock-resistant
- low power consumption
- minimised maintenance costs
- non-compromising safety
- outstanding illumination of the coloured lens due to scattering lens

Range as per EN 54

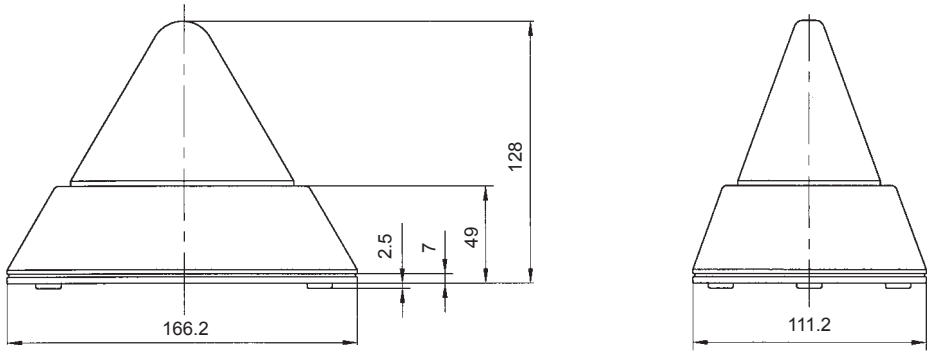
Protection system

Operating temperature

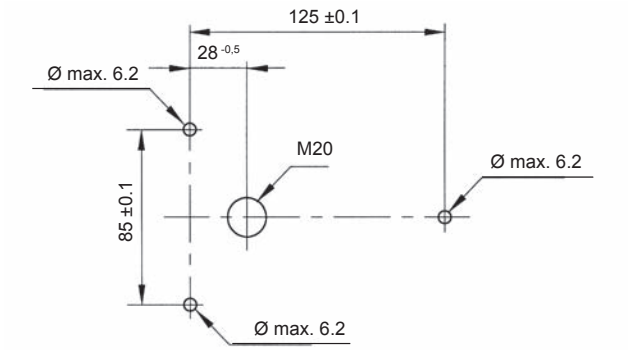
Electrical data	PD 2100-LED		
Rated voltage	230 V AC	115 V AC	24 V AC/DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz / DC
Operating range	± 10 %	± 10 %	AC: 18 V – 27 V DC: 19 V – 30 V
Nominal current consumption	12 mA	24 mA	AC: 115 mA DC: 65 mA

Mechanical data		PD 2100-LED
Light source		LED
Light intensity (DIN 5037)	clear lens	5 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 80 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)
Protection class		II
Duty cycle		100%
Service life of light source		> 50.000 hrs
Material	lens	polycarbonate (PC)
	housing	ABS, light grey, similar to RAL 7035
	baseplate	ABS, light grey, similar to RAL 7035
Cable entry		M20 x 1.5, either at the side or underneath
Connecting terminals		fine wire 0.14 – 2.5 mm²
Weight	AC	380 g
	AC/DC	270 g

Dimensions



Mounting holes



Ordering details

Article numbers		PD 2100-LED	
Lens colour	**Rated voltage**	230 V AC	24 V AC/DC
clear		211 20 61 1 000	211 20 60 1 000
yellow		211 20 61 3 000	211 20 60 3 000
amber		211 20 61 4 000	211 20 60 4 000
red		211 20 61 5 000	211 20 60 5 000
green		211 20 61 6 000	211 20 60 6 000
blue		211 20 61 7 000	211 20 60 7 000

Options / accessories

Artikelnummer:
287 10 50 0 040

See page 121 for further information

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
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EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Marine series LED light
PMBL 1

- very sturdy beacons especially for outdoor use
- with stainless steel protective cage as standard
- 3-stage operation, externally controllable
- total of 9 operating modes in continuous, flashing and rotating operation
- extreme resistance to vibration and shock due to use of LED technology

Range as per EN 54

Protection system

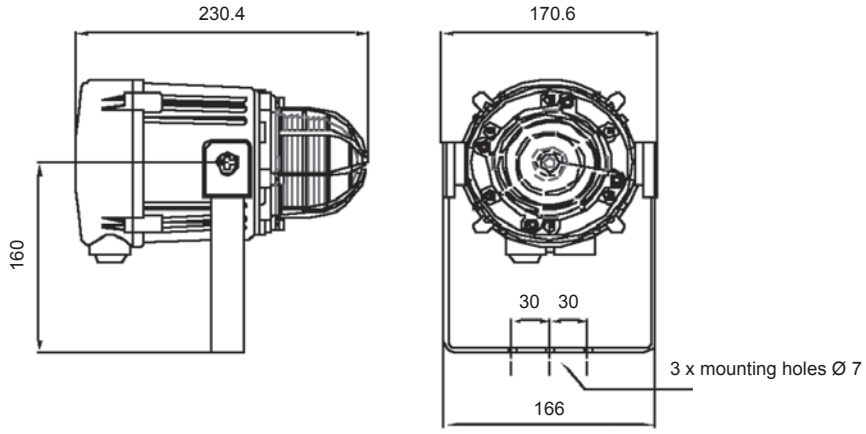
Protection system

Operating temperature

Electrical data	PMBL 1			
Rated voltage	230 V AC	115 V AC	24 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	± 10 %	± 10 %	± 10 %	10 V – 50 V
Nominal current consumption	70 mA	140 mA	380 mA	400 mA

Mechanical data		PMBL 1
Operating mode		rotating light, flashing light, blinking light, continuous light
Light source		32 high output LEDs
Lens colours		amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66, IP 67
Material	lens	borosilicate glass
	protective cage	stainless steel
	housing	UL 94 VO & 5VA classified ABS
Housing colour		grey (RAL 7038)
Cable entry		2 x M20 (with 1 blanking plug)
Connecting terminals		0.5 – 4.0 mm^2
Weight		1.48 kg

Dimensions



Operating modes

Mode	internal	external	
	stage 1	stage 2	stage 3
1	all on	9	8
2	rotation 3 LED fast “ON“	7	1
3	rotation 6 LED fast “ON“	8	1
4	rotation 3 LED slow “ON“	9	1
5	rotation 6 LED slow “ON“	6	1

Mode	internal	external	
	stage 1	stage 2	stage 3
6	double flash 1 Hz	9	1
7	single flash 2 Hz	3	1
8	double flash 2 Hz	3	1
9	alternating flash 1:1 2 Hz	3	1

Ordering details

Article numbers		PMBL 1		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
amber		213 07 10 4 000	213 07 15 4 000	213 07 80 4 000
red		213 07 10 5 000	213 07 15 5 000	213 07 80 5 000

Article numbers for other colours and voltages on request

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **‘Machine safety – visual alarm signals’.**
Requirements contained in the DIN EN 981 standard: **‘Machine safety – system of acoustic and visual alarm and information signals’,** can be fulfilled.
The colours ‘red’ for the emergency signal and ‘yellow’ for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
‘Coding of display devices and control elements using colours and supplementary means’.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

LED continuous/blinking light
PL 105-LED

- the small LED light is suitable for many applications without being too bulky
- mounting methods: internal hole mounting or via external lugs
- impact-proof lens
- pole-reversal protection in the DC version
- continuous/blinking light functions externally switchable via voltage input

Also available
- as a flashing light (see page 60)
- housing colours: red, white (available as an option)

Range as per EN 54

Protection system

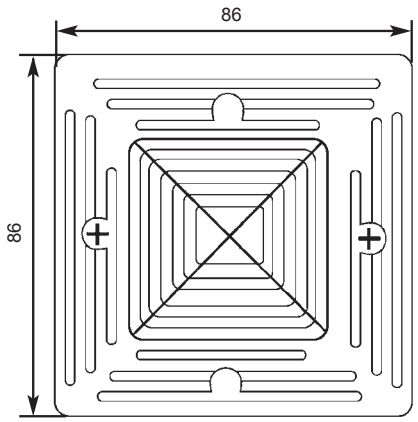
Operating temperature

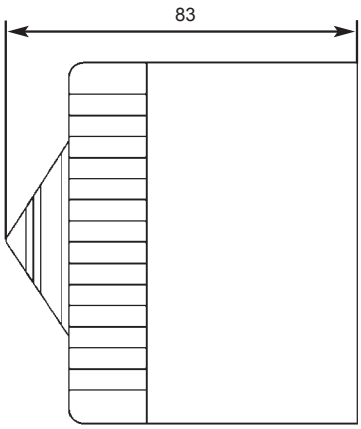
Electrical data	PL 105-LED	
Rated voltage	230 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	
Operating range	207 V – 253 V	20 V – 28 V
Nominal current consumption	27 mA	100 mA

Mechanical data		PL 105-LED
Operating mode		continuous or blinking light, externally controllable via voltage input
Blinking frequency		2 Hz = 120 blinks/min.
Light source		8 high output LEDs
Light intensity (DIN 5037)	clear lens	5 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		max. 90%
Protection system according to EN 60529		IP 56
Duty cycle		100%
Service life of light source		> 50.000 hrs
Material	lens	polycarbonate (PC)
	housing	ABS, flame retardant, UL 94 VO
Cable entry	without lugs	1 disruption (M20) prepared
	with lugs	1 disruption at the back, 2 disruptions (M20) prepared on the side
Connecting terminals		screw terminals 0.5 = 2.5 mm^2
Weight		200 g

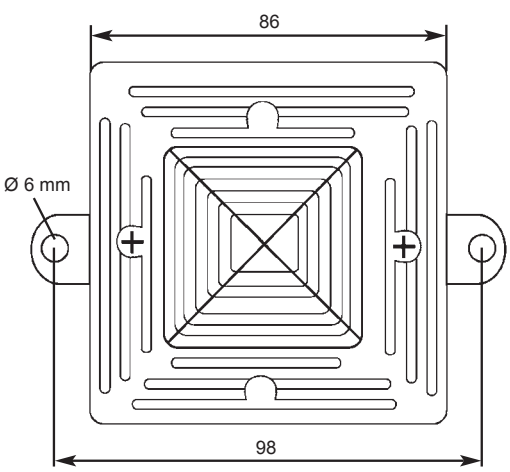
Dimensions

PL105-LED without lugs





PL105-LED with lugs



Ordering details

Article numbers		PL105-LED without lugs	PL105-LED with lugs	
Lens colour	**Rated voltage**	24 V DC	230 V AC	24 V DC
amber		213 02 80 4 000	213 02 10 4 010	213 02 80 4 010
red		213 02 80 5 000	213 02 10 5 010	213 02 80 5 010

Article numbers for other colours and voltages on request

Options / accessories

GOST

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series compact LED continuous lights P 200 LDA / P 100 LDA (Ø 60 mm)

- compact LED light series, also for installation where space is limited
- energy-saving and durable thanks to the use of maintenance-free LED technology
- large variety of mounting methods due to modular design principle:
  - panel-mounted devices with convenient plug contact (P 100)
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position

Range as per EN 54

Protection system

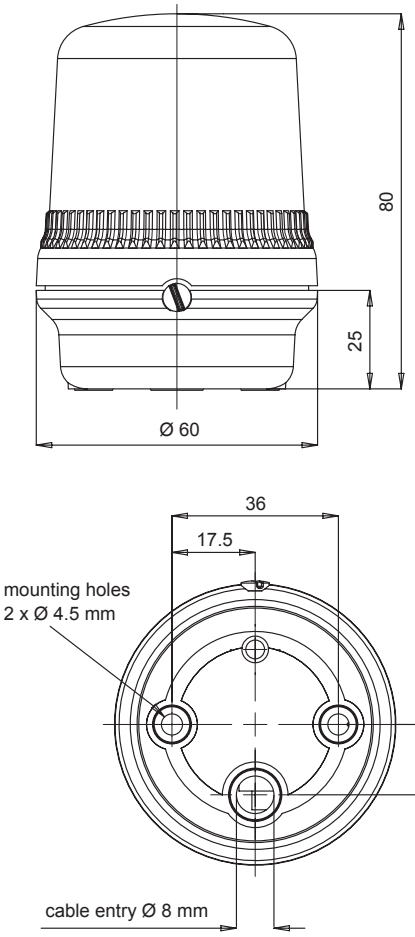
Operating temperature

Electrical data	P 200 LDA		P 100 LDA	
Rated voltage	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Rated frequency	50 Hz / 60 Hz		50 Hz / 60 Hz	
Operating range	90 V – 253 V	10 V – 30 V	90 V – 253 V	10 V – 30 V
Nominal current consumption	32 mA	80 mA	12 mA	80 mA

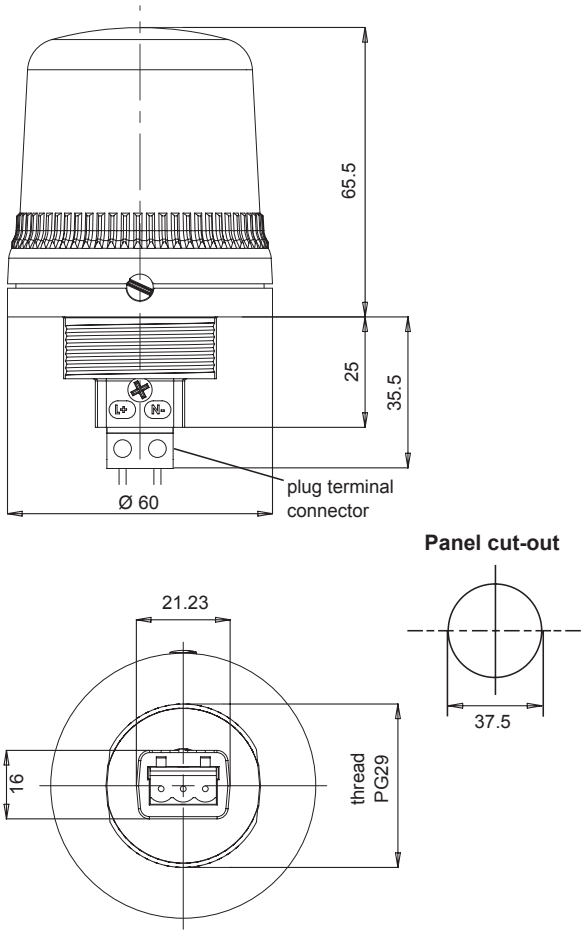
Mechanical data	P 200 LDA	P 100 LDA
Operating mode	LED continuous light	
Light source	9 high output LEDs	
Lens colours	yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Service life of light source	> 50.000 hrs	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 37.5 mm (PG29)
Connecting terminals	screw terminals 1.5 mm²	screw terminals 1.5 mm², pluggable
Weight	78 g	93 g

Dimensions

P 200 LDA



P 100 LDA



Ordering details

Article numbers		P 200 LDA		P 100 LDA	
Lens colour	**Rated voltage**	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
yellow		213 28 64 3 000	213 28 63 3 000	213 18 64 3 000	213 18 63 3 000
amber		213 28 64 4 000	213 28 63 4 000	213 18 64 4 000	213 18 63 4 000
red		213 28 64 5 000	213 28 63 5 000	213 18 64 5 000	213 18 63 5 000

Article numbers for other colours on request

Options / accessories

Wall bracket only for P 200 LDA
Article number:
213 90 00 0 000

Tubular stand 137 mm only for P 200 LDA
Article number:
213 91 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 122/124 for further information

Conformity to standards

The visual characteristics of LED continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
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EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Traffic light
Quadro LED-TL

- bright LED signal lights for traffic light applications, e.g. for
  - traffic routing in non-public areas
  - conveyer and storage systems
  - crane safety (see also ‘Regulations and standards for crane applications’, page 87)
  - container handling systems
- extraordinary housing protection (IP 66, IK0 8 and UV-protected PC housing) and innovative LED technology provide for very bright signals, long service lives and reliable operation
- mounted using external lugs or internal holes that do not impair the IP protection; mounting can be performed in any direction
- preassembled as traffic light and ready to connect
- also available as non-preassembled version
- optionally with integrated light sensor for optimal adaptation to the ambient light (glare avoidance)

Protection system

Impact-proof housing

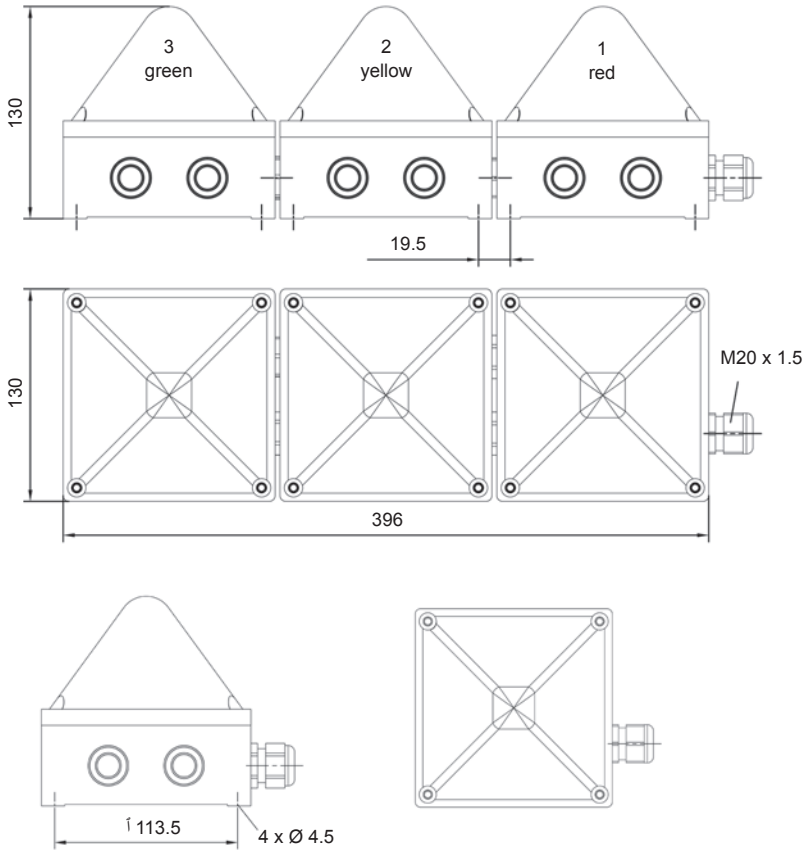
Operating temperature


Light sensor (optional)

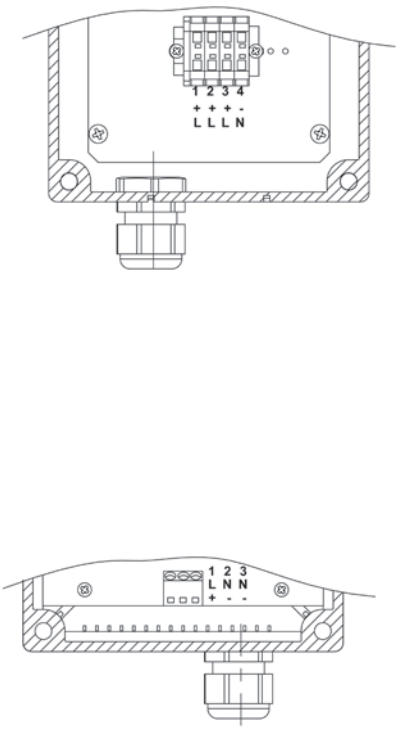
Electrical data	Quadro LED-TL	
Rated voltage	115 / 230 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	
Operating range	85 V – 265 V	10 V – 30 V
Max. current consumption	60 mA / 30 mA	1.06 A

Mechanical data		Quadro LED-TL
Operating mode		LED continuous light
Light source		high output LED array
Light intensity (DIN 5037)		> 80 cd
Lens colours		red / yellow / green
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		95%
Protection system according to EN 60529		IP 66; IK 08 (EN 50102), mounting arbitrary
Duty cycle		100%
Service life of light source		> 50.000 hrs
Material	lens	polycarbonate (PC), UV-resistant
	housing	polycarbonate (PC), UV-resistant, RAL 7035
Cable entry		M20/M32 sideways, other imprints prepared
Connecting terminals		spring-type terminal 0.08 – 2.5 mm² (in the red light)
Mounting		external lugs or internal holes
Weight		1.32 kg

Dimensions



Connection diagrams



Ordering details

Article numbers		Quadro LED-TL		Quadro LED-TLi (with light sensor)	
Lens colour	Rated voltage	115/230 V AC	24 V DC	115/230 V AC	24 V DC
red / yellow / green		211 06 64 0 008	211 06 63 0 008	211 07 64 0 008	211 07 63 0 008
yellow		211 06 64 3 000	211 06 63 3 000	211 07 64 3 000	211 07 63 3 000
red		211 06 64 5 000	211 06 63 5 000	211 07 64 5 000	211 07 63 5 000
green		211 06 64 6 000	211 06 63 6 000	211 07 64 6 000	211 07 63 6 000

Article numbers for other combinations on request

Conformity to standards

The visual characteristics of LED lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
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References to visual alarm devices can be found in the following standards:

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DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Regulations and standards for crane applications		
DIN-EN 13000:2004-09 Cranes – truck-mounted cranes	Visual warning to the driver (EN 842) in the case of	- approaching the load capacity (at 90 - 98.5% of the permissible load capacity) - triggering of the overload safety system - overriding of the overload safety system
DIN-EN 14439:2006 Safety – rotating tower cranes	Visual warning by the crane driver (EN 457) to persons in the vicinity in the case of	- remote control – green, continuous light - anti-collision – white, blinking light - rotating (in some cases when required by local authorities) – green, blinking light
	Visual warning to the driver (EN 842) in the case of	- approaching the load capacity (at 90 - 95% of the permissible load capacity) – yellow, continuous light - wind warning and alarm – yellow, blinking light and red, blinking light

SPECTRA series traffic lights
P 450 TLA (∅ 140 mm) / P 350 TLA (∅ 100 mm)

- signal lights for traffic light applications
- simple to combine for horizontal or vertical configuration
- convenient electrical connection of combined traffic lights
- safe and maintenance-free even under the influence of extreme vibration thanks to LED technology
- clear signalling even in extremely bright surroundings thanks to the use of clear lenses
- stable fixing bracket for flexible alignment and mounting (optional)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- high signaling effect due to prismatic coloured lens
- glare protection adjustable to suit local conditions
- high IP protection in any installation position
- connecting piece for traffic light combinations included

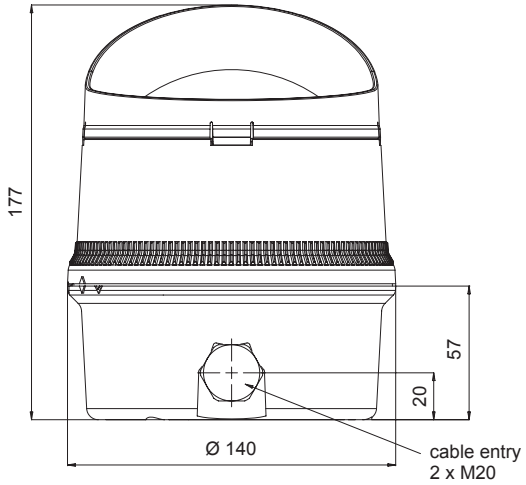
P 450 LDA	P 350 LDA		
r = 23 m	r = 10.5m	IP 65	+ 50 °C - 25 °C
Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

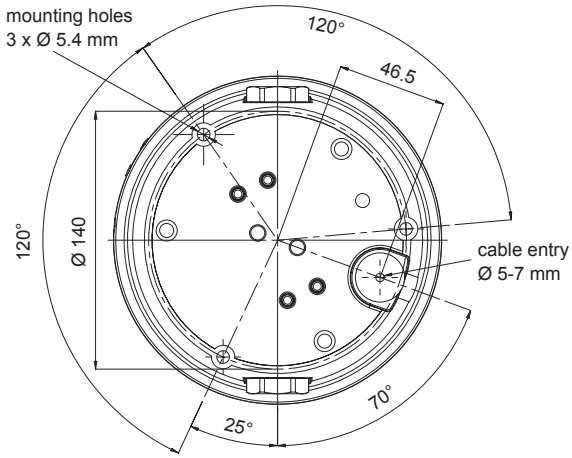
Electrical data	P 450 TLA		P 350 TLA	
Rated voltage	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Operating range	90 V – 253 V	10 V – 30 V	90 V – 253 V	10 V – 30 V
Nominal current consumption	15 - 40 mA	175 mA	10 - 40 mA	140 mA

Mechanical data	P 450 TLA	P 350 TLA
Operating mode	LED continuous light	
Light source	high output LED array	
Light intensity (DIN 5037)	60 cd	45 cd
Lens colour	clear	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Duty cycle	100%	
Service life of light source	> 50.000 hrs	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket available as accessory)	
Connecting terminals	screw terminals 2 x 1.5 mm²	screw terminals 2 x 1.5 mm²
Cable entry	1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways (incl. connecting piece)	1 x 5-7 mm push through grommet; 2 x M20 cable entry (incl. connecting piece)
Weight	410 g	230 g

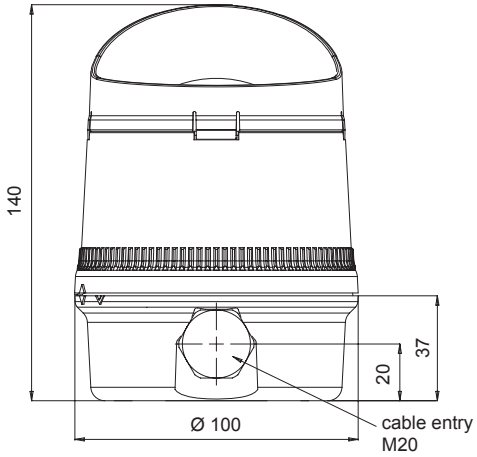
Dimensions

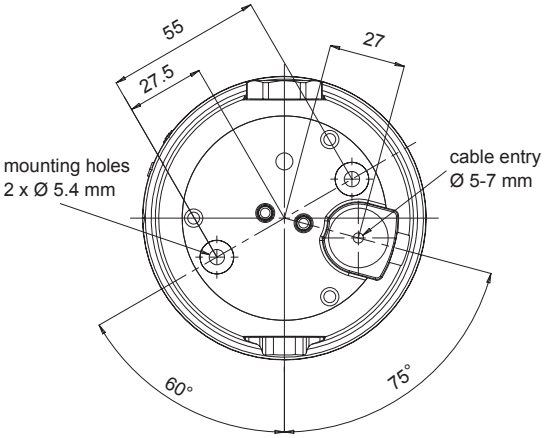
P 450 TLA





P 350 TLA





Ordering details

Article numbers		P 450 TLA		P 350 TLA	
Lens colour	**Rated voltage**	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
amber		213 55 64 4 000	213 55 63 4 000	213 52 64 4 000	213 52 63 4 000
red		213 55 64 5 000	213 55 63 5 000	213 52 64 5 000	213 52 63 5 000
green		213 55 64 6 000	213 55 63 6 000	213 52 64 6 000	213 52 63 6 000

Options / accessories

Wall bracket for single mounting P 450
Article number:
213 99 00 0 000

Wall bracket for single mounting P 350
Article number:
213 98 00 0 000

Wall bracket-set for combinations of 2 or 3 P 450
Article number:
213 97 00 0 000

Wall bracket-set for combinations of 2 or 3 P 350
Article number:
213 96 00 0 000

See pages 122-124 for further information

Continuous LED Panel Mount Indicator P 22 D
Blinking LED Panel Mount Indicator P 22 DFS

- indicator lamps for 22.5 mm mounting hole
- guaranteed high protection class (IP 65) to the housing
- superior shape, hence high signaling effect on all sides
- optimum illumination through the use of multi-chip LED array
- easy to mount labels holders available as accessories
- simple electrical connection by means of screw terminals

IP 65
Protection system

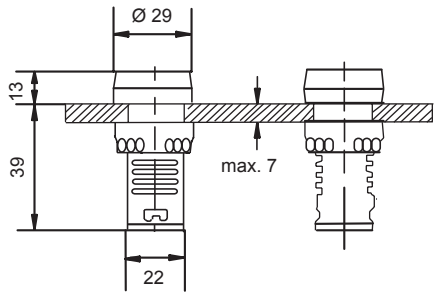
+ 50 °C
- 25 °C
Operating temperature

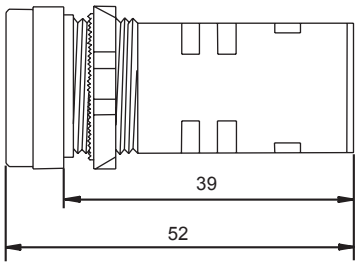
Electrical data	P 22 D red / amber				
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	12 V AC/DC
Nominal current consumption	25 mA	25 mA	20 mA	80 mA	80 mA
Electrical data	**P 22 D white / green / blue**				
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	12 V AC/DC
Nominal current consumption	25 mA	25 mA	20 mA	20 mA	20 mA
Electrical data	**P 22 DFS**				
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	
Nominal current consumption	15 – 30 mA				

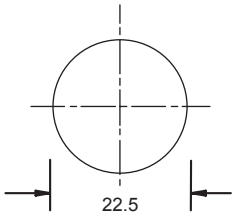
Mechanical data	P 22 D	P 22 DFS
Operating mode	continuous light	1 Hz blinking light
Light source	LED array	
Lens colours	white, amber, red, green, blue	red
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65 (to housing)	
Service life of light source	> 50.000 hrs	
Mounting	panel-mounting: Ø 22.5 mm	
Connecting terminals	screw terminals 1.5 mm²	
Weight	90 g	

Dimensions — Panel cut-out

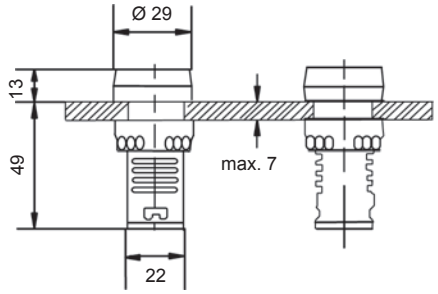
P 22 D

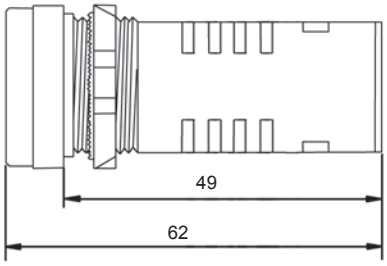


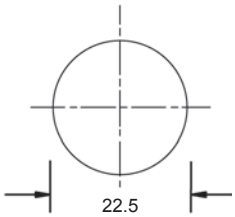




P 22 DFS







Ordering details

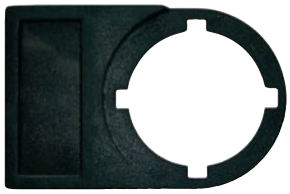
Article numbers		P 22 D				
Lens colour	Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC	12 V AC/DC
white		232 73 10 2 000	232 73 15 2 000	232 73 70 2 000	232 73 80 2 000	232 73 85 2 000
amber		232 73 10 4 000	232 73 15 4 000	232 73 70 4 000	232 73 80 4 000	232 73 85 4 000
red		232 73 10 5 000	232 73 15 5 000	232 73 70 5 000	232 73 80 5 000	232 73 85 5 000
green		232 73 10 6 000	232 73 15 6 000	232 73 70 6 000	232 73 80 6 000	232 73 85 6 000
blue		232 73 10 7 000	232 73 15 7 000	232 73 70 7 000	232 73 80 7 000	232 73 85 7 000

Article numbers		P 22 DFS			
Lens colour	Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
red		232 71 10 5 000	232 71 15 5 000	232 71 70 5 000	232 71 80 5 000

Options / accessories

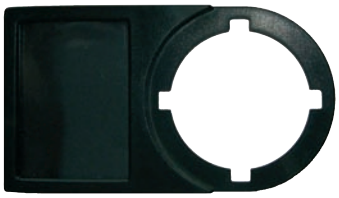
Label holder **25 x 10 mm**

Article number:
232 92 00 0 000



Label holder **25 x 18 mm**

Article number:
232 91 00 0 000



SPECTRA Series status lights
P 400 SLF / P 400 SLH (Ø 140 mm)

- powerful status lights for universal use
- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens

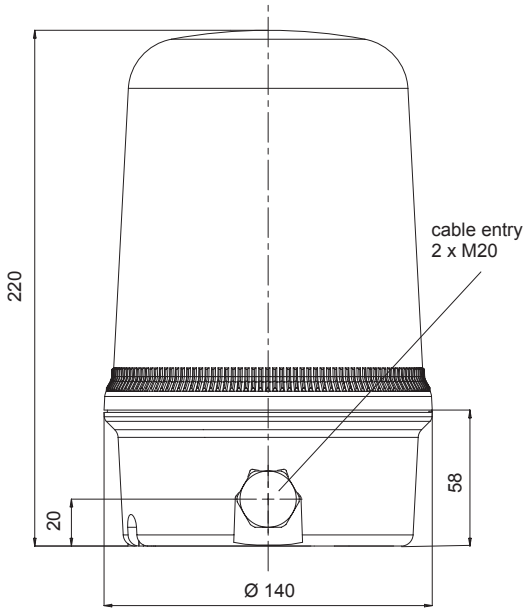
P 400 SLF	P 400 SLH		
r = 16 m	r = 18 m	IP 65	+ 50 °C - 25 °C
Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

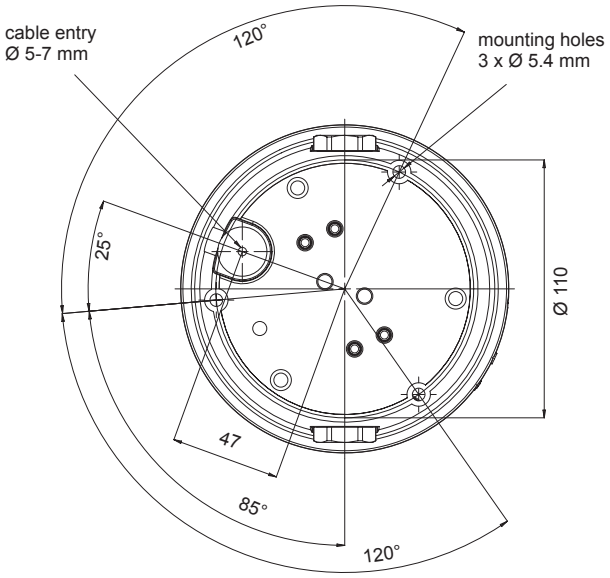
Electrical data	P 400 SLF	P 400 SLH
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	40 W	12V/24V: 35 W / 115V/230V: 40W

* Light source not included

Mechanical data	P 400 SLF	P 400 SLH
Operating mode	continuous light	halogen continuous light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power	40 W	35 / 40 W
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	510 g	

Dimensions





Ordering details

Article numbers		P 400 SLF	P 400 SLH
Lens colour	Rated voltage	12 – 250 V *	12 – 250 V *
clear		213 40 62 1 000	213 42 61 1 000
yellow		213 40 62 3 000	213 42 61 3 000
amber		213 40 62 4 000	213 42 61 4 000
red		213 40 62 5 000	213 42 61 5 000
green		213 40 62 6 000	213 42 61 6 000
blue		213 40 62 7 000	213 42 61 7 000

* Please order light bulb separately

Options / accessories

Wall bracket
Article number:
213 94 00 0 000

Tubular stand 145 mm
Article number:
213 95 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000

Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series status lights
P 300 SLF / P 300 SLH (∅ 100 mm)

- status lights for universal use
- optionally with halogen lamp or filament lamp
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens

P 300 SLF

Range as per EN 54

P 300 SLH

Range as per EN 54

Protection system

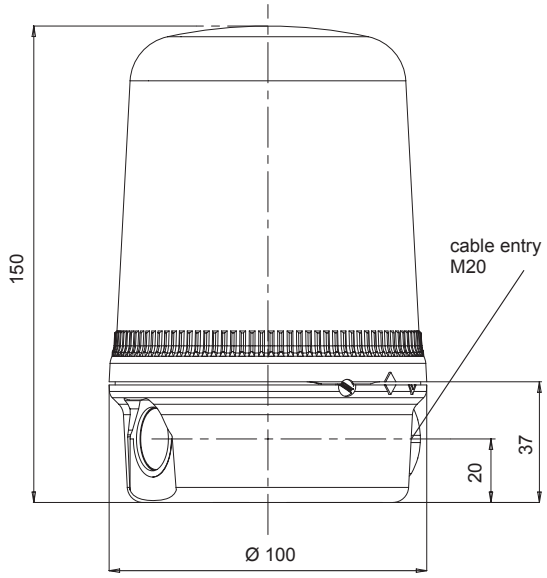
Operating temperature

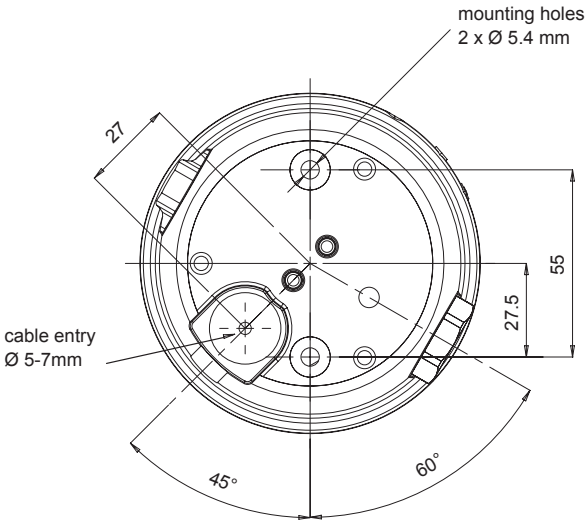
Electrical data	P 300 SLF	P 300 SLH
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	15 W	12V/24V: 20 W / 115V/230V: 25W

* Light source not included

Mechanical data	P 300 SLF	P 300 SLH
Operating mode	continuous light	halogen continuous light
Light source	filament lamp E14	halogen lamp G6.35 / GY6.35
Light power	15 W	20 / 25 W
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Connecting terminals	screw terminals 1.5 mm^2	
Weight	262 g	

Dimensions





Ordering details

Article numbers		P 300 SLF	P 300 SLH
Lens colour	Rated voltage	12 – 250 V *	12 – 250 V *
clear		213 30 62 1 000	213 32 61 1 000
yellow		213 30 62 3 000	213 32 61 3 000
amber		213 30 62 4 000	213 32 61 4 000
red		213 30 62 5 000	213 32 61 5 000
green		213 30 62 6 000	213 32 61 6 000
blue		213 30 62 7 000	213 32 61 7 000

* Please order light bulb separately

Options / accessories

Wall bracket
Article number:
213 92 00 0 000

Tubular stand 140 mm
Article number:
213 93 00 0 000

Wall holder
only in combination with tubular stand
Article number:
282 50 20 0 000


Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Continuous lights
KDL / PD 2100

Status lights for universal use

KDL

- stable metal housing with impact-proof lens, suitable for many different industrial applications

PD 2100

- machine light in an elegant pyramid design

KDL	PD 2100	KDL	PD 2100	
r = 10 m	r = 6 m	IP 54	IP 55	+ 32 °C - 40 °C
Range as per EN 54	Range as per EN 54	Protection system	Protection system	Operating temperature

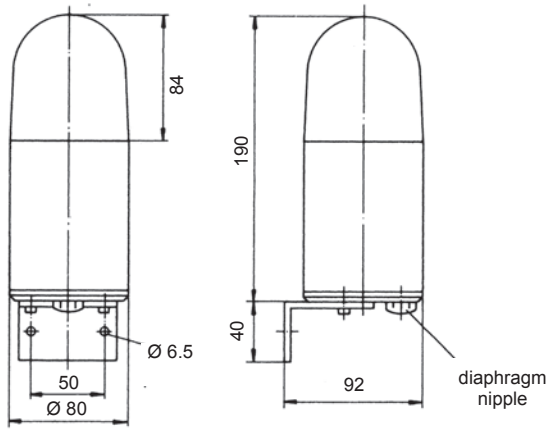
Electrical data	KDL	PD 2100
Rated voltage	max. 240 V	max. 250 V
Power consumption	max. 25 W *	max. 15 W *

* Light source not included

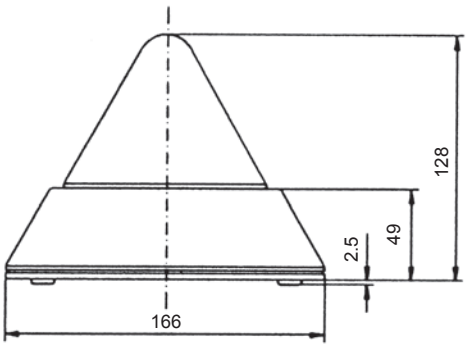
Mechanical data		KDL	PD 2100
Operating mode		continuous light	
Light source		filament lamp E14	BA15d, E14
Light power		max. 25 W	max. 15 W
Lens colours		clear, yellow, amber, red, green, blue	
Operating temperature		- 40 °C ... + 32 °C	
Storage temperature		- 40 °C ... + 80 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 54 (vertical)	IP 55 (vertical/horizontal)
Duty cycle		100%	
Material	lens	polycarbonate (PC)	
	housing	aluminium (Al Mg Si 1), yellow	ABS, light grey, similar to RAL 7035 (optionally graphite grey RAL 7024)
Cable entry		M20 x 1.5 diaphragm nipple	M20 x 1.5 either at the side or underneath
Weight		360 g	250 g

Dimensions

KDL



PD 2100



Ordering details

Article numbers		KDL	PD 2100	
Lens colour	Socket	E14	BA15d	E14
clear		211 02 10 1 000	211 20 30 1 000	211 20 10 1 000
yellow		211 02 10 3 000	211 20 30 3 000	211 20 10 3 000
amber		211 02 10 4 000	211 20 30 4 000	211 20 10 4 000
red		211 02 10 5 000	211 20 30 5 000	211 20 10 5 000
green		211 02 10 6 000	211 20 30 6 000	211 20 10 6 000
blue		211 02 10 7 000	211 20 30 7 000	211 20 10 7 000

* Please order light bulb separately

Options / accessories

Light source

Article number:
287 10 50 0 042

GOST

See pages 121/124 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series compact status lights
P 200 SLF / P 100 SLF (Ø 60 mm)

- compact status light series, also for use where space is limited
- large variety of mounting methods due to modular design principle:
  - panel-mounted devices with convenient plug contact (P 100)
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand (P 200)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- optimum illumination due to prismatic coloured lens
- also for exposed installation locations by combining wall bracket and tubular stand
- high IP protection in any installation position

Range as per EN 54

Protection system

Operating temperature

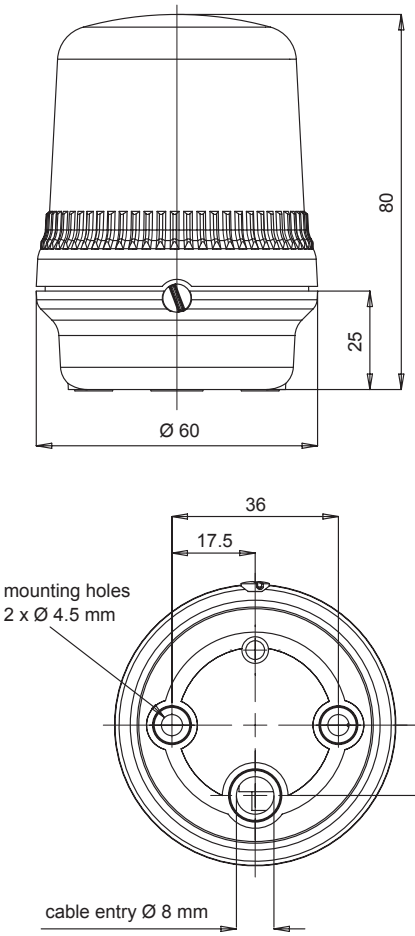
Electrical data	P 200 SLF	P 100 SLF
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	5 W	5 W

* Light source not included

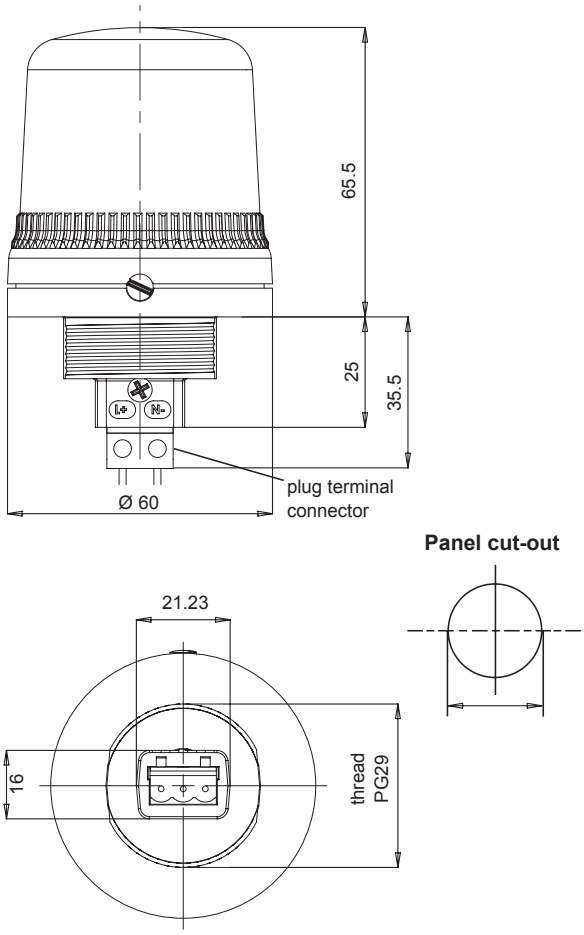
Mechanical data	P 200 SLF	P 100 SLF
Operating mode	continuous light	
Light source	filament lamp BA9s	
Light power	5 W	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	panel-mounting: Ø 37.5 mm (PG29)
Connecting terminals	screw terminals 1.5 mm²	screw terminals 1.5 mm², pluggable
Weight	77 g	90 g

Dimensions

P 200 SLF



P 100 SLF



Ordering details

Article numbers		P 200 SLF	P 100 SLF
Lens colour	**Rated voltage**	12 – 250 V *	12 – 250 V *
clear		213 20 61 1 000	213 10 61 1 000
yellow		213 20 61 3 000	213 10 61 3 000
amber		213 20 61 4 000	213 10 61 4 000
red		213 20 61 5 000	213 10 61 5 000
green		213 20 61 6 000	213 10 61 6 000
blue		213 20 61 7 000	213 10 61 7 000

* Please order light bulb separately

Options / accessories

Wall bracket only for P 200 SLF
Article number: **213 90 00 0 000**

Tubular stand 137 mm only for P 200 SLF
Article number: **213 91 00 0 000**

Wall holder only in combination with tubular stand
Article number: **282 50 20 0 000**

Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series traffic lights P 450 TSB / P 450 TDB (∅ 140 mm) / P 350 TSB (∅ 100 mm)

- signal lights for traffic light applications
- simple to combine for horizontal or vertical configuration
- also for safety-relevant applications through use of two light sources (TDB)
- stable fixing bracket for flexible alignment and mounting (optional)
- durable, sturdy and functionally reliable due to the use of high-quality plastic
- high signaling effect due to prismatic coloured lens
- glare protection adjustable to suit local conditions
- high IP protection in any installation position
- connecting piece for traffic light combinations included

P 450 TSB	P 450 TDB	P 350 TSB		
r = 10 m	r = 6 m	r = 6 m	IP 65	+ 50 °C / - 25 °C
Range as per EN 54	Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

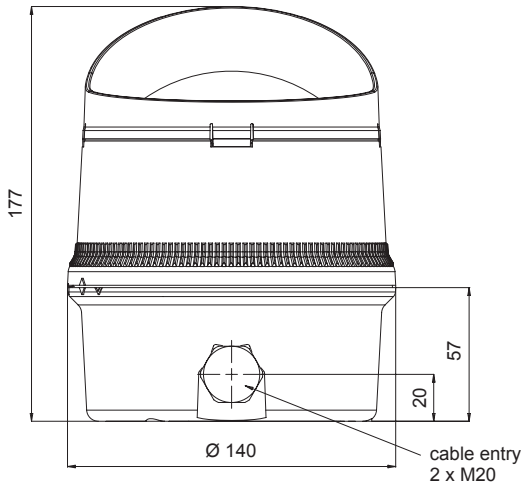
Electrical data	P 450 TSB	P 450 TDB	P 350 TSB
Rated voltage	12 – 250 V *	12 – 250 V *	12 – 250 V *
Power consumption	25 W	2 x 15 W	15 W

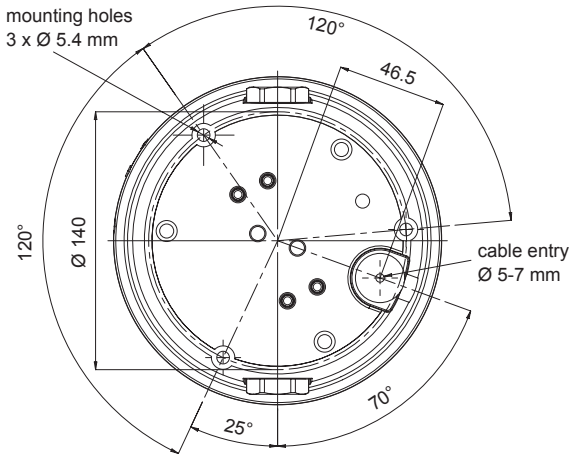
* Light source not included

Mechanical data	P 450 TSB	P 450 TDB	P 350 TSB
Operating mode	continuous light	continuous light (redundant)	continuous light
Light source	filament lamp E27	2 x filament lamp E14	filament lamp E14
Lens colours	amber, red, green		
Operating temperature	- 25 °C ... + 50 °C		
Relative humidity	90% @ + 20 °C		
Protection system according to EN 60529	IP 65		
Material	polycarbonate (PC), UL 94 VO f1		
Design	bayonet with anti-tamper locking screw		
Mounting	surface mounting (wall bracket available as accessory)		
Cable entry	1 x 5-7 mm push through grommet; 1 x M20 cable entry (incl. connecting piece)	1 x 5-7 mm push through grommet (bottom side); 2 x M20 cable entries sideways (incl. connecting piece)	1 x 5-7 mm push through grommet; 1 x M20 cable entry (incl. connecting piece)
Connecting terminals	screw terminals 1.5 mm²		
Weight	395 g	380 g	210 g

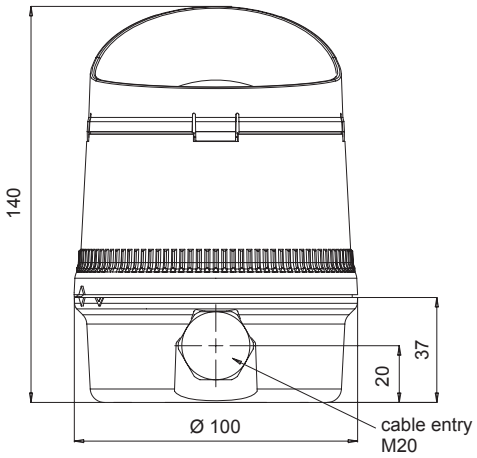
Dimensions

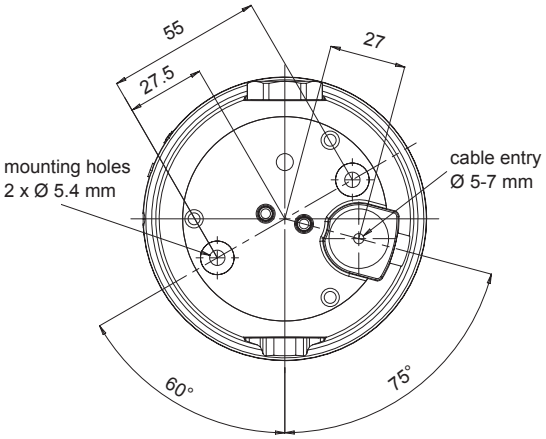
P 450 TSB / P 450 TDB





P 350 TSB





Ordering details

Article numbers		P 450 TSB	P 450 TDB	P 350 TSB
Lens colour	**Rated voltage**	12 – 250 V *	12 – 250 V *	12 – 250 V *
amber		213 54 65 4 000	213 53 62 4 000	213 51 62 4 000
red		213 54 65 5 000	213 53 62 5 000	213 51 62 5 000
green		213 54 65 6 000	213 53 62 6 000	213 51 62 6 000

* Please order light bulb separately

Options / accessories

Wall bracket for single mounting P 450
Article number:
213 99 00 0 000

Wall bracket for single mounting P 350
Article number:
213 98 00 0 000

Wall bracket-set for combinations of 2 or 3 P 450
Article number:
213 97 00 0 000

Wall bracket-set for combinations of 2 or 3 P 350
Article number:
213 96 00 0 000

Light source

See pages 122-124 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

SPECTRA series rotating mirror lights
P 400 RTH (∅ 140 mm) / P 300 RTH (∅ 100 mm)

- sturdy rotating mirror lights, also for installation where space is limited
- very high signaling effect due to the use of halogen lamps
- large variety of mounting methods due to modular design principle:
  - surface-mounted devices for mounting directly or on a wall bracket or a tubular stand
  - also for exposed installation locations through combination of wall bracket and tubular stand
  - cable entry at the side or through the base of the housing
- durable, sturdy and functionally reliable due to the use of high-quality plastic

P 400 RTH

Range as per EN 54

P 300 RTH

Range as per EN 54

Protection system

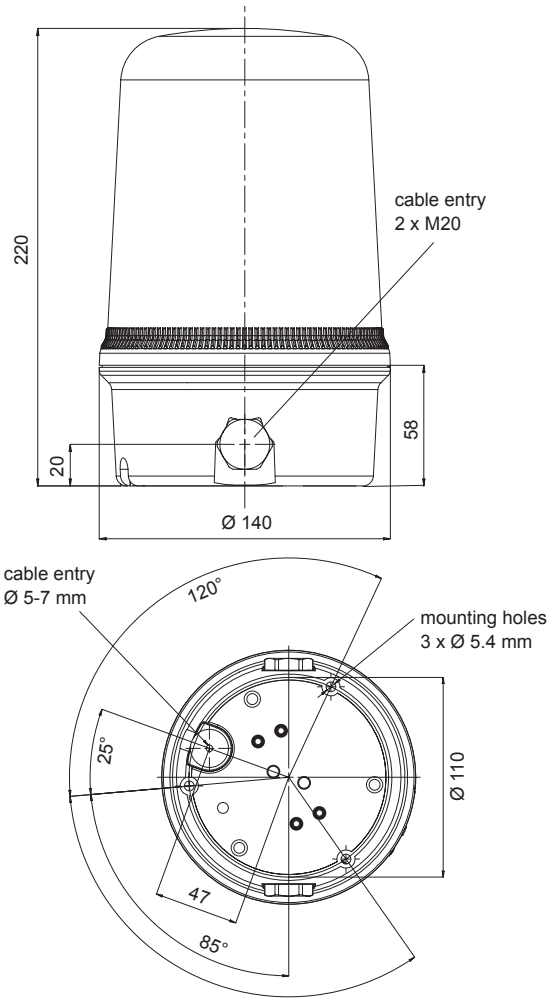
Operating temperature

Electrical data	P 400 RTH				P 300 RTH			
Rated voltage	230 V AC	115 V AC	24 V DC	12 V DC	230 V AC	115 V AC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			50 Hz / 60 Hz	50 Hz / 60 Hz		
Nominal current consumption	186 mA	338 mA	1.54 A	3.00 A	117 mA	216 mA	0.91 A	1.72 A
Capacity of light source	40 W	40 W	35 W	35 W	25 W	25 W	20 W	20 W

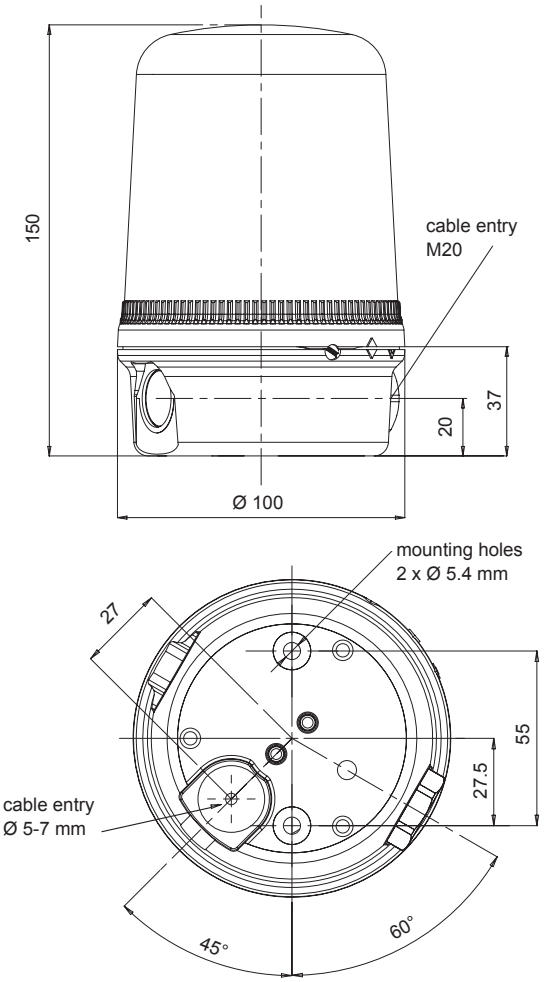
Mechanical data	P 400 RTH	P 300 RTH
Operating mode	halogen rotating mirror light	
Light source	halogen lamp G6.35 / GY6.35	
Rotation	approx. 180 U/min.	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	plain, transparent	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	IP 65	
Duty cycle	100%	
Servie life	> 5.000 hrs	
Material	polycarbonate (PC), UL 94 VO f1	
Design	bayonet with anti-tamper locking screw	
Mounting	surface mounting (wall bracket and tubular stand available as accessories)	
Installation position	arbitrary	
Connecting terminals	screw terminals 1.5 mm^2	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Weight	578 g	370 g

Dimensions

P 400 RTH



P 300 RTH



Ordering details

Article numbers		P 400 RTH				P 300 RTH			
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC	12 V DC	230 V AC	115 V AC	24 V DC	12 V DC
yellow		21347103000	21347153000	21347803000	21347853000	21337103000	21337153000	21337803000	21337853000
amber		21347104000	21347154000	21347804000	21347854000	21337104000	21337154000	21337804000	21337854000
red		21347105000	21347155000	21347805000	21347855000	21337105000	21337155000	21337805000	21337855000

Article numbers for other colours on request

Options / accessories

Wall bracket for P 400
Article number:
213 94 00 0 000

Wall bracket for P 300
Article number:
213 92 00 0 000

Tubular stand 140 mm for P 400
Article number:
213 95 00 0 000

Tubular stand 145 mm for P 300
Article number:
213 93 00 0 000

Wall holder only in combination with tubular stand
Article number:
282 50 20 0 000

See pages 122/123 for further information

Conformity to standards

The visual characteristics of rotating mirror lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing lights 13 Joules
Quadro S-M-Flex

- proven tunnel safety light; conforms to the guideline of the Swiss Federal Highways Authority: ‘Signaling systems of safety devices in tunnels’
- synchronised flashing of up to 10 beacons in series with no additional controller
- initial current limited to below 1 A
- integrated function monitoring with fault message contact
- variable brightness and flash frequency settings on-site on the device
- use of double-pole terminals for the simple connection of parallel operated lights

Range as per EN 54

Protection system

Protection system

Impact-proof housing

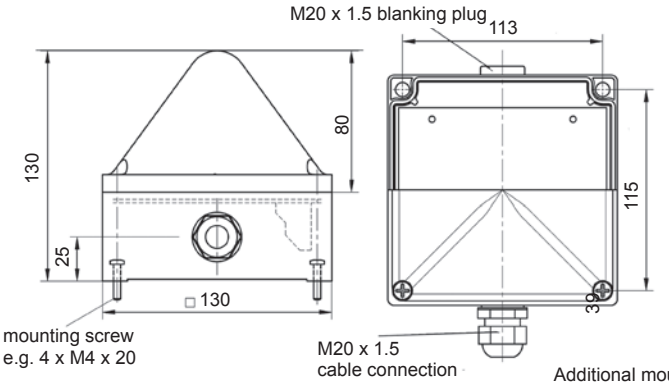
Initial current limited to < 1A

Operating temperature

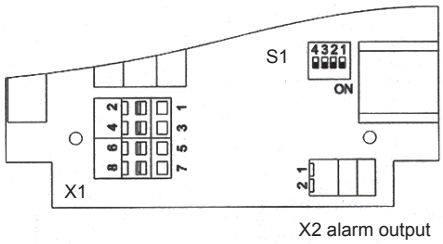
Electrical data	Quadro S-M-Flex	
Rated voltage	230 V AC	115 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	195 V – 253 V	95 V – 127 V
Nominal current consumption	250 mA (1 Hz / 13 J)	350 mA (1 Hz / 13 J)
Initial current limited to	< 1 A / 10 ms	
Alarm output	230 V / 80 mA	

Mechanical data		Quadro S-M-Flex
Flash rate		adjustable (1 Hz = 60 flashes/min. factory setting)
Flash energy		max. 13 Joules
Light intensity (DIN 5037)	clear lens	140 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66, IP 67; mounting arbitrary
Impact resistance as per EN 50102		IK 08
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 12,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	polycarbonate (PC), RAL 7035
Connecting terminals		spring-type terminal 0.08 - 2.5 mm²
Cable entry (prepared)		2 x M20 x 1.5 sideways
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5
	internal holes	113 x 113 mm
Weight		600 g

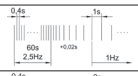
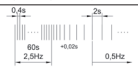
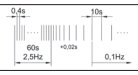
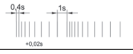
Dimensions



Fault message contact



Additional mounting possible via external lugs (included).

DIP switch setting				Setting for Quadro S-M-Flex	
4	3	2	1	Frequency (Hz)	Flash energy (Joules)
				1	13
			ON	2	13
		ON		0.5	13
		ON	ON	0.1	13
	ON			1	7.5
	ON		ON	2	7.5
	ON	ON		0.5	7.5
	ON	ON	ON	0.1	7.5
ON				1.5	13
ON			ON	1.75	13
ON		ON		2.5	13
ON		ON	ON		13
ON	ON				13
ON	ON		ON		13
ON	ON	ON		 repeating	7.5
ON	ON	ON	ON	only one flash	13

Ordering details

Article numbers		Quadro S-M-Flex
Lens colour	Rated voltage	230 V AC
clear		210 42 10 1 179
yellow		210 42 10 3 179
amber		210 42 10 4 179
red		210 42 10 5 179

Article numbers for other colours and voltages on request

Options / accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing warning lights 5 Joules
WBL-M / WBS-M

- flashing light with integrated flash monitoring and fault message contact
- for systems with safety-relevant applications, such as X-ray and laser equipment
- housing and fixing bracket made of sturdy anodised aluminium
- also available with GL approval
- ideally suited for tough industrial environments
- flash tube secured by additional steel clamp
- impact-proof lens

Range as per EN 54

Protection system

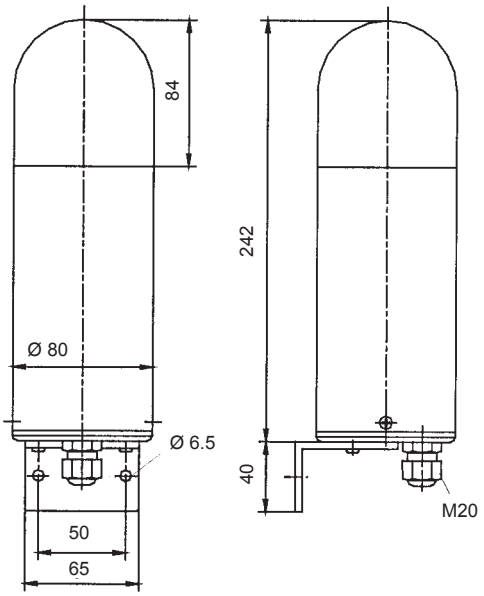
Operating temperature

Electrical data	WBL-M		WBS-M		
Rated voltage	230 V AC	42 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	185 V – 242 V	37 V – 47 V	40 V – 57 V	18 V – 35 V	10 V – 15 V
Nominal current consumption	0.07 A	0.50 A	0.18 W	0.25 A	0.60 A

Switching capacity of the faiure indication	
Switching voltage	max. 250 V AC
Switching current	max. 3 A

Mechanical data		WBx-M
Flash rate		1 Hz = 60 flashes/min.
Flash energy		5 Joules
Light intensity (DIN 5037)	clear lens	44 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 20 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	aluminium (Al Mg Si 1), yellow anodised
	base	polycarbonate (PC) with fibre glass
Cable entry		M20 x 1.5
Connecting terminals		single wire 0.5 = 2.5 mm², fine wire 0.5 = 1.5 mm², with wire end ferrules DIN 46228/1
Weight		700 g

Dimensions

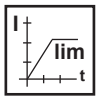


Ordering details

Article numbers		WBL-M		WBS-M
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
yellow		210 03 10 3 156	210 03 16 3 156	210 03 80 3 156
amber		210 03 10 4 156	210 03 16 4 156	210 03 80 4 156
red		210 03 10 5 156	210 03 16 5 156	210 03 80 5 156

Article numbers for other colours and voltages on request

Options / accessories



Article number:
287 10 50 0 042

GOST

GL

See page 121 for further information

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

All-round flashing lights
PMF 2015-M

- extremely bright due to 14 Joules total flash energy of the impulse group and light bundling with fresnel lens, low power consumption (energy-saving)
- the function of the flashing light is monitored internally via an optical sensor and evaluation circuitry
- both sub-systems (flashing light and monitoring unit) have separate operating voltage connections
- the light is extremely failure-tolerant and carries type approval from the Swiss Ministry of Transport
- independent technical safety report within the definitions of EN 50129 exists

Range as per EN 54

Protection system

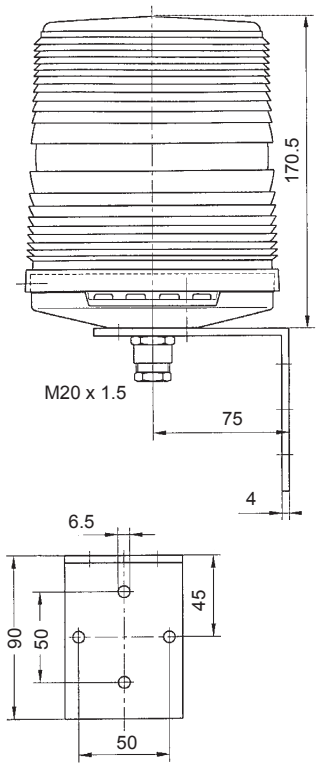
Operating temperature

Electrical data		PMF 2015-M
Rated voltage		24 V DC
Operating range		18 V – 30 V
Current consumption	flashing light	0.65 A
	monitoring unit	0.05 A
Alarm contact	contact version	positively driven contact (1 x NC, 1 x NO)
	switching current	max. 6 A
	switching voltage	max. 250 V AC
	max. switching power (AC)	1500 VA
	recommended minimum load	> 50 mW

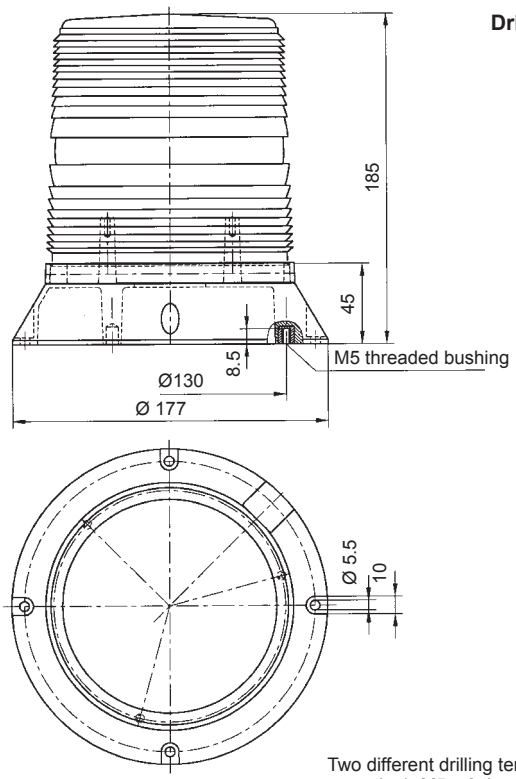
Mechanical data		PMF 2015-M
Operating mode		double flash
Light source		xenon flash tube
Flash frequency of the main flash		1 Hz = 60 flashes/min.
Flash energy of the main flash		7 Joules
Light intensity (DIN 5037)	clear lens	200 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
Beam angle	vertical	approx. 16°
	horizontal	360°
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)
Cable entry for bracket mounting		M20 x 1.5 for cables 6.5 – 13.5 mm
Connecting terminals		0.08 – 2.5 mm²

Dimensions

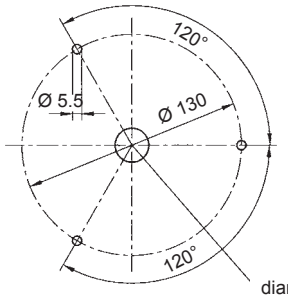
Bracket mounting



Direct mounting

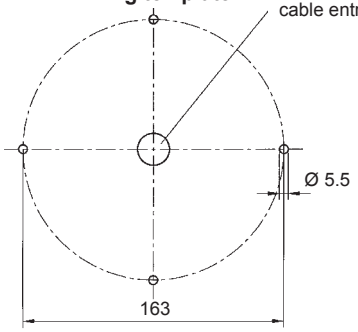


Drilling template 1 (for M5 threaded bushing)



Drilling template 2

diameter variable depending on cable entry

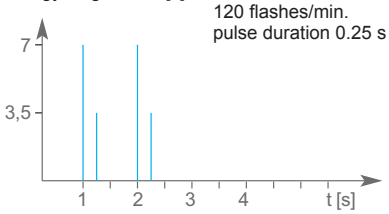


Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

Flash rate

Energy single flash [J]

2 flashes,
120 flashes/min.
pulse duration 0.25 s



Ordering details

Article numbers		PMF 2015-M bracket mounting
Lens colour	**Rated voltage**	24 V DC
amber		210 07 80 4 012
red		210 07 80 5 012

Article numbers for other colours on request

Options / accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV
EN 50129:2003	Railway applications – telecommunication technology, signalling technology and data processing systems – safety-relevant electronic systems for signal technology
EN 12352:2000	Traffic routing systems, warning and safety lights class: L1 C red F3 O3 M0 T1 S3

LED Obstacle light
POL 32 / POL 10

LED obstacle light, AVV-approved, conforms to ICAO annex 14, band 1, chapter 6

- omnidirectional light with a radiation angle of 360° for operation at night and at twilight (night marking of aviation obstacles)
- 2 in 1: optional completely redundant construction of LED, electronics and power supply in one housing. A 2nd light is therefore not necessary.
- switch to standby light in case of error automatically or by means of external controller
- integrated function monitoring with potential-free fault contact
- extremely long service life of over 50,000 hrs, hence maintenance-free
- optionally equipped with mounting-friendly plug contact

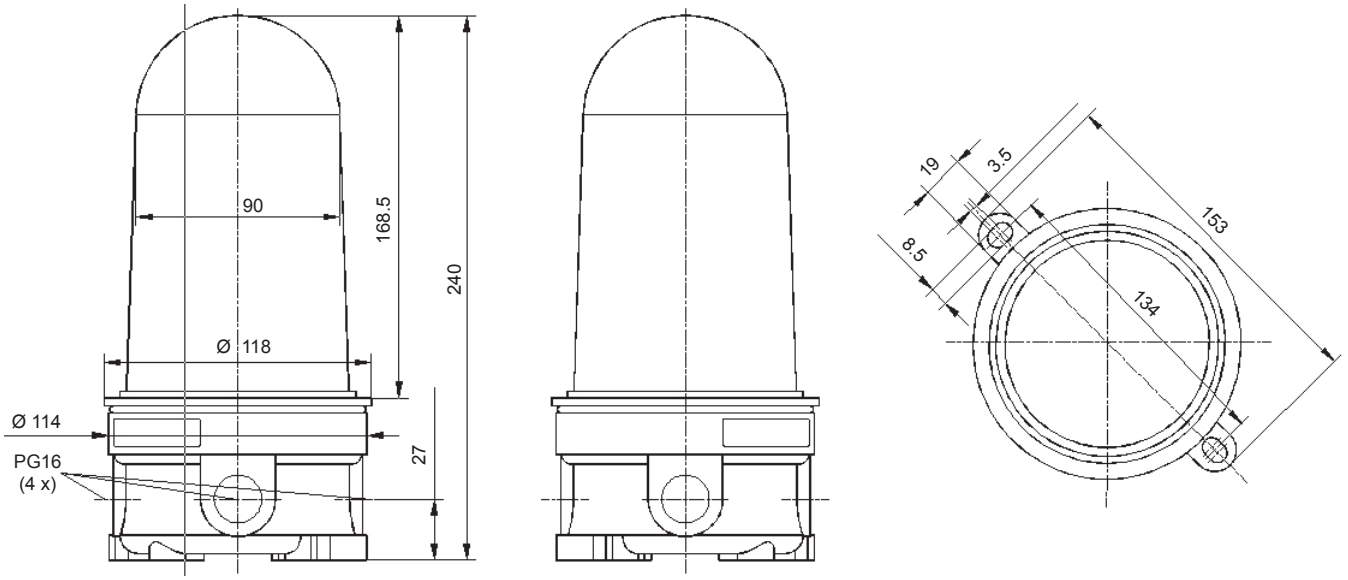
IP 68
Protection system

+ 55 °C
- 40 °C
Operating temperature

Electrical data		POL 32			POL 10		
Rated voltage		115 / 230 V AC	48 V DC	12 / 24 V DC	115 / 230 V AC	48 V DC	12 / 24 V DC
Rated frequency		50 Hz / 60 Hz			50 Hz / 60 Hz		
Operating range		85 V – 265 V	40 V – 57 V	9.6 V – 28.8 V	85 V – 265 V	40 V – 57 V	9.6 V – 28.8 V
Current consumption, determined arithmetically	115 V	96 mA			60 mA		
	230 V	45 mA			40 mA		
	48 V		270 mA			180 mA	
	24 V			430 mA			350 mA
	12 V			800 mA			600 mA
Fault contact	NC	max. 230 V, 80 mA					

Mechanical data		POL 32-M	POL 10-M	POL 10-M-R	POL 10-M-RA
Operating mode		continuous light			
Light source		LED array (red)		2 x LED array	
Version	monitored (standard)	●	●	●	●
	redundant			●	●
Activation of standby light in case of error by means of				external switching	automatic switching
Light intensity (DIN 5037)		> 32 cd	> 10 cd		
Lens colour		clear			
Light colour		aviation red			
Beam angle	vertical	approx. ± 35°			
	horizontal	360°			
Operating temperature		- 40 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 68			
Duty cycle		100%			
Service life of light source		> 50.000 hrs			
Material	lens	polycarbonate (PC)			
	base	polybutylene terephthalate (PBT)			
Mounting		direct mounting			
Connecting terminals		0.5 - 1.5 mm² fine wire - H05(07)V-K 0.5 - 2.5 mm² single wire - H05(07)V-U			
Weight		approx. 750 g			

Dimensions



Ordering details

Article numbers	POL 32-M	POL 10-M	POL 10-M-R	POL 10-M-RA
Rated voltage				
115 / 230 V AC	211 05 68 1 005	211 05 64 1 005	211 05 64 1 011	211 05 64 1 010
48 V DC	211 05 66 1 005	211 05 65 1 005	211 05 65 1 011	211 05 65 1 010
12 / 24 V DC	211 05 67 1 005	211 05 63 1 005	211 05 63 1 011	211 05 63 1 010

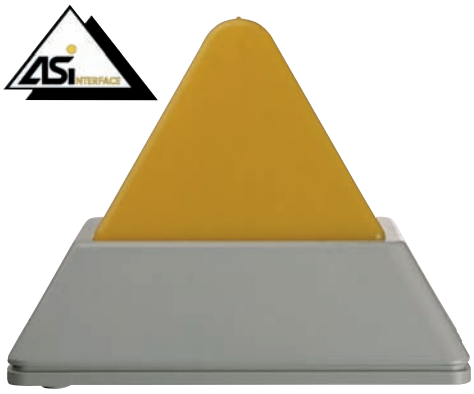
Options / accessories

Plug connec-tor

Conformity to standards

The light complies with the requirements of ICAO Annex 14, Volume 1, Chapter 6.
The light is approved in Germany in accordance with the General Administrative Rules for the Identification of Aircraft Obstructions (AVV).

LED continuous lights
PD 2100-M-AS-i / PD 2100-LED-M



Machine lights in an elegant pyramid design, equipped with LED light source for extremely long service life (> 50,000 hrs)

- vibration/shock-resistant
- low power consumption (direct via AS-i-Bus)
- minimised maintenance costs
- uncompromising safety
- reliable monitoring circuitry and AS interface integrated in the light
- integrated function monitoring with potential-free fault contact
- for safety-relevant applications, such as X-ray and laser equipment

Additional for AS-i-Bus light:

- supplying of the light directly by bus system
- control and function monitoring directly via AS interface

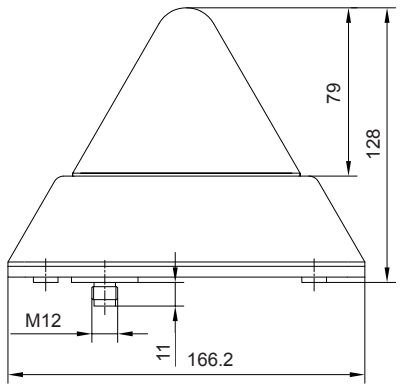
		M-AS-i	LED-M
r = 4 m	IP 55	+ 45 °C / - 25 °C	+ 55 °C / - 25 °C
Range as per EN 54	Protection system	Operating temperature	Operating temperature

Electrical data	PD 2100-M-AS-i	PD 2100-LED-M	
Rated voltage	28 V	230 V AC	24 V DC
Nominal current consumption	ca. 250 mA	12 mA	65 mA
Rated frequency		50 Hz / 60 Hz	
Operating range	26.5 V – 32.6 V	± 10%	21 V – 29 V
Alarm output	via AS-i Bus	230 V / 80 mA (MOS relay, $R_{ON\ max.}$ = 35 Ω) (NC)	

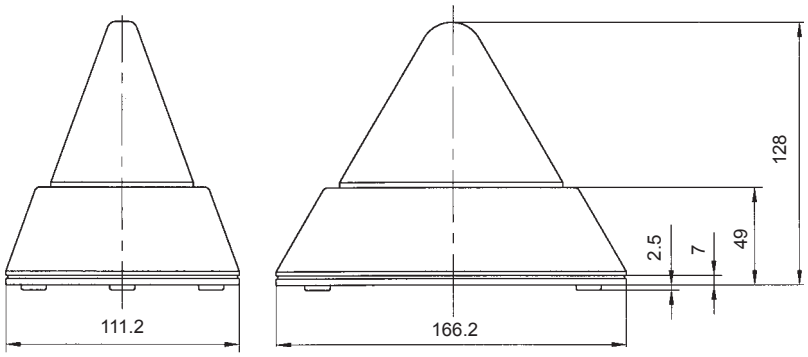
Mechanical data		PD 2100-M-AS-i	PD 2100-LED-M
Operating mode		continuous light	
Light source		LED	
Light intensity (DIN 5037)	clear lens	5 cd	
Lens colours		clear, white, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 45 °C	- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55 (if mounted vertically/horizontally)	
Protection class			II
Duty cycle		100%	
Service life of light source		> 50.000 h	
Material	lens	polycarbonate (PC)	
	housing	ABS, light grey, similar to RAL 7035	
	baseplate	ABS, light grey, similar to RAL 7035	
Cable entry			M20 x 1.5, either at the side or underneath
Connecting terminals			fine wire 0.14 – 2.5 mm²
Type of connection		M12 plug connector, 4-pole	
	Pin 1	AS-i +	
	Pin 2	NC	
	Pin 3	AS-i –	
	Pin 4	NC	
Addressing socket		DC jack, Ø 1.3 mm — AS-i + / AS-i –	
AS-i specification		AS-i 2.1, A/B capable EN 50295	
Weight		300 g	AC: 380 g / DC: 270 g

Dimensions

PD 2100-M-AS-i

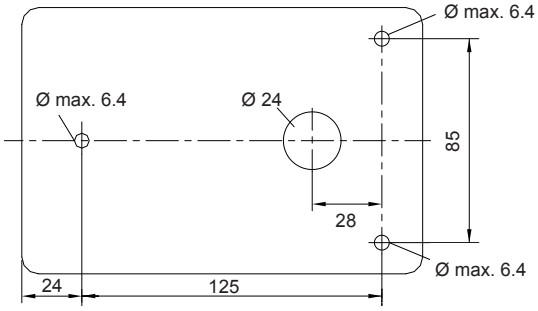


PD 2100-LED-M

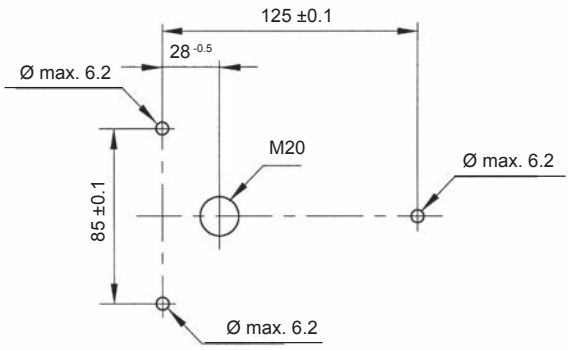


Mounting holes

PD 2100-M-AS-i



PD 2100-LED-M



Ordering details

Article numbers		PD 2100-M-AS-i	PD 2100-LED-M	
Lens colour	**Rated voltage**	26.5 V – 32.6 V	230 V AC	24 V DC
white		211 20 50 2 004		
yellow			211 20 61 3 005	211 20 60 3 005
amber			211 20 61 4 005	211 20 60 4 005
red		211 20 50 5 004	211 20 61 5 005	211 20 60 5 005

Article numbers for other colours on request

Options / accessories

Article number:
287 10 50 0 040

GOST

See page 121 for further information

Conformity to standards

The visual characteristics of continuous lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

References to visual alarm devices can be found in the following standards:

EN 60825-1	Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837
DIN EN 54	Fire alarm systems
DIN 54113-2	Radiation protection regulations for the technical operation of X-ray equipment up to 500 kV

Flashing light 10 Joules
Quadro F12-SIL

- integrated safety in sturdy Quadro-Design
- to signal dangerous situations in safety-relevant application such as process and plant safety, e.g.
  - leaks / gas warning
  - high-pressure / overfilling

  and machine safety, e.g. as
  - start-up warning
  - muting indication
  - machine stop delay warning
- by means of integrated self-monitoring of the devices the normative required, regular inspection of warning devices is ensured
- the warning devices can be implemented in Safety Instrumented Systems (SIS) up to **SIL 2**

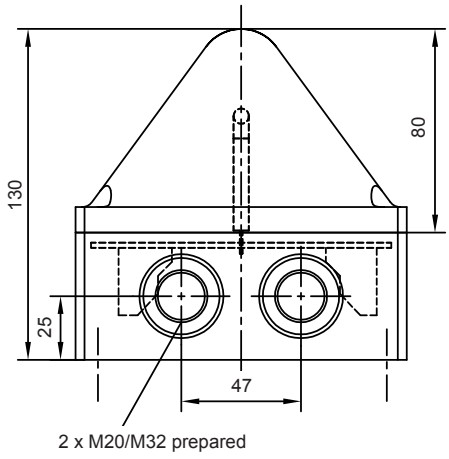
We would be more than happy to provide all safety-technical key data.

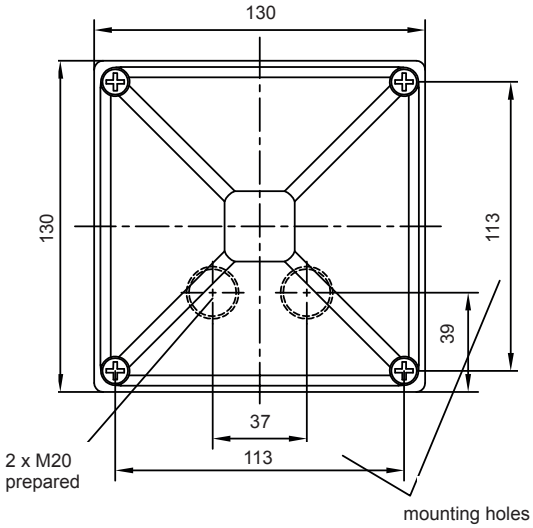
r = 17 m	IP 66	IP 67	IK 08	+ 55 °C / - 25 °C
Range as per EN 54	Protection system	Protection system	Impact-proof housing	Operating temperature

Electrical data		Quadro F12-SIL		
Rated voltage		230 V AC	115 V AC	24 V DC
Rated frequency		50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range		195 V – 253 V	95 V – 127 V	18 V – 30 V
Nominal current consumption	flashing light	250 mA	350 mA	700 mA
	diagnostics channel	100 mA	100 mA	65 mA
Diagnostics channel	contact version	positively driven contact (1 x NC, 1 x NO)		
	switching current	max. 6 A		
	switching voltage	max. 250 V AC		
	max. switching power (AC)	1500 VA		
	recomended minimum load	> 50 mW		

Mechanical data		Quadro F12-SIL
Flash rate		1 Hz = 60 flashes/min.
Flash energy		10 Joules
Light intensity (DIN 5037)	clear lens	118 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary
Impact resistance as per EN 50102		IK 08
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	polycarbonate (PC), RAL 7035
Cable entry		2 x M20 bottom side / 2 x M20/M32 sideways
Connecting terminals		cage clamp terminal 0,08 - 2,5 mm^2
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5
	internal lugs	113 x 113 mm
Weight		600 g

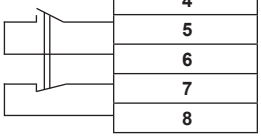
Dimensions





Additional mounting possible via external lugs (included).

Connection diagram



1	L/+ Operating voltage flashing light
2	N/- Operating voltage flashing light
3	L/+ Operating voltage monitoring channel
4	N/- Operating voltage monitoring channel
5	Alarm relay NO (mechanical safety relay,
6	Alarm relay NO positively driven contacts,
7	Alarm relay NC voltage rating 250V/6A
8	Alarm relay NC minimum contact load 10mA/5V)

Ordering details

Article numbers		Quadro F12-SIL		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC
yellow		210 41 10 3 601	210 41 16 3 601	210 41 80 3 601
amber		210 41 10 4 601	210 41 16 4 601	210 41 80 4 601
red		210 41 10 5 601	210 41 16 5 601	210 41 80 5 601

Article numbers for other colours and voltages on request

Options / accessories

GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.**
Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled.
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199:
'Coding of display devices and control elements using colours and supplementary means'.

The viual alarms fulfill the requirements to the functional safety according to:
EN 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61511 Functional safety - Safety instrumented systems for the process industry sector
The devices can be used in safety related control systems in accordance with the following standards:
EN ISO 13849-1 Safety of machinery - Safety related parts of control systems – part 1
EN 62061 Safety of machinery - Functional safety of electrical/electronic/programmable electronic safety-related systems

All-round flashing lights 10 Joules
PMF 2015-SIL

- extremely bright flashing light by light bundling with fesnel lens, low power consumption
- to signal dangerous situations in safety-relevant application such as process and plant safety, e.g.
  - leaks / gas warning
  - high-pressure / overfilling

  and machine safety, e.g. as
  - start-up warning
  - muting indication
  - machine stop delay warning
- by means of integrated self-monitoring of the devices the normative required, regular inspection of warning devices is ensured
- the warning devices can be implemented in Safety Instrumented Systems (SIS) up to **SIL 2**

We would be more than happy to provide all safety-technical key data.

Range as per EN 54

Protection system

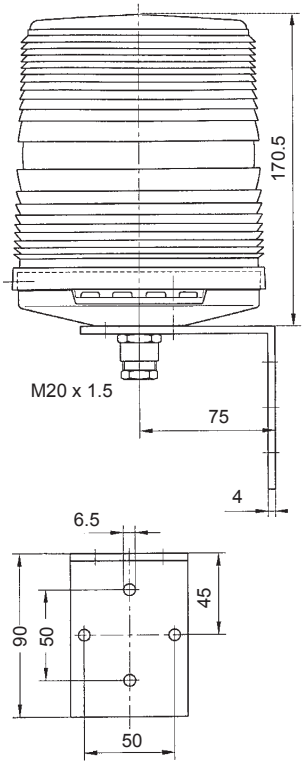
Operating temperature

Electrical data		PMF 2015-SIL	
Rated voltage		230 V AC	24 V DC
Operating range		50 Hz / 60 Hz	
Operating range		195 – 253 V	18 – 30 V
Nominal current consumption	flashing light	250 mA	700 mA
	diagnostics channel	100 mA	65 mA
Diagnostics channel	contact version	positively driven contact (1 x NC, 1 x NO)	
	switching current	max. 6 A	
	switching voltage	max. 250 V AC	
	max. switching power (AC)	1500 VA	
	recomended minimum load	> 50 mW	

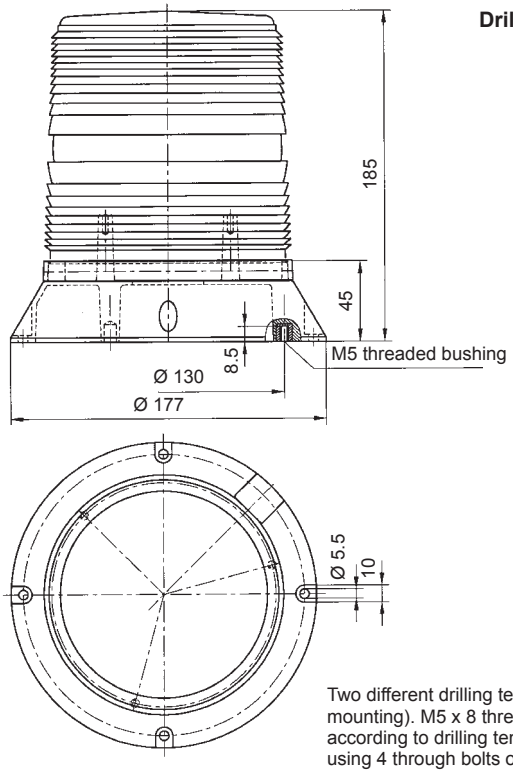
Mechanische Daten		PMF 2015-SIL
Flash frequency of the main flash		1 Hz = 60 flashes/min.
Flash energy of the main flash		10 Joules
Light intensity (DIN 5037)	clear lens	200 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
Beam angle	vertical	approx. 16 °
	horizontal	360 °
Operating temperature		- 30 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55 (vertical mounting)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	bracket mounting: polycarbonate (PC) / direct mounting: acrylonitrile butadiene styrene (ABS)
Cable entry for bracket mounting		M20 x 1.5 for cables 6.5 - 13.5 mm
Connecting terminals		single wire 0.5 = 2.5 mm^2, fine wire 0.5 = 1.5 mm^2, with cable end sleeves DIN 46228/1
Weight	bracket mounting	AC: 1.1 kg / DC: 1.2 kg
	direct mounting	AC: 0.6 kg / DC: 0.7 kg

Dimensions

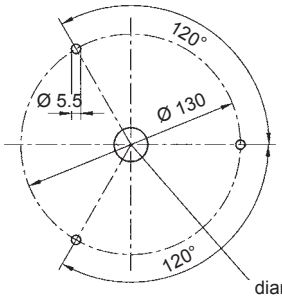
Bracket mounting



Direct mounting

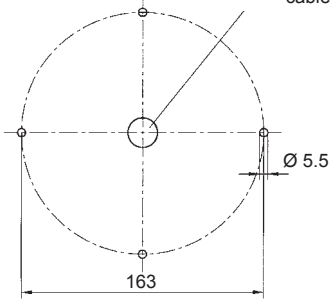


Drilling template 1 (for M5 threaded bushing)



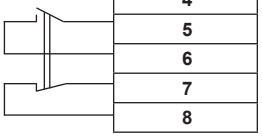
diameter variable depending on cable entry

Drilling template 2



Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

Connection diagram



1	L/+ Operating voltage flashing light
2	N/- Operating voltage flashing light
3	L/+ Operating voltage monitoring channel
4	N/- Operating voltage monitoring channel
5	Alarm relay NO (mechanical safety relay,
6	Alarm relay NO positively driven contacts,
7	Alarm relay NC voltage rating 250V/6A
8	Alarm relay NC minimum contact load 10mA/5V)

Ordering details

Article numbers		PMF 2015-SIL direct mounting		PMF 2015-SIL bracket mounting	
Lens colour	Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC
amber		210 07 10 4 601	210 07 80 4 601	210 07 10 4 611	210 07 80 4 611
red		210 07 10 5 601	210 07 80 5 601	210 07 10 5 611	210 07 80 5 611

Article numbers for other colours and voltages on request

Options / accessories

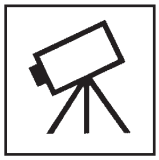
GOST

Conformity to standards

The visual characteristics of flashing lights conform to the European standard DIN EN 842: **'Machine safety – visual alarm signals'.** Requirements contained in the DIN EN 981 standard: **'Machine safety – system of acoustic and visual alarm and information signals',** can be fulfilled. The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199: **'Coding of display devices and control elements using colours and supplementary means'.**

The viual alarms fulfill the requirements to the functional safety according to:
EN 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61511 Functional safety - Safety instrumented systems for the process industry sector
The devices can be used in safety related control systems in accordance with the following standards:
EN ISO 13849-1 Safety of machinery - Safety related parts of control systems – part 1
EN 62061 Safety of machinery - Functional safety of electrical/electronic/programmable electronic safety-related systems

Accessories



External flash monitoring system

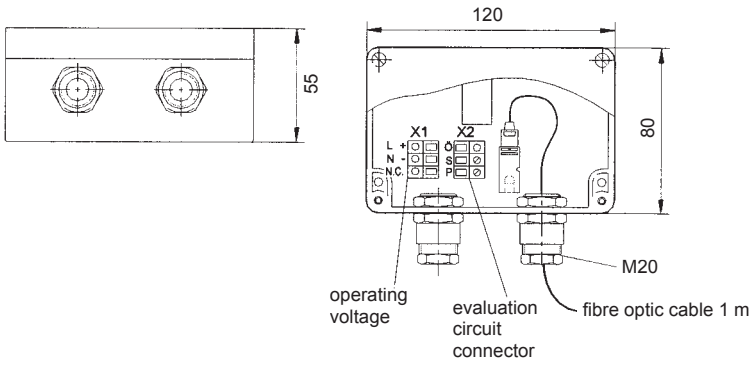
This device monitors the correct functioning of a flashing light by opto-electronic means. The flash from the light is fed via an optical fibre to a phototransistor, which converts the optical impulse to an electrical impulse. The electronic circuit evaluates the pulse and its regular repetition. As soon as the operating voltage is applied, the evaluation relay closes the changeover contact. If the operating voltage fails, the relay opens immediately.

This method of operation represents the fail-safe normally-closed circuit function and guarantees an alarm even if the operating voltage fails. On the other hand, the changeover contact serves to continue an alarm, e.g. in an failure message line, or the direct blocking of further machine processes.

Electrical data	External flash monitoring			
Rated voltage	230 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz			
Operating range	198 V – 242 V	11 V – 15 V	16 V – 34 V	38 V – 52 V
Nominal current consumption	0.001 A	0.050 A	0.050 A	0.050 A

Mechanical data		External flash monitoring
Fibre optic cable		1 m
Duty cycle		100%
Switching capacity of the evaluation circuit		max. 230 V AC: 2 A
Operating temperature		- 20 °C ... + 50 °C
Storage temperature		- 40 °C ... + 50 °C
Relative humidity		90%
Protection system according to EN 60529		IP 55
Material		acrylonitrile butadiene styrene (ABS)
Colour		similar to RAL 7035
Cable entry		2 x M20
Weight	AC	330 g
	DC	230 g

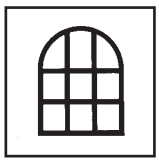
Dimensions | **Mounting holes**



Ordering details

suitable for ...	Rated voltage	Article number
any flashing light with a 1 Hz flash rate	24 V DC	291 30 80 0 000

Article numbers for other voltages on request



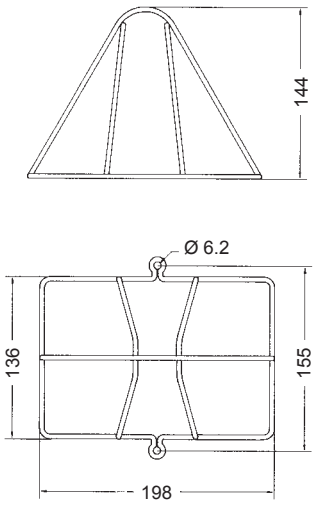
Protective cages

For protection against large mechanical demands. A very useful accessory for visual signaling devices fitted to vehicles, such as fork lift trucks or driverless transport vehicles.

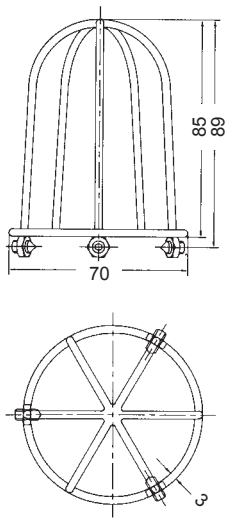
Mechanical data	
Material	steel, powder-coated
Colour	white, similar to RAL 9016

Dimensions

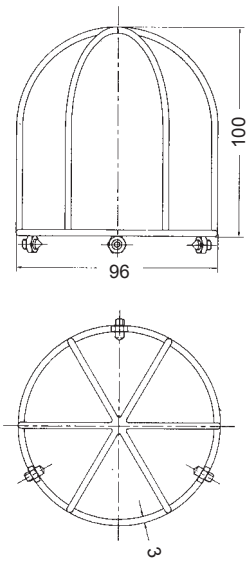
for PB- / PD series



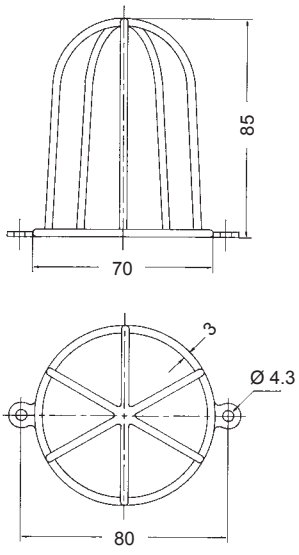
for WBL/WBS, DWBL/DWBS



for ABL/ABL, KBL, WB-M, KDL

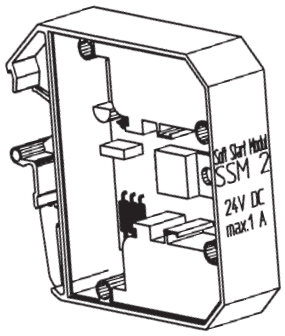


for WBLR/WBSR



Ordering details

suitable for ...	Weight	Article number
PB-/PD series	165 g	287 10 50 0 040
WBL/WBS, DWBL/DWBS	55 g	287 10 50 0 041
ABL/ABS, WBL-M/WBS-M, KBL, KDL	65 g	287 10 50 0 042
WBLR/WBSR	52 g	287 10 50 0 043



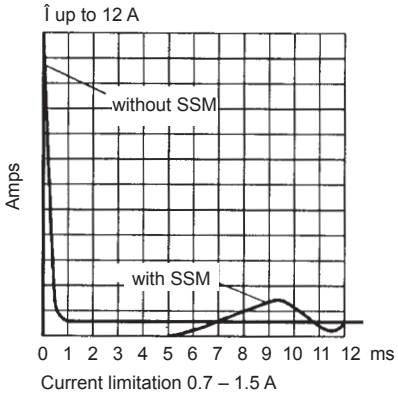
Soft start module SSM2

The module enables the soft start and limitation of the large initial current peaks of capacitive consumers. This includes all DC devices with a smoothing capacitor on the voltage input, regardless of whether the devices are sounders or flashing lights. The SSM soft start module prevents the overloading of the relay contacts when switching on and the premature triggering of overcurrent circuit breakers (e.g. PLC controller). The module is available as a built-in housing for DIN rail mounting or is already integrated in various devices.

Data	SSM2
Rated voltage	24 V DC
Operating range	18 V – 30 V
Nominal current consumption	1 A
Operating temperature	- 40 °C ... + 50 °C
Storage temperature	- 40 °C ... + 70 °C
Relative humidity	90%

Ordering details

suitable for ...	Article number
DC devices	410 00 00 0 500



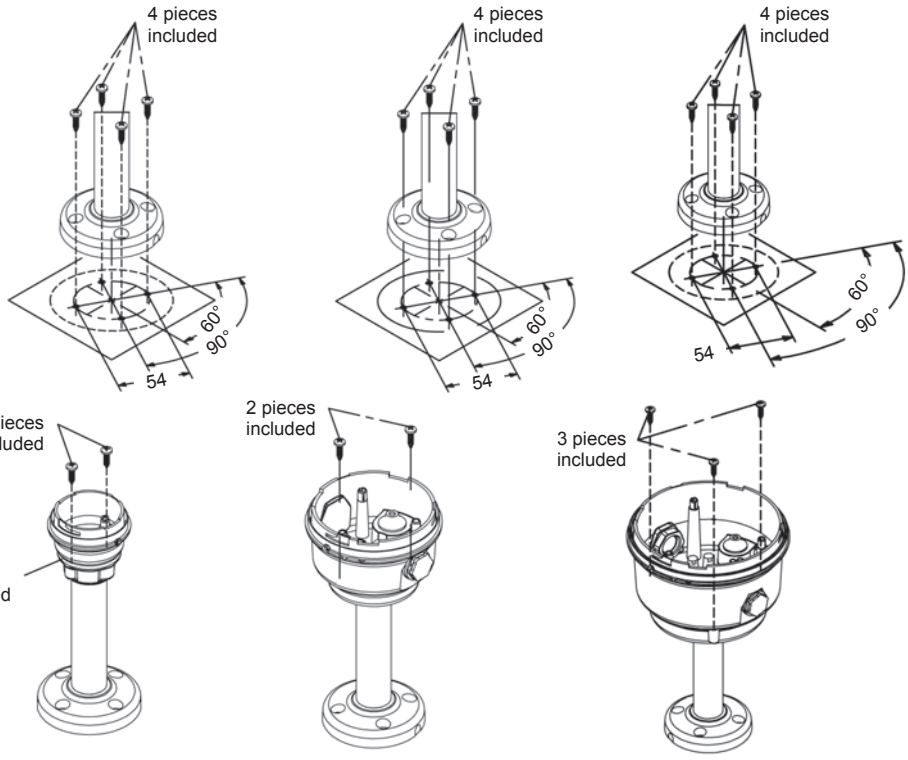
Current limitation 0.7 – 1.5 A

Tubular stands

Tubular stands for mounting SPECTRA lights.

Dimensions

P 200 TMA001	P 300 TMA001	P 400 TMA001



Ordering details

Article numbers	Height	P 200 TMA001	P 300 TMA001	P 400 TMA001
for P 200 series	137 mm	213 91 00 0 000	–	–
for P 300 series	140 mm	–	213 93 00 0 000	–
for P 400 series	145 mm	–	–	213 95 00 0 000

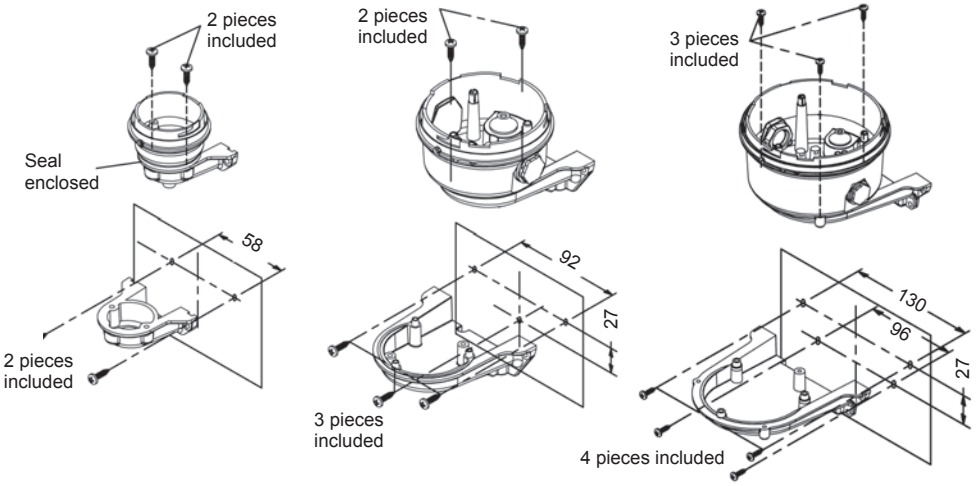
further tubular stand lengths on enquiry

Wall bracket

Wall bracket for mounting SPECTRA lights.

Dimensions

P 200 RAB001	P 300 RAB001	P 400 RAB001



Ordering details

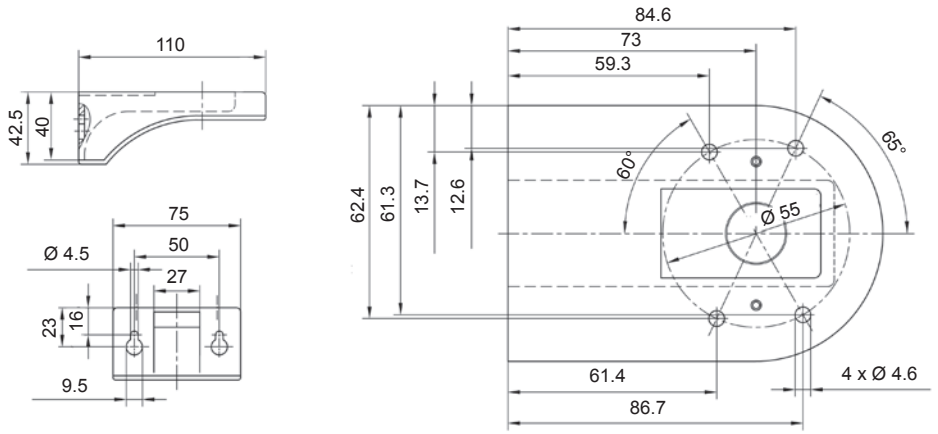
Article numbers	Heights	P 200 RAB001	P 300 RAB001	P 400 RAB001
for P 200 series	137 mm	213 90 00 0 000	–	–
for P 300 series	140 mm	–	213 92 00 0 000	–
for P 400 series	145 mm	–	–	213 94 00 0 000

Wall holder with hood

Wall holder for mounting SPECTRA lights on tubular stands.

Dimensions

BR 50-W



Ordering details

suitable for ...	Article number
mounting the P 200 / P 300 / P 400 series on tubular stands	282 50 20 0 000

Wall bracket for traffic lights

Metal wall bracket for traffic lights and combinations.

Ordering details

Article numbers	P 350 TMB	P 450 TMB
Wall bracket for single mounting of the P 350	213 98 00 0 000	–
Wall bracket for single mounting of the P 450	–	213 99 00 0 000
Wall bracket set for combinations of 2 or 3 P 350	213 96 00 0 000	–
Wall bracket set for combinations of 2 or 3 P 450	–	213 97 00 0 000

Light source

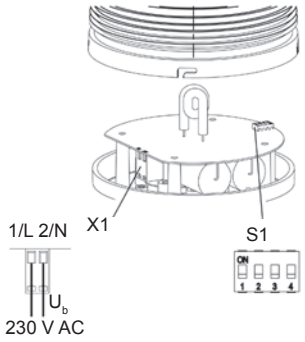
Filament lamps

Filament lamps for Pfannenberg lights with socket

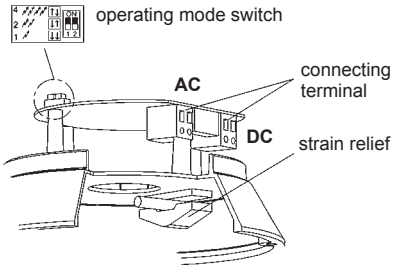
Product	suitable for ...	Rated voltage	Article number
filament lamp E14 15 W	PD / GDL / KDL / P 350 TSB / P 450 TDB	24 V	281 13 00 0 000
filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	12 V	281 13 00 0 001
filament lamp E14 15 W	PD / GDL / P 350 TSB / P 450 TDB	48 V	281 13 00 0 002
filament lamp E14 15 W	PD / GDL / P 350 TSB / P 450 TDB	110 V	281 13 00 0 003
filament lamp E14 15 W	PD / GDL / KDL / P 350 TSB / P 450 TDB	240 V	281 13 00 0 004
filament lamp E14 25 W	P 300 SLF / P 300 FLF	12 V	281 13 00 0 010
filament lamp E14 25 W	P 300 SLF / P 300 FLF	24 V	281 13 00 0 011
filament lamp E14 25 W	P 300 SLF / P 300 FLF	48 V	281 13 00 0 012
filament lamp E14 25 W	P 300 SLF / P 300 FLF	115 V	281 13 00 0 013
filament lamp E14 25 W	P 300 SLF / P 300 FLF	230 V	281 13 00 0 014
filament lamp E14 40 W	P 400 SLF / P 400 FLF	12 V	281 13 00 0 015
filament lamp E14 40 W	P 400 SLF / P 400 FLF	24 V	281 13 00 0 016
filament lamp E14 40 W	P 400 SLF / P 400 FLF	115 V	281 13 00 0 017
filament lamp E14 40 W	P 400 SLF / P 400 FLF	230 V	281 13 00 0 018
filament lamp E27 15 W	KDL	240 V	281 13 00 0 009
filament lamp E27 25 W	P 450 TSB	24 V	281 13 00 0 019
filament lamp E27 25 W	P 450 TSB	115 V	281 13 00 0 020
filament lamp E27 25 W	P 450 TSB	230 V	281 13 00 0 021
filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	12 V	281 13 00 0 022
filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	24 V	281 13 00 0 023
filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	48 V	281 13 00 0 024
filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	115 V	281 13 00 0 025
filament lamp BA9s 5 W	P 100 FLF / P 100 SLF / P 200 FLF / P 200 SLF	230 V	281 13 00 0 026
filament lamp BA15s 15 W	KDL	240 V	281 13 00 0 006
filament lamp BA15s 15 W	KDL	24 V	281 13 00 0 007
filament lamp BA15s 15 W	KDL	12 V	281 13 00 0 008
halogen lamp G6.35/GY6.35 20 W	P 300 SLH / P 300 FLH / P 300 RTH	12 V	281 13 00 0 027
halogen lamp G6.35/GY6.35 20 W	P 300 SLH / P 300 FLH / P 300 RTH	24 V	281 13 00 0 028
halogen lamp G6.35/GY6.35 25 W	P 300 SLH / P 300 FLH / P 300 RTH	115 V	281 13 00 0 029
halogen lamp G6.35/GY6.35 25 W	P 300 SLH / P 300 FLH / P 300 RTH	230 V	281 13 00 0 030
halogen lamp G6.35/GY6.35 35 W	P 400 SLH / P 400 FLH / P 400 RTH	12 V	281 13 00 0 031
halogen lamp G6.35/GY6.35 35 W	P 400 SLH / P 400 FLH / P 400 RTH	24 V	281 13 00 0 032
halogen lamp G6.35/GY6.35 40 W	P 400 SLH / P 400 FLH / P 400 RTH	115 V	281 13 00 0 033
halogen lamp G6.35/GY6.35 40 W	P 400 SLH / P 400 FLH / P 400 RTH	230 V	281 13 00 0 034

Connection diagrams

PMF 2030

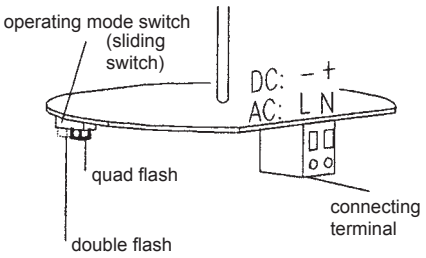


PMF 2020



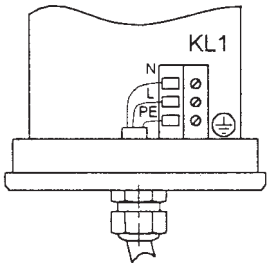
The operating modes quad flash (factory setting), double flash and single flash can be set via the DIP switch, which is accessible from the side.

PMF 2015

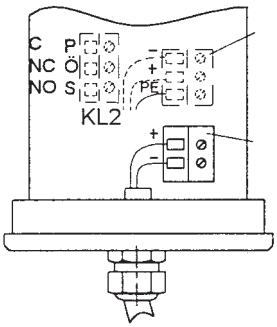


The operating modes quad flash (factory setting), double flash and single flash can be set via the DIP switch, which is accessible from the side.

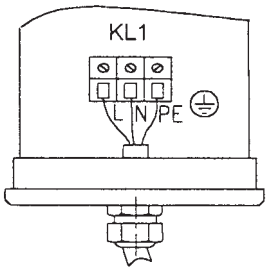
ABL



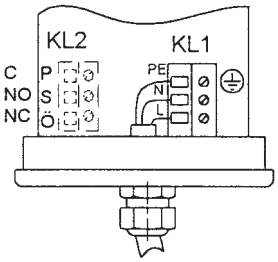
ABS / WBS / DWBS KBL DC version WBS-M



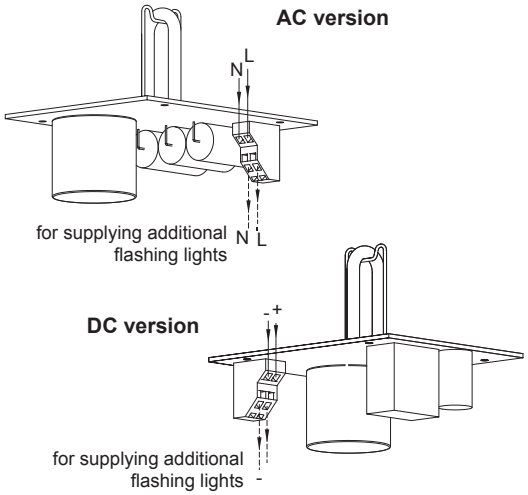
WBL / WBL-PX DWBL



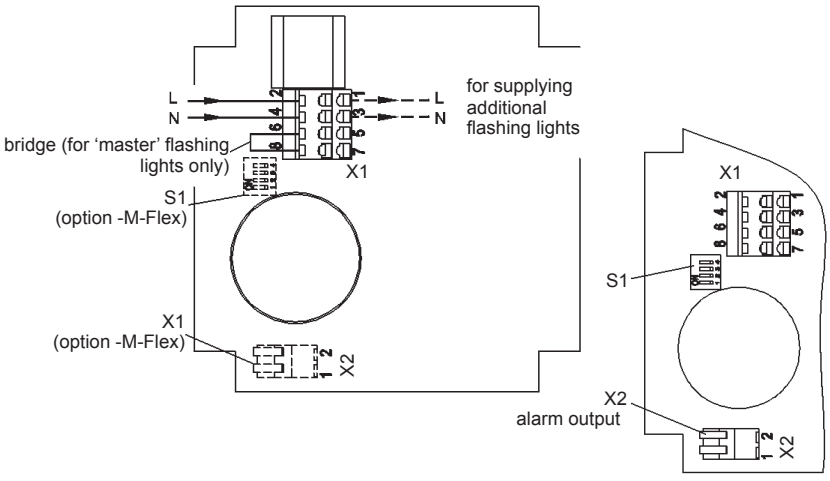
KBL AC version WBL-M 230 V AC



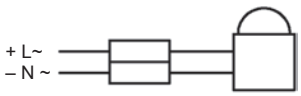
Quadro F12



Quadro S / Quadro S-M-Flex



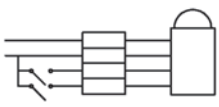
P 300/400 STR / P 300/400 STS P 300/400 FLF / P 300/400 FLH P 300/400 SLF / P 300/400 SLH

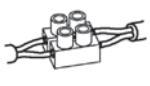


colour	D/C	A/C
brown	+	L~
blue	–	N ~

P 400 LDA

+ red L~ brown
– N ~ blue
– N ~ green stage 2
– N ~ yellow stage 3

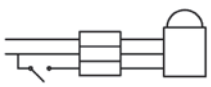


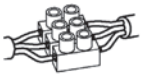


colour	D/C	A/C
red / brown	+	L~
blue	–	N ~
green stage 2	–	
yellow stage 3	–	

P 300 STF

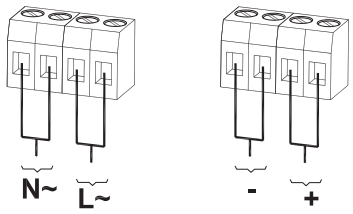
+ L~ red
– N ~ blue 1 Hz
– N ~ green 2 Hz





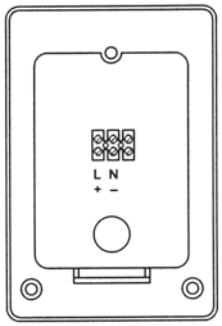
colour	D/C	A/C
red	+	L~
blue	–	N ~
green	–	N ~

PMB 010 / PMB 005
AC version | DC version

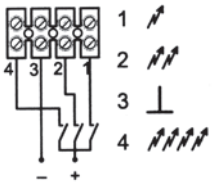


PB 2010 / PMB 2010 / PB 2005

standard version

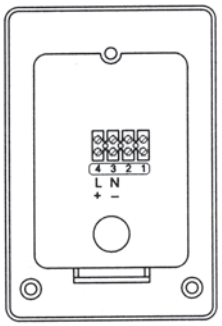


flash rate is set via the DIP switch in the PMB (standard version)



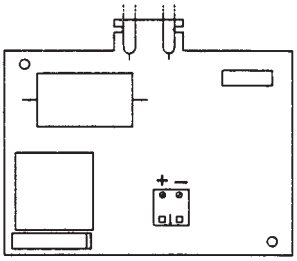
PMB 2010 external operation controller [1]

version for external operating controller

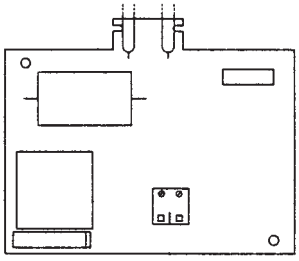


[1] optional for DC types from the PMB 2000 series

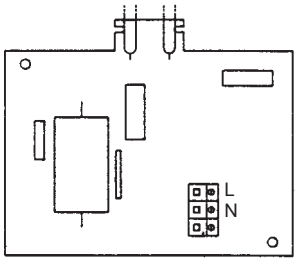
WBSR



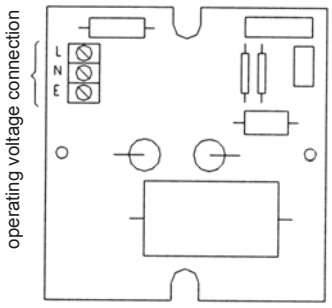
WBLR (< 42 V AC)



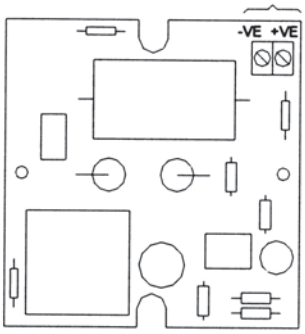
WBLR (> 110 V AC)



PL 105 AC version

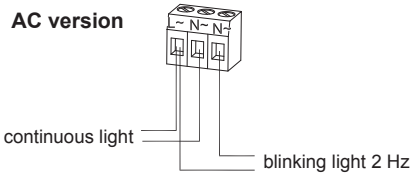


PL 105 DC version

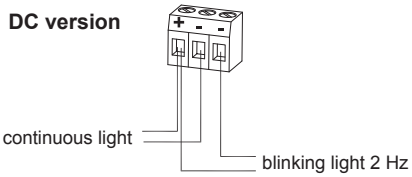


PL 105-LED

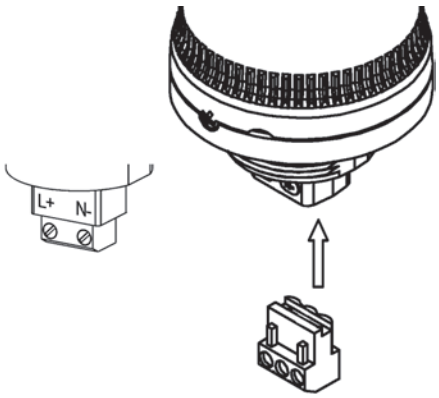
AC version



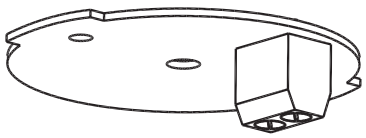
DC version



P 100 STR / P 100 FLF
P 100 SLF / P 100 LDA

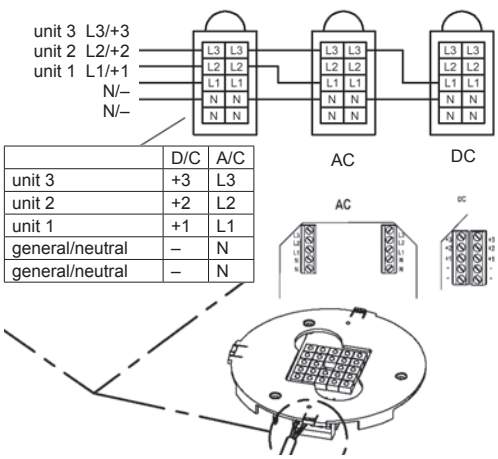


P 200 STR / P 200 FLF
P 200 SLF / P 200 LDA



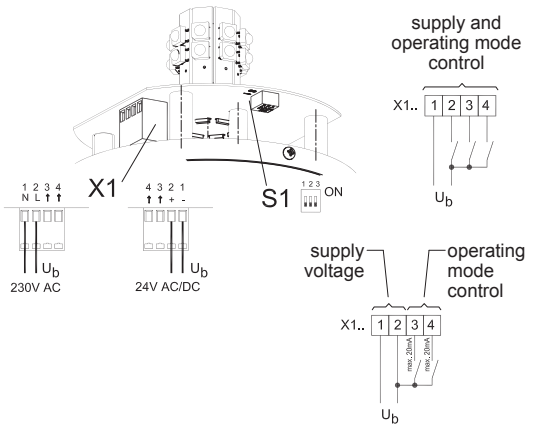
DC	AC
+	L~
-	N~

P 450 TLA / P 350 TLA

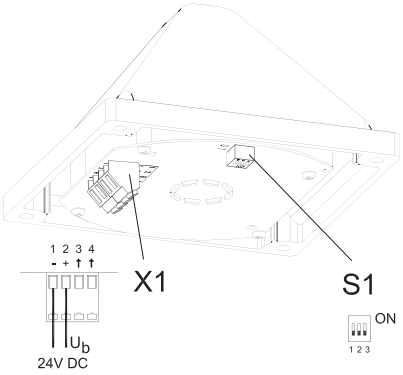


	D/C	A/C
unit 3	+3	L3
unit 2	+2	L2
unit 1	+1	L1
general/neutral	–	N
general/neutral	–	N

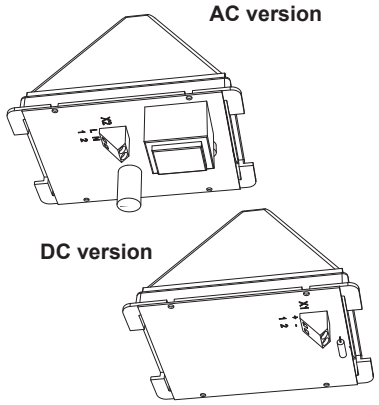
PMF-LED Flex



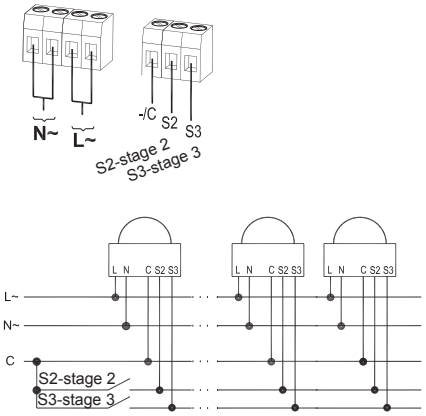
Quadro-LED Flex



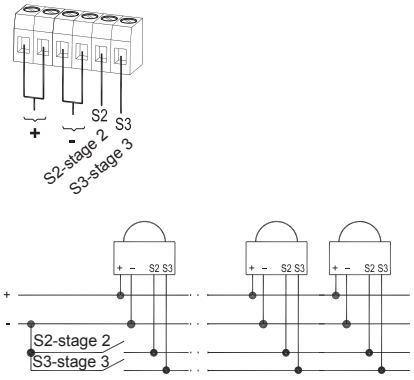
PD 2100-LED



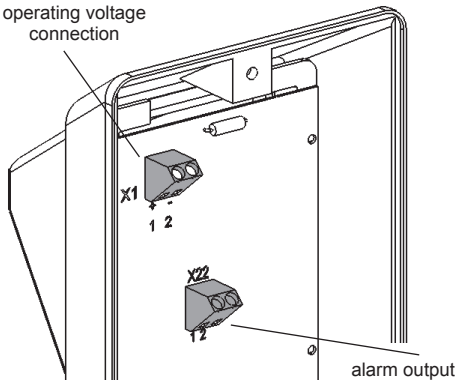
PMBL1 AC version



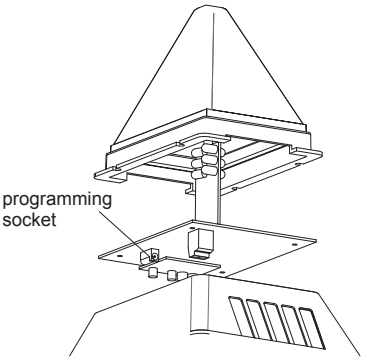
PMBL1 DC version



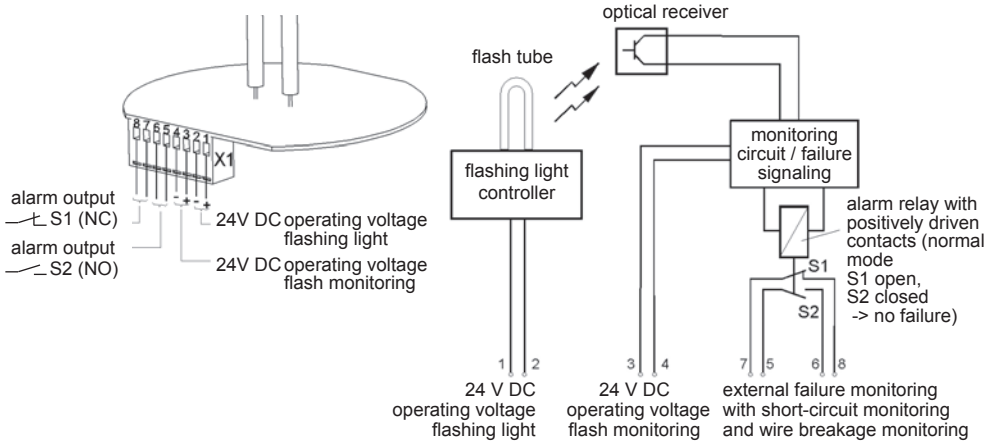
PD 2100-LED-M



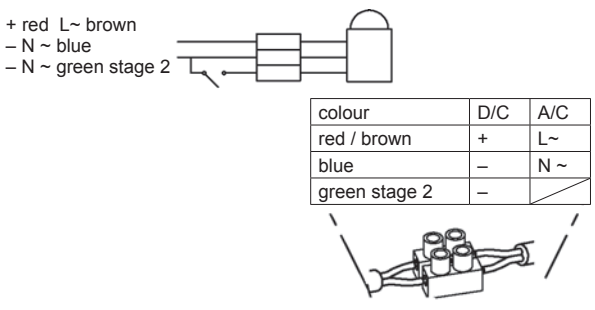
PD 2100-M-AS-i



PMF 2015-M

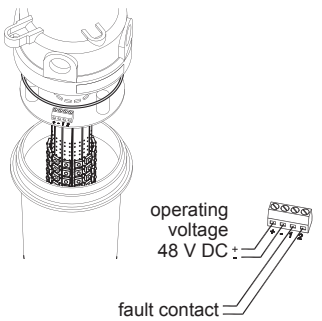


P 300 LDA

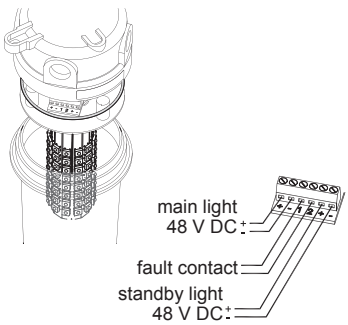


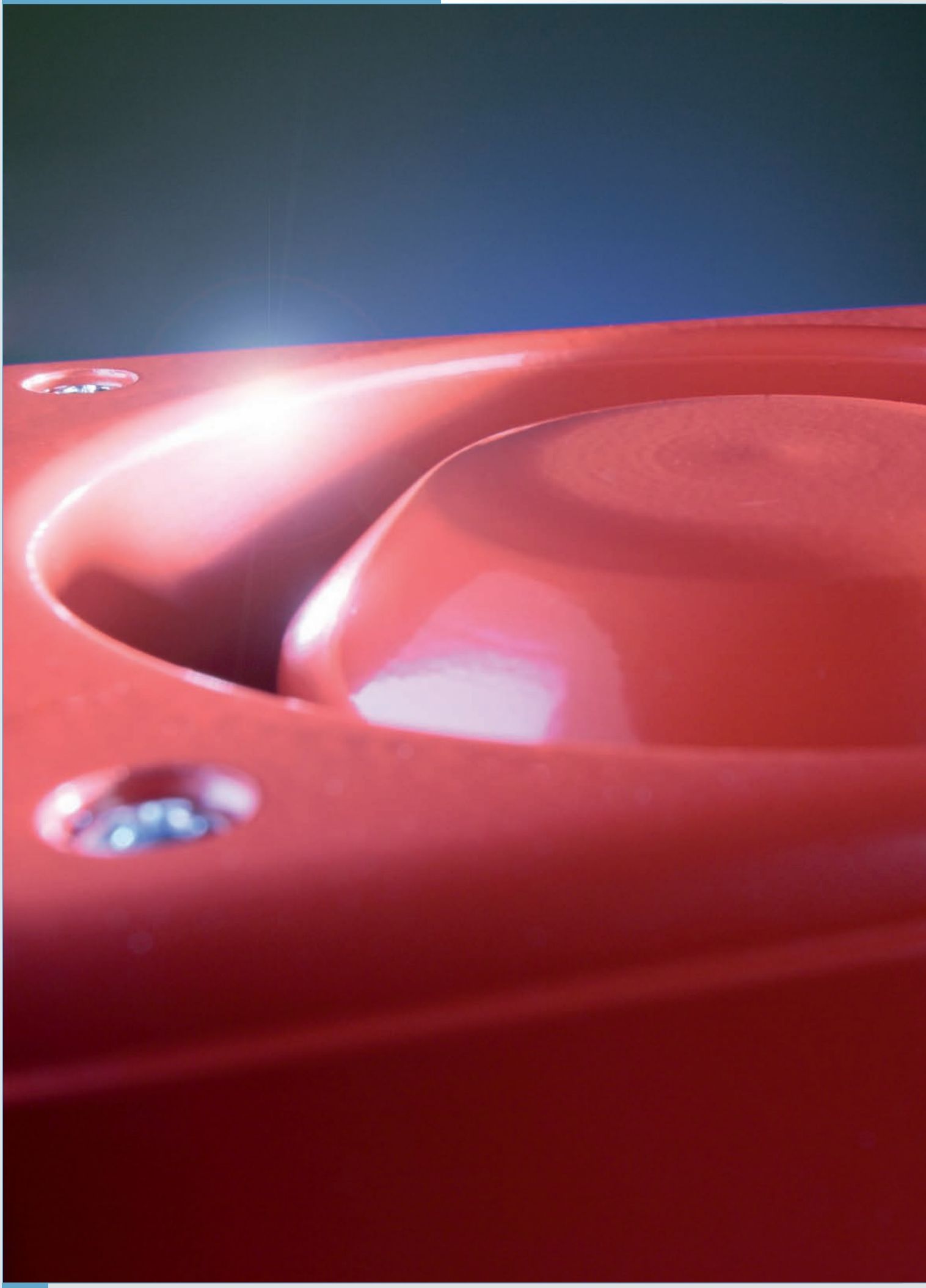
colour	D/C	A/C
red / brown	+	L~
blue	–	N ~
green stage 2	–	

POL 32-M



POL 10





Sound waves are a language that everybody understands!

Use our range of audible signaling devices for all industrial areas of application

A baby's cry, cars sounding their horns, the front door bell – acoustic signals are part of our life right from the very beginning. All over the world. Everybody who hears a loud acoustic signal feels called upon to act in some way, regardless of the situation.

On the basis of these conditions, the use of acoustic signaling devices is also of great advantage in the industrial sector. Malfunctions are reported immediately, dangerous situations are displayed without delay. Benefit from our wide range of acoustic signaling devices, which are guaranteed to draw the necessary attention in your company - when it really matters.

All audible signaling devices at a glance

	Type	Maximum signal reception range for a 65 dB ambient noise level in metres (m) [1]					Sound pressure level	Protection system	Dimensions (HxWxD) mm	Approvals / standards						Page
		10	100	250	500	1500				GL	GOST	UL	VdS	EN 54-3	RS	
	Sounder															
	SON 2						100 dB (A)	IP 55	86 x 86 x AC: 89.5 DC: 64.5		○					132
	SON F1						100 dB (A)		86 x 86 x 64.5		○	●	●	●		
	DS 5						105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143	●	●	●	●	●	●	134
	DS 10						110 dB (A)			●	●	●	●	●	●	
	DS 5-DN						105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143							136
	PA 100						100 dB (A)	IP 56	87 x 87 x 79	●	●	●	●	●	●	138
	PA 106						105 dB (A)	IP 66	130 x 130 x 132	●	●	●	●	●	●	138
	PA 110						110 dB (A)	IP 66	168 x 168 x 156.5	●	●	●	●	●	●	140
	PA 120						120 dB (A)	IP 66	190 x 190 x 191.5	●	●	●	●	●	●	140
	PMA 112						112 dB (A)	IP 67	Ø 181 x 270.6		○					142
	PMA 121						121 dB (A)	IP 67	Ø 220 x 321		○					142
	PA 130						130 dB (A)	IP 54	285 x 490 x 595		●					144
	Safety-related Sounders															
	DS 5-SIL						105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143	●	●	●	●	●	●	146
	DS 10-SIL						110 dB (A)			●	●	●	●	●	●	146

● available
○ in preparation

All audible signaling devices at a glance

	Type	Maximum signal reception range for a 65 dB ambient noise level in metres (m) [1]					Sound pressure level	Protection system	Dimensions (HxWxD) mm	Approvals / standards						Page
		10	100	250	500	1500				GL	GOST	UL	VdS	EN 54-3	RS	
	Voice Sounders															
	PAS 110						110 dB (A)	IP 66	168 x 168 x 156.5		●					148
	PAS 106						105 dB (A)	IP 66	DC: 130 x 130 x 132 AC: 130 x 185 x 132		●					148
	PAS 106 SYNC						100 dB (A)	IP 66	130 x 130 x 132		●					150
	Loudspeakers															
	PS15R						122 dB (A)	IP 54	117 x 181 x 230		○					152
	PS15B										○					152
	PS50B						125 dB (A)	IP 66	144 x 218 x 145							152
	PML 15						118 dB (A)	IP 67	Ø 181 x 270.6		○					153
	PML 25						121 dB (A)	IP 67	Ø 220 x 321							153
	Electronic Buzzers															
	P 22 DBZ						80 dB (A) @ 10 cm	IP 65	Ø 29 x 62							154
	P 28 DMC948						91 dB (A)	IP 65	Ø 35.8 x 38.2							
	P 28 DMC201						91 dB (A)									
	P 28 DMC301						91 dB (A)									
	P 28 DMB530						91 dB (A)									

[1] The specification for the alarm signal reception range assumes an existing ambient noise level of 65 dB (A). In accordance with applicable regulations, the calculated alarm range for the sound level 65 dB (A) was given + 10 dB (A) = 75 dB (A).

● available
○ in preparation

Note:
Using sounders with a sound pressure level of ≥ 120 dB (A) can lead to hearing damage.
People must not be permitted to stay in the near vicinity of the sounder.
All specified sound pressure levels are based on a measurement distance of 1 m, provided that nothing different is specified.

Further information can be found on the Internet:
www.pfannenberg.com · www.pfannenberg-spareparts.com
Keep up to date. Subscribe to our newsletter now:
newsletter.pfannenberg.com

Sounder 100 dB (A)
SON 2 / SON F1

- integrated reverse polarity protection
- automatic synchronisation of several sounders
- integrated volume control
- SON 2: choice of 32 different tones, 2 additional externally selectable tones
- SON F1: choice of 10 different tones, 1 additional externally selectable tone
- compact design
- ideal for fire alarm systems due to low power consumption

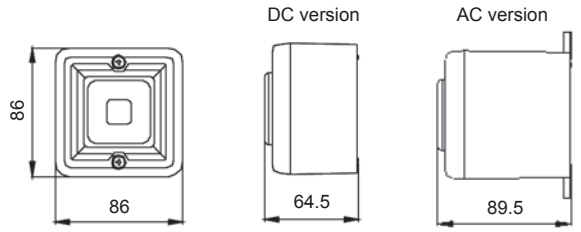
r = 18 m	IP 55	+ 55 °C / - 25 °C	EN 54-3	VdS G209080 (only for SON F1 24 V DC)
max. signal reception range	Protection system	Operating temperature	Standard	Standard

Electrical data	SON 2			SON F1
Rated voltage	230 V AC	115 V AC	24 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 25 %	10 V – 30 V
Rated current consumption	12 mA	24 mA	20–80 mA	25 mA

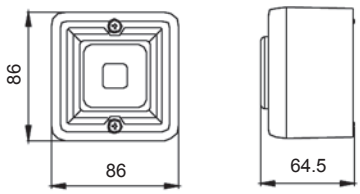
Mechanical data		SON 2	SON F1
Sound pressure level		100 dB (A) @ 1 m	100 dB (A) @ 1 m
Sound level reduction		by - 4 / - 6 dB	by - 9 dB
Alarm tones		32 alarm tones / 3-stage alarm	10 alarm tones / 2-stage alarm
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55	
Material		UL 94 VO & 5VA classified ABS	
Colour		RAL 3000 (flame red)	
Cable entry		4 disruptions prepared on the side and bottom	
Connecting terminals		0.5 – 2.5 mm²	
Weight	AC	400 g	260 g
	DC	300 g	260 g

Dimensions

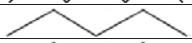
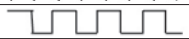
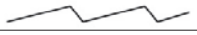
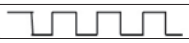
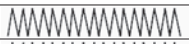
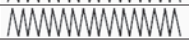
SON 2



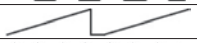
SON F1



Alarm tone table SON 2

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	sweeping 500 / 1200 / 500 Hz, switching frequency 0.3 Hz		tone 2	tone 5
tone 9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.		tone 15	tone 2
tone 10	alternating tone 2400 / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 32	tone 26
tone 31	sweeping 660 / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	Australian evacuation alarm, 500 Hz / 1200 Hz, 3.75 s signal, 0.25 s gap		tone 30	tone 26

Alarm tone table SON F1

Stage 1	Description - Frequency		Stage 2
tone 1	alternating tone 800 / 1000 Hz, alternation every 0.25 s		tone 8
tone 2	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 1
tone 3	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.		tone 8
tone 4	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 9
tone 5	simulated bell		tone 1
tone 6	sweeping 800 / 1000 Hz, switching frequency 7 Hz		tone 8
tone 7	Australian evacuation alarm, 500 Hz / 1200 Hz, 3.75 s signal, 0.25 s gap		tone 10
tone 8	continuous tone 1000 Hz – PFEER toxic gas		–
tone 9	continuous tone 554 Hz		–
tone 10	interrupted tone 420 Hz, every 0.625 s – Australian alert		–

EN 54-3 tested frequencies: tone 1, 2, 3, 4, 8 and 9.

Ordering details

Article numbers	SON 2			SON F1
Rated voltage	230 V AC	115 V AC	24 V DC	24 V DC
	232 20 10 0 010	232 20 15 0 010	232 20 80 0 010	232 50 80 0 010

Article numbers for other voltages and versions on request

Options / accessories

IP 56
Protection system

cULus

Sounder 105 dB (A) / 110 dB (A)
DS 5 / DS 10

The sounders from the DS 10 / DS 5 series can be used for tough demands under industrial conditions and as universal alarms. The sounders, which are suitable for use both indoors and outdoors, generate warning signals in 31 different tones can be selected with the aid of an internal switch. Optionally, a maximum of 3 additional tones can be switched to by means of an external controller. In addition to the factory settings, the tone combination can be individually selected by means of on-site programming (tone 32). Custom versions are available for special applications. The GL version is especially resistant to shock and vibration.

• volume control (DS 5)

DS 5	DS 10				
r = 32 m	r = 56 m	IP 66 IP 67	EN 54-3	VdS G28609	+ 55 °C / - 25 °C
max. signal reception range	max. signal reception range	Protection system	Standard	Standard	Operating temperature

Electrical data	DS 5					
Rated voltage	230 V AC	115 V AC	24 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz			
Functional range	195 V – 253 V	95 V – 127 V	19 V – 29 V	10 V – 15 V	19 V – 29 V	41 V – 53 V
Rated current consumption	0.03 A	0.06 A	0.28 A	0.28 A	0.28 A	0.28 A
Electrical data	**DS 10**					
Rated voltage	230 V AC	115 V AC	24 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz			
Functional range	195 V – 253 V	95 V – 127 V	19 V – 29 V	10 V – 15 V	19 V – 29 V	41 V – 53 V
Rated current consumption	0.06 A	0.12 A	0.42 A	0.30 A	0.42 A	0.42 A

Mechanical data		DS 5	DS 10
Sound pressure level		105 dB (A)	110 dB (A)
Sound level reduction		by - 20 dB via potentiometer (optional)	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Duty cycle		100%	
Material		die-cast aluminium GD-Al Si12 Cu	
Surface coating		epoxy resin paint RAL 3000, flame red	
Cable bushing		2 x M20 (1 x chrome-plated brass cable fitting, 1 x chrome-plated brass blanking plug)	
Clamping range of the cable fitting		8 – 12 mm	
Connecting terminals		max. 2.5 mm²	
Weight	AC	2.15 kg	
	DC	1.95 kg	

Options / accessories

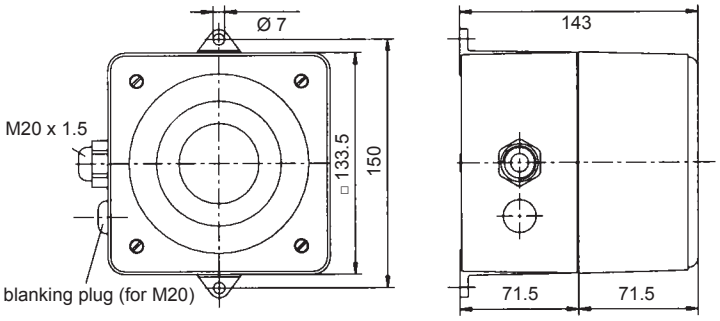
External tone selection (2 variants) for controlling several tones over great distances:
1: for all voltages = potential-free NO function
2. for 12 V / 24 V = voltage input

GOST

GL
30457-83-HH

C UL US

Dimensions



Alarm tone table

Tone	Code switch 1	2	3	4	5	6	Description - Basic tone (preset: tone no. 1)		Stage 2	Stage 3	Stage 4
0							no tone		1	5	4
1					•		emergency signal DIN 33 404, part 3	1s 1200Hz 500Hz	3	2	4
2				•			emergency evacuation signal as per ISO 8201	1,5s 950Hz 1s	1	4	3
3				•	•		alternating tone	1025Hz 825Hz 0,5s	1	2	4
4			•				continuous tone	950Hz	1	3	5
5			•		•		interrupted tone	2s 950Hz	1	4	3
6			•	•			siren	1200Hz 500Hz 3s 3s	1	4	9
7			•	•	•		fire alarm France – NFS21-001	0,4s 0,1s 554Hz 440Hz	3	10	4
8		•					emergency signal Sweden – SS 031711	0,125s 0,125s 700Hz 60s	2	3	4
9		•			•		horn	800Hz 8ms 4ms	1	3	4
10		•		•			continuous tone	500Hz	27	9	26
11		•		•	•		continuous tone - Bayer	725Hz	1	17	9
12		•	•				continuous tone	825Hz	27	9	26
13		•	•		•		continuous tone	1200Hz	1	5	3
14		•	•	•			continuous tone	1500Hz	1	4	10
15		•	•	•	•		interrupted tone	0,5s 0,5s 500Hz	1	24	12
16	•						interrupted tone	0,5s 0,5s 825Hz	1	24	15
17	•				•		interrupted tone - Bayer	0,7s 0,3s 725Hz	1	11	9

Tone	Code switch 1	2	3	4	5	6	Description - Basic tone (preset: tone no. 1)		Stage 2	Stage 3	Stage 4
18	•			•			interrupted tone	0,25s 1s 800Hz	19	7	4
19	•			•	•		alternating tone	1000Hz 800Hz 0,25s 0,25s	27	13	23
20	•		•				interrupted tone IMO SOLAS III/50 + SOLAS III/6.4	2,5s 825Hz 2,5s 7s	9	21	26
21	•		•		•		interrupted tone – leave ship	1s 1s 950Hz 3s	20	9	26
22	•		•	•			evacuation tone - Netherlands	3s 1200Hz 500Hz 0,5s	19	14	2
23	•		•	•	•		siren	3s 500Hz 2400Hz	27	12	2
24	•	•					alternating tone	1075Hz 825Hz 0,5s 0,5s	1	16	12
25	•	•			•		alternating tone	900Hz 500Hz 0,25s 0,25s	1	14	5
26	•	•		•			alternating tone	1400Hz 1200Hz 20ms 20ms	4	9	27
27	•	•		•	•		siren	3s 300Hz 1200Hz	13	23	19
28	•	•	•				siren	3s 1500Hz 700Hz	7	10	4
29	•	•	•		•		siren – Hoechst	40s 1000Hz 10s 10s 150Hz	1	30	9
30	•	•	•	•			interrupted tone	0,875s 680Hz 0,875s	1	4	26
31	•	•	•	•	•		siren – NF C 48-265	0,5s 1600Hz 1400Hz 1s	3	14	4
32	•	•	•	•	•	•	selection of available tone combinations in stages 2, 3 and 4				

Ordering details

Article numbers		DS 5			DS 10		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard		231 06 10 0 000	231 06 15 0 000	231 06 80 0 000	231 11 10 0 000	231 11 15 0 000	231 11 80 0 000
GL		231 06 10 0 001	231 06 15 0 001	231 06 80 0 001	231 11 10 0 001	231 11 15 0 001	231 11 80 0 001
LSR (volume control)		231 06 10 0 151	231 06 15 0 151	231 06 80 0 151			
TAS (external tone selection via closed function of the control voltage)		231 06 10 0 152	231 06 15 0 152	231 06 80 0 152	231 11 10 0 152	231 11 15 0 152	231 11 80 0 152

Article numbers for other voltages and versions on request

Conformity to standards

DIN EN 54-3: 2001 + DIN EN 54-3/A1: 2001	Fire alarm systems - part 3: fire alarm devices; Audible signaling devices and annex A1
EN 50 130-4: 1996	Stability of system components for fire and burglar alarm systems
EN 61 000-6-2	EMV, stability for industrial areas
EN 61 000-6-3	EMV, emission standard for residential commercial, and light-industrial environments
EN 60 947-1: 2003	Low voltage switchgear standard
EN 60 529: 2000	Protection system by enclosure (IP code)
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
DIN 33 404/3: 1982	Alarms for workplaces, unified emergency signal
ISO 8201: 1987	Evacuation alarm
DIN EN 981: 1997	System of acoustic and visual alarm signals and information signals
ISO 11 429: 1996	System of acoustic and visual alarm signals and information signals

Sounder 105 dB (A)
DS 5-DN

- sounder with 2 externally controllable volume levels
- wherever sounders need to be operated virtually 24 hours a day for alarm purposes, e.g. in port areas, container terminals, conveyor belts in coal mines or for supplying power stations, it is important to disturb local residents as little as possible. This is especially the case in the evening and at night, when the ambient noise level is also lower.
- can also be used to avoid startled reactions by starting the alarm with a reduced sound level and increasing it in steps (soft alarm)
- the sound level can be reduced by an external controller or via a floating contact
- the reduction may be preselected during the installation in accordance with local conditions (0 to - 20 dB)

max. signal reception range

Protection system

Operating temperature

Electrical data	DS 5-DN					
Rated voltage	230 V AC	115 V AC	24 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz			
Functional range	195 V – 253 V	95 V – 127 V	19 V – 29 V	10 V – 15 V	19 V – 29 V	41 V – 53 V
Rated current consumption	0.03 A	0.06 A	0.28 A	0.28 A	0.28 A	0.28 A

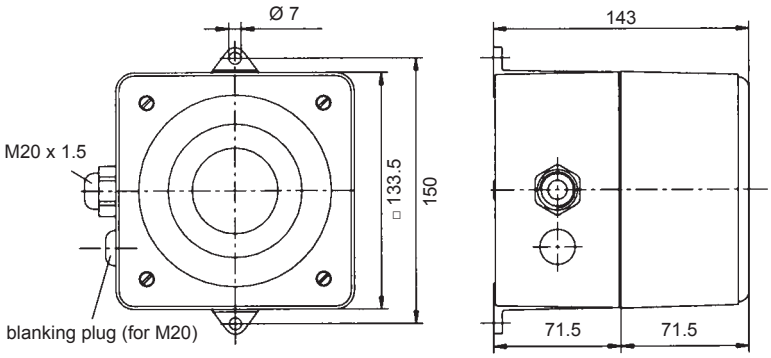
Mechanical data		DS 5-DN
Sound pressure level		105 dB (A)
Sound level reduction		externally adjustable up to - 20 dB via potentiometer
Alarm tones		32 tones (see alarm tone table page 135)
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66, IP 67
Duty cycle		100%
Material		die-cast aluminium GD-Al Si12 Cu
Surface coating		epoxy resin paint RAL 3000, flame red
Cable bushing		2 x M20 (1x chrome-plated brass cable fitting, 1 x chrome-plated brass blanking plug)
Clamping range of the cable fitting		8 – 12 mm
Connecting terminals		max. 2.5 mm²
Weight	AC	2.15 kg
	DC	1.95 kg

Options / accessories

External tone selection (2 variants) for controlling several tones over great distances:
1: for all voltages = potential-free NO function
2. for 12 V / 24 V = voltage input

GOST

Dimensions



Ordering details

Article numbers		DS 5-DN		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC
Standard		231 06 10 0 163	231 06 15 0 163	231 06 80 0 163
TAS (external tone selection via closed function of the control voltage)		231 06 10 0 162	231 06 15 0 162	231 06 80 0 162

Article numbers for other voltages and versions on request

Conformity to standards

EN 61 000-6-2	EMV, stability for industrial areas
EN 61 000-6-3	EMV, emission standard for residential commercial, and light-industrial environments
EN 60 947-1: 2003	Low voltage switchgear standard
EN 60 529: 2000	Protection system by enclosure (IP code)
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
DIN 33 404/3: 1982	Alarms for workplaces, unified emergency signal
ISO 8201: 1987	Evacuation alarm
DIN EN 981: 1997	System of acoustic and visual alarm signals and information signals
ISO 11 429: 1996	System of acoustic and visual alarm signals and information signals

Sounder 100 dB (A) / 105 dB (A)
PA 100 / PA 106

The sounders from the PA series are the result of consistent development by Pfannenberg. Manufactures from extremely impact-resistant plastic, hence suitable for industry.
Low power consumption, high sound levels and unmistakable warning tones with optimum penetration enable universal use in hospitals, administration buildings and technicals plants.

• generates 3 different tones by means of external control

PA 100	PA 106	PA 100	PA 106			
r = 18 m	r = 32 m	IP 56	IP 66	+ 55 °C / - 25 °C	EN 54-3	VdS G209079
max. signal reception range	max. signal reception range	Protection system	Protection system	Operating temperature	24V DC 48V DC	24V DC 48V DC

Electrical data	PA 100				
Rated voltage	230 V AC	115 V AC	24 V AC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 10 %	10 V – 30 V	40 V – 60 V
Rated current consumption	15 mA	20 mA	40 mA	25 mA	50 mA
Electrical data	**PA 106**				
Rated voltage	230 V AC	115 V AC	24 V AC	24 V DC	48 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 10 %	10 V – 30 V	40 V – 60 V
Rated current consumption	15 mA	20 mA	40 mA	25 mA	50 mA

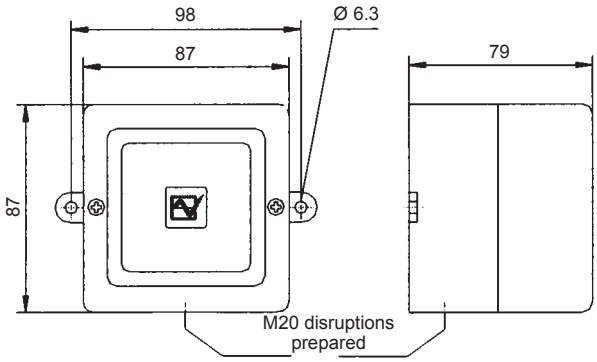
Mechanical data		PA 100	PA 106
Sound pressure level		100 dB (A)	105 dB (A)
Sound level reduction		by - 15 dB via potentiometer	
Alarm tones		32 tones (see alarm tone table)	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 56	IP 66
Duty cycle		100%	
Material		ABS, self-extinguishing, similar to UL 94 VO	
Colour		similar to RAL 3000 (flame red), optionally in white	
Cable entry		M20 disruptions prepared	
Weight	AC	370 g	1000 g
	DC	260 g	750 g

Options / accessories

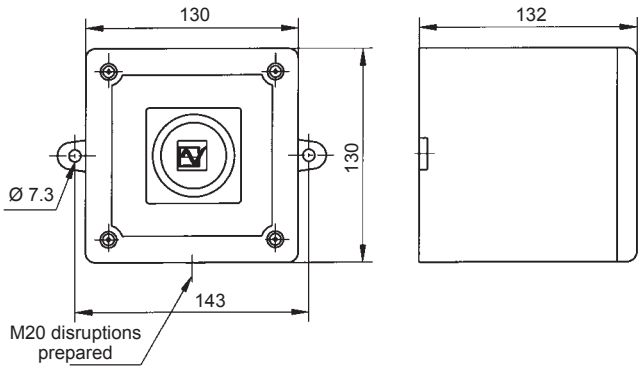
GOST GL C UL US

Dimensions

PA 100



PA 106



Alarm tone table

Basic tone no.	Description - tones	Stage 2	Stage 3
1	continuous tone 340 Hz	2	5
2	alternating tone 800 / 1000 Hz, alternation every 0.25 s	17	5
3	slow whoop 500-1000 Hz, 3 s signal, 0.5 s gap	2	5
4	sweeping 800 / 1000 Hz, switching frequency 1 Hz	6	5
5	continuous tone 2400 Hz	3	20
6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz	7	5
7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	10	5
8	siren 500 / 1200 / 500 Hz, duration 3 s	2	5
9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	15	2
10	alternating tone 2400 / 2900 Hz, alternation every 0.25 s	7	5
11	interrupted tone 1000 Hz, 0.5 s signal, 0.5 s gap	2	5
12	alternating tone 800 / 1000 Hz, alternation every 1.14 s	4	5
13	interrupted tone 2400 Hz, 0.5 s signal, 0.5 s gap	15	5
14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	4	5
15	continuous tone 800 Hz	2	5
16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	18	5

Basic tone no.	Description - tones	Stage 2	Stage 3
17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) (NF S 32-001)	2	27
18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	2	5
19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s (NF C 48-265)	2	5
20	continuous tone 660 Hz	2	5
21	alternating tone 554 / 440 Hz, alternation every 0.5 s	2	5
22	interrupted tone 660 Hz, 0.875 s signal, 0.875 s gap	2	5
23	800 Hz, 0.25 s signal, 0.25 s gap	6	5
24	sweeping 800 / 1000 Hz, switching frequency 50 Hz	29	5
25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz	29	5
26	simulated bell	2	15
27	continuous tone 554 Hz	26	5
28	continuous tone 440 Hz	2	5
29	sweeping 800 / 1000 Hz, switching frequency 7 Hz	7	5
30	continuous tone 300 Hz	2	5
31	siren 660 / 1200 Hz, switching frequency 1 Hz	26	5
32	2-tone bell sound	26	5

Tone selection via DIP switch. Two alternative tones (stage 2 and 3) can be generated by means of external control.

Ordering details

Article numbers		PA 100			PA 106		
Version	**Rated voltage**	230 V AC	110 V AC	10-30 V DC	230 V AC	110 V AC	10-30 V DC
Standard		230 10 10 0 000	230 10 16 0 000	230 10 90 0 000	230 16 10 0 000	230 16 16 0 000	230 16 80 0 000
GL		230 10 10 0 001	230 10 16 0 001	230 10 90 0 001	230 16 10 0 001	230 16 16 0 001	230 16 80 0 001
UL		230 10 10 0 002	230 10 16 0 002	230 10 90 0 002	230 16 10 0 002	230 16 16 0 002	230 16 80 0 002

Article numbers for other voltages and versions on request

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731 ‘Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals’.

The requirement for an acoustic alarm signal can be found in the harmonised standards:
EN 60204-1 Electrical equipment of machines
EN 60825-1 Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Sounder 110 dB (A) / 120 dB (A)
PA 110 / PA 120

The sounders from the PA series are the result of consistent development by Pfannenberg. Manufactures from extremely impact-resistant plastic, hence suitable for industry.
Low power consumption, high sound levels and aggressive warning tones with optimum penetration enable universal use in hospitals, administration buildings and technicals plants.

• generates 3 different tones by means of external control

PA 110	PA 120				
r = 56 m	r = 178 m	IP 66	+ 55 °C / - 25 °C	EN 54-3	VdS G209079
max. signal reception range	max. signal reception range	Protection system	Operating temperature	24V DC 48V DC	24V DC 48V DC

Electrical data	PA 110				
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 10 %	40 V – 60 V	10 V – 30 V
Rated current consumption	60 mA	100 mA	500 mA	120 mA	200 mA
Electrical data	**PA 120**				
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 10 %	40 V – 60 V	10 V – 30 V
Rated current consumption	120 mA	240 mA	1000 mA	600 mA	950 mA

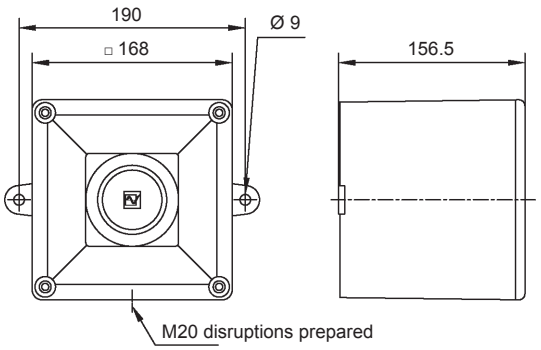
Mechanical data		PA 110	PA 120
Sound pressure level		110 dB (A)	120 dB (A)
Sound level reduction		by - 12 dB via potentiometer	by - 10 dB via potentiometer
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66	
Material		ABS, self-extinguishing, similar to UL 94 VO	
Colour		similar to RAL 3000 (flame red), optionally in white	
Cable entry		M20 disruptions prepared	
Weight	AC	2,1 kg	2,7 kg
	DC	1,8 kg	2,1 kg

Options / accessories

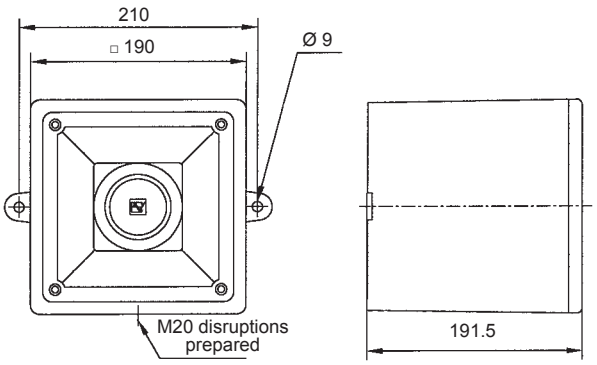
GOST GL C UL US

Dimensions

PA 110



PA 120



Alarm tone table

Basic tone no.	Description - tones	Stage 2	Stage 3
1	continuous tone 340 Hz	2	5
2	alternating tone 800 / 1000 Hz, alternation every 0.25 s	17	5
3	slow whoop 500-1000 Hz, 3 s signal, 0.5 s gap	2	5
4	sweeping 800 / 1000 Hz, switching frequency 1 Hz	6	5
5	continuous tone 2400 Hz	3	20
6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz	7	5
7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	10	5
8	siren 500 / 1200 / 500 Hz, duration 3 s	2	5
9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	15	2
10	alternating tone 2400 / 2900 Hz, alternation every 0.25 s	7	5
11	interrupted tone 1000 Hz, 0.5 s signal, 0.5 s gap	2	5
12	alternating tone 800 / 1000 Hz, alternation every 1.14 s	4	5
13	interrupted tone 2400 Hz, 0.5 s signal, 0.5 s gap	15	5
14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	4	5
15	continuous tone 800 Hz	2	5
16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	18	5
17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) (NF S 32-001)	2	27
18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	2	5
19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s (NF C 48-265)	2	5
20	continuous tone 660 Hz	2	5
21	alternating tone 554 / 440 Hz, alternation every 0.5 s	2	5
22	interrupted tone 660 Hz, 0.875 s signal, 0.875 s gap	2	5

Basic tone no.	Description - tones	Stage 2	Stage 3
23	800 Hz, 0.25 s signal, 0.25 s gap	6	5
24	sweeping 800 / 1000 Hz, switching frequency 50 Hz	29	5
25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz	29	5
26	simulated bell	2	15
27	continuous tone 554 Hz	26	5
28	continuous tone 440 Hz	2	5
29	sweeping 800 / 1000 Hz, switching frequency 7 Hz	7	5
30	continuous tone 300 Hz	2	5
31	siren 660 / 1200 Hz, switching frequency 1 Hz	26	5
32	2-tone bell sound	26	5
33	interrupted tone 745 Hz, 0.5 s signal, 0.5 s gap	2	–
34	alternating tone 1000 / 2000 Hz, alternation every 0.5 s	38	45
35	interrupted tone 420 Hz, every 0.625 s	36	5
36	slow whoop 500 Hz up to 1200 Hz within 0.375 s, 0.25 s gap	35	5
37	continuous tone 1000 Hz	9	45
38	continuous tone 2000 Hz	34	45
39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	23	17
40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) (NF S 32-001)	31	27
41	motor siren, slowly rising to 1200 Hz	2	5
42	motor siren, slowly rising to 800 Hz	2	5
43	continuous tone 1200 Hz	2	5
44	motor siren, slowly rising to 2400 Hz	2	5
45	1000 Hz, 1 s signal, 1 s gap	38	34

Tone selection via DIP switch. Two alternative tones (stage 2 and 3) can be generated by means of external control.

Ordering details

Article numbers		PA 110			PA 120		
Version	Rated voltage	230 V AC	110 V AC	10-30 V DC	230 V AC	110 V AC	10-30 V DC
Standard		230 20 10 0 000	230 20 16 0 000	230 20 90 0 000	230 25 10 0 000	230 25 16 0 000	230 25 90 0 000
GL		230 20 10 0 001	230 20 16 0 001	230 20 90 0 001	230 25 10 0 001	230 25 16 0 001	230 25 90 0 001
UL		230 20 10 0 002	230 20 16 0 002	230 20 90 0 002	230 25 10 0 002	230 25 16 0 002	230 25 90 0 002

Article numbers for other voltages and versions on request

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731 ‘Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals’.

The requirement for an acoustic alarm signal can be found in the harmonised standards:
EN 60204-1 Electrical equipment of machines
EN 60825-1 Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Sounder 112 dB (A) / 121 dB (A)
PMA 112 / PMA 121

- very sturdy sounder especially for outdoor use
- integrated volume control
- choice of 45 different tones
- 2 additional stages externally selectable; control by minus or optionally by plus
- stainless steel mounting bracket for 360° positioning

PMA 112

max. signal reception range

PMA 121

max. signal reception range

Protection system

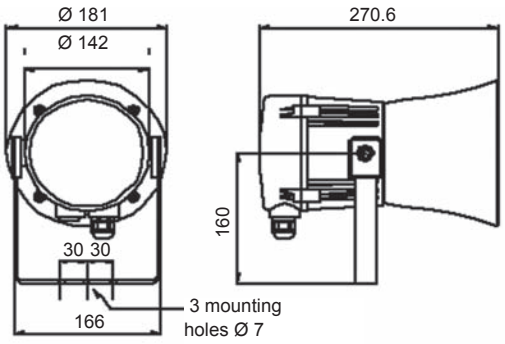
Operating temperature

Electrical data	PMA 112				
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 10 %	35 V – 60 V	10 V – 30 V
Rated current consumption	60 mA	110 mA	500 mA	120 mA	200 mA
Electrical data	**PMA 121**				
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	± 10 %	35 V – 60 V	10 V – 30 V
Rated current consumption	90 mA	150 mA	1000 mA	600 mA	950 mA

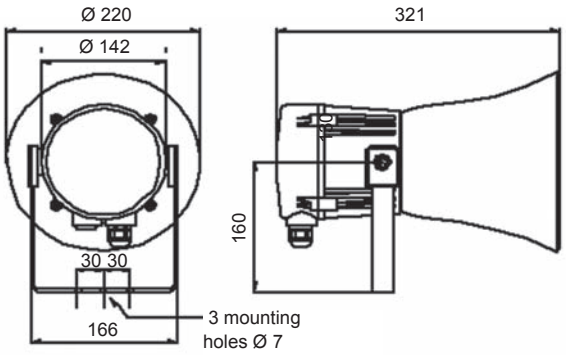
Mechanical data	PMA 112	PMA 121
Sound pressure level	112 dB (A)	121 dB (A)
Operating mode	automatic synchronisation in multi-sounder systems	
Alarm tones	45 (UKOOA/PFEER conform)	
Duty cycle	100%	
Operating temperature	- 25 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 75 °C	
Relative humidity	90%	
Protection system according to EN 60529	IP 66, IP 67	
Material	UL 94 VO & 5VA classified ABS	
Colour	grey (RAL 7038)	
Cable entry	2 x M20 (with 1 blanking plug)	
Connecting terminals	0.5 – 4.0 mm²	
Weight	AC: 3.0 kg / DC: 2.5 kg	

Dimensions

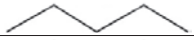
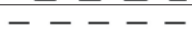
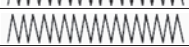
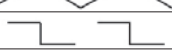
PMA 112



PMA 121



Alarm tone table

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	sweeping 500 / 1200 / 500 Hz, switching frequency 0.3 Hz		tone 2	tone 5
tone 9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.		tone 15	tone 2
tone 10	alternating tone 2400 / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	continuous tone 300 Hz		tone 2	tone 5
tone 31	siren 660 / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	2-tone bell sound		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s – Singapore		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 0.375 s, 0.25 s gap		tone 35	tone 5
tone 37	continuous tone 1000 Hz – PFEER toxic gas		tone 9	tone 45
tone 38	continuous tone 2000 Hz		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz		tone 2	tone 5
tone 43	continuous tone 1200 Hz		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz		tone 2	tone 5
tone 45	1000 Hz, 1 s signal, 1 s gap – PFEER general alarm		tone 38	tone 34

Ordering details

Article numbers	PMA 112			PMA 121		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
	230 91 10 0 000	230 91 15 0 000	230 91 80 0 000	230 92 10 0 000	230 92 15 0 000	230 92 80 0 000

Article numbers for other voltages on request

Sounder 130 dB (A)
PA 130

- secure alarming in the loudest environments and over large areas
- also dimensioned for use as warning devices in civil defence
- with just one sounder, reaction to the most diverse alarm situations is possible by means of remote control of up to 9 of currently 80 pre-installed tones
- integrated self-monitoring, test function and malfunction message relay
- maintenance-free
- power-saving standby mode with automatic self-test function
- suitable for indoor and outdoor operation
- switchable 4.7 kOhm terminal resistor for cable monitoring

optionally avaibale:

- voice transmisssion possible via audio input
- can be mounted in a cluster by means of stable mast holder

max. signal reception range

Protection system

Operating temperature

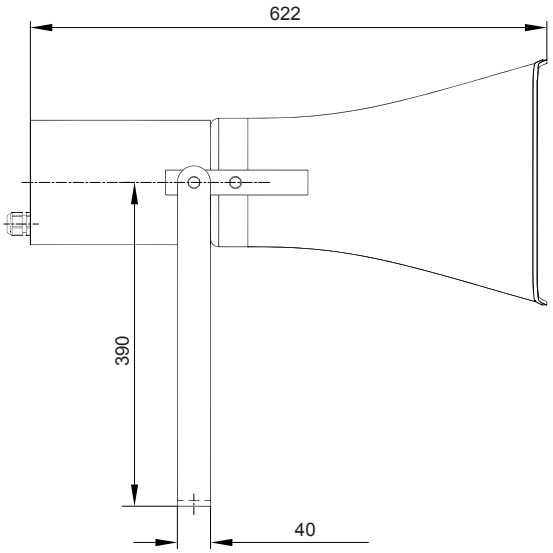
Electrical data		PA 130	
Rated voltage		230 V AC	20-60 V DC
Rated frequency		50 Hz / 60 Hz	
Functional range		- 25% / + 15%	20 V – 60 V
Rated current consumption		1 A	4 A
	in standby mode	< 15 mA	< 40 mA
Malfunction message relay/auxiliary relay		0.5 A, 50 V / NO or NC potential free, configurable	

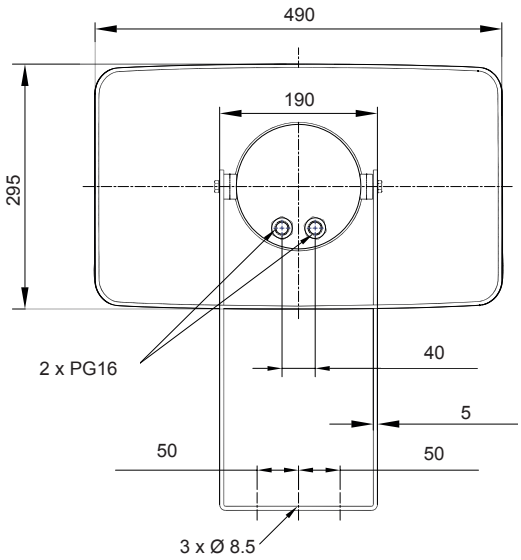
Mechanical data		PA 130
Sound pressure level		130 dB (A)
Alarm tones		80, incl. DIN tone
Remote controlled tones		9 tones, externally controllable
Operating temperature		- 20 °C ... + 50 °C
Storage temperature		- 20 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54
Material	housing - horn	MOPLEN plastic, light grey
	housing - circuitry	aluminium, painted in light grey
Cable entry		2 x PG16 for simple series connection of up to 4 sounders
Type of connection		2 x 2.5 mm²
Weight		AC: 7.45 kg / DC: 5.85 kg

Options / accessories

GOST

Dimensions





Ordering details

Article numbers	PA 130	
Rated voltage	230 V AC	20–60 V DC
	230 26 10 0 000	230 26 91 0 000

Sounder 105 dB (A) / 110 dB (A)
DS 5-SIL / DS 10-SIL

- integrated safety tough demands under industrial conditions
- to signal dangerous situations in safety-relevant application such as process and plant safety, e.g.
  - start-up warning
  - excess rotation speed warning
  - machine stop delay warning
- by means of integrated self-monitoring of the devices the normative required, regular inspection of warning devices is ensured
- the warning devices can be implemented in Safety Instrumented Systems (SIS) up to **SIL 2**

We would be more than happy to provide all safety-technical key data.

DS 5-SIL

max. signal reception range

DS 10-SIL

max. signal reception range

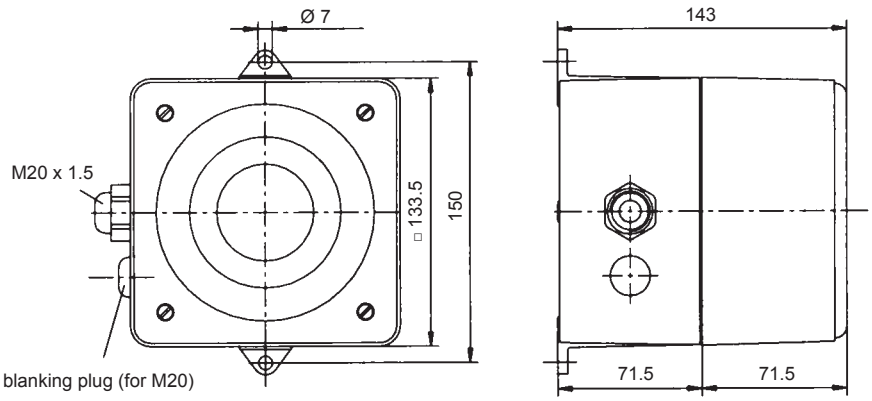
Protection system

Operating temperature

Electrical data		DS 5-SIL			DS 10-SIL		
Rated voltage		230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency		50 Hz / 60 Hz	50 Hz / 60 Hz		50 Hz / 60 Hz	50 Hz / 60 Hz	
Functional range		195 V – 253 V	95 V – 127 V	19 V – 29 V	195 V – 253 V	95 V – 127 V	19 V – 29 V
Rated current consumption		0.03 A	0.06 A	0.28 A	0.06 A	0.12 A	0.42 A
Diagnostics channel	power consumption	15 mA	15 mA	20 mA	15 mA	15 mA	20 mA
	switching power	230 V / 80 mA					

Mechanical data		DS 5-SIL	DS 10-SIL
Sound pressure level		105 dB (A)	110 dB (A)
Alarm tones		32 tones (see alarm tone table page 135)	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Duty cycle		100%	
Material		die-cast aluminium GD-Al Si12 Cu	
Surface coating		epoxy resin paint RAL 3000, flame red	
Cable bushing		2 x M20 (1 x chrome-plated brass cable fitting, 1 x chrome-plated brass blanking plug)	
Clamping range of the cable fitting		8 – 12 mm	
Connecting terminals		max. 2.5 mm²	
Weight	AC	2.15 kg	
	DC	1.95 kg	

Dimensions



Connection diagram

X1
Sounder channel

1	PE
2	PE
3	L/+ operating voltage
4	L/+ operating voltage
5	N/- operating voltage
6	N/- operating voltage

X2
optional external tone selection (option -TAS or -TAV)

1	L/+ stage S2
2	L/+ stage S2
3	L/+ stage S3
4	L/+ stage S3

X1
Monitoring channel

1	L/+ operating voltage
2	L/+ operating voltage
3	N/- operating voltage
4	N/- operating voltage
5	alarm relay (MOS-Relay 230V~, 80mA, 35Ω,
6	alarm relay conductive, if function
7	alarm relay channel is acoustically
8	alarm relay active)

Ordering details

Article numbers		DS 5-SIL			DS 10-SIL		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard		231 06 10 0 601	231 06 15 0 601	231 06 80 0 601	231 11 10 0 601	231 11 15 0 601	231 11 80 0 601
TAS (external tone selection via closed function of the control voltage)		231 06 10 0 603	231 06 15 0 603	231 06 80 0 603	231 11 10 0 603	231 11 15 0 603	231 11 80 0 603

Article numbers for other voltages and versions on request

Options / accessories

External tone selection for controlling several tones over great distances

GOST

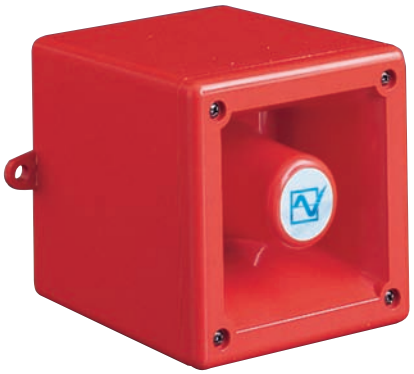
Conformity to standards

The sounders fulfill the requirements to the functional safety according to:
EN 61508 Functional safety of electrical/electronic/programmable electronic safety-related systems
EN 61511 Functional safety - Safety instrumented systems for the process industry sector

The devices can be used in safety related control systems in accordance with the following standards:
EN ISO 13849-1 Safety of machinery - Safety related parts of control systems – part 1
EN 62061 Safety of machinery - Functional safety of electrical/electronic/programmable electronic safety-related systems

The devices conform to the following standards:
EN 61310-1 Safety of machinery - Indication, marking and actuation - part 1: Requirements for visual, acoustic and tactile signals
EN ISO 7731 Ergonomic – alarms for public areas and workplaces – acoustic alarms
EN 981 Safety of machinery - System of acoustic and visual alarm signals and information signals
DIN 33404-1 Alarms for workplaces, uniform emergency signal
ISO 8201 Acoustics - Audible emergency evacuation signal

Sounder with speech reproduction 100 / 105 dB (A) PAS 106 / PAS 110



- easy text programming without programming device (integrated microphone)
- max. 16 seconds speech reproduction or two 8 seconds messages
- 9 different tones (DIN tone)
- volume control via potentiometer up to - 20 dB (A)
- combinaton of tone / spoken message
- precice definition of alarms and warnings
- low power consumption, therefore long alarm durations possible using emergency voltage
- suitable for UPS systems due to 24V rated voltage
- playback of behavioural rules
- no PA system required for speech reprodction

PAS 106

max. signal reception range

PAS 110

max. signal reception range

Schutzart

Operating temperature

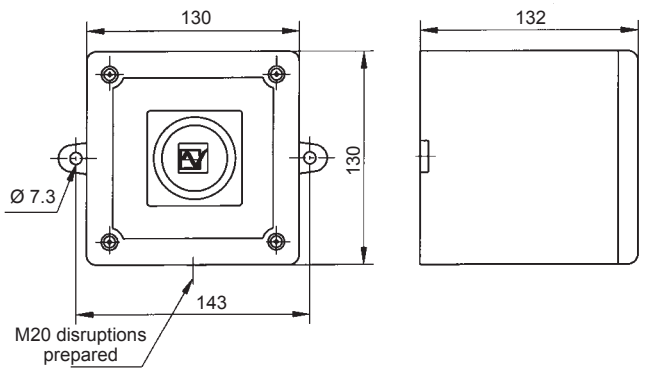
Electrical data	PAS 106			
Rated voltage	230 V AC	110 V AC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	18 V – 30 V	9 V – 15 V
Rated current consumption	20 mA	40 mA	180 mA[1]	150 mA[1]
Electrical data	**PAS 110**			
Rated voltage	230 V AC	110 V AC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Functional range	± 10 %	± 10 %	18 V – 30 V	9 V – 15 V
Rated current consumption	35 mA	70 mA	440 mA[1]	400 mA[1]

[1] at maximum volume

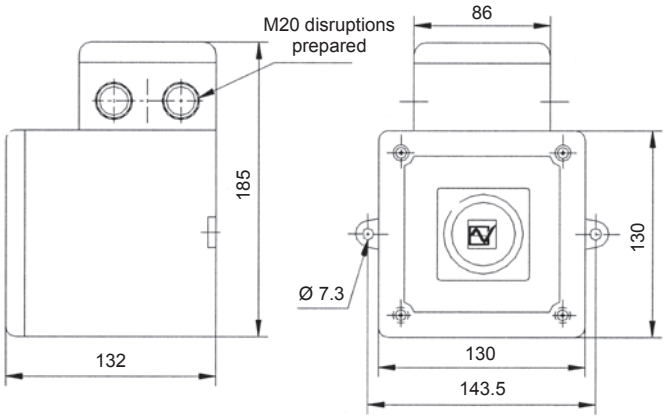
Mechanical data		PAS 106	PAS 110
Sound pressure level		105 dB (A), speech reproduction 5 dB lower	110 dB (A), speech reproduction 5 dB lower
Sound level reduction		by 20 dB via potentiometer	
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 25 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66	
Material		ABS, self-extinguishing, similar to UL 94 VO	
Colour		similar to RAL 3000 (flame red), optionally grey or white	
Cable entry		M20 disruptions prepared	
Weight	AC	1.00 kg	2.10 kg
	DC	0.75 kg	1.80 kg

Dimensions

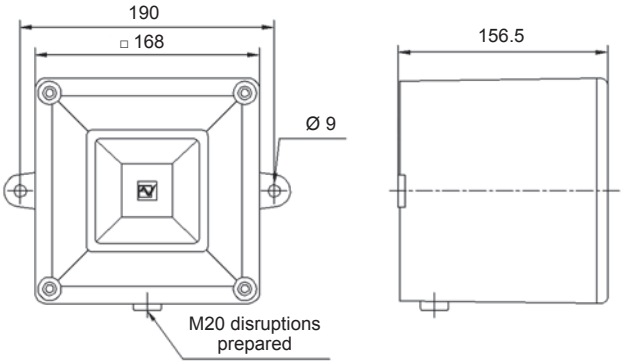
PAS 106 DC



PAS 106 AC



PAS 110



Alarm tone table

Tone and frequency selection			
Stage 1	**Frequency description**	**Tone length**	**Stage 2**
1	alternating tone 800/1000 Hz, alternation every 0.5 s	4 cycles	**1**
2	slow whoop 500/1200 Hz, duration 2.5 s, 0.5 s gap	2 cycles	**2**
3	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	4 cycles	**3**
4	alternating tone 544/440 Hz for 100/400 ms	4 cycles	**4**
5	continuous tone 1000 Hz	3	**5**
6	simulated bell	7	**6**
7	interrupted tone 1000 Hz, 1s signal, 1s gap, **general alarm**	3 cycles	**7**
8	Australian alert, 420 Hz with 0.624 s gap	4 cycles	**8**
9	Australian evacuation alarm, 500/1200 Hz, within 1 s	2 cycles	**9**
10	no tone - 0.5 s gap between messages or 2 s gap, if 2nd message option is selected		**10**

Important: total speech reproduction max. 16 s or 2 messages of max. 8 s each!

Ordering details

Article numbers				
Rated voltage	230 V AC	110 V AC	24 V DC	12 V DC
PAS 106	230 81 10 0 029	230 81 16 0 029	230 81 80 0 029	230 81 85 0 029
PAS 110	230 85 10 0 029	230 85 16 0 029	230 85 80 0 029	230 85 85 0 029

Options / accessories

GOST

Sounder with speech reproduction 100 dB (A) synchronised PAS 106 SYNC

- fully synchronised playback if several sounders are present; no synchronisaton cable required
- all sounders are programmed using the same memory module
- multiple re-programming possible
- user-defined text programmable in all languages
- 14 different tones (DIN tone)
- volume control: 3 settings and potentiometer
- max. 16 second tone playback at 3 different levels
- external tone selection
- excellent speech reproduction
- ideal for fire and evacuation alarms
- suitable for UPS systems due to 24V rated voltage
- low power consumption, hence long alarm durantions possible using emergency power

max. signal reception range

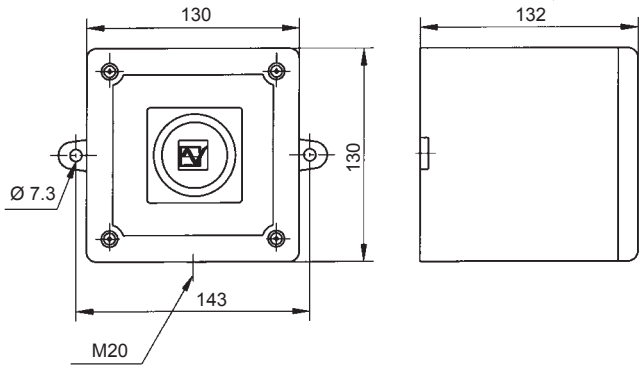
Protection system

Operating temperature

Electrical data		PAS 106 SYNC	
Rated voltage		230 V AC	24 V DC
Rated frequency		50 Hz / 60 Hz	
Functional range		210 V – 253 V	10 V – 30 V
Rated current consumption	100 dB (A)	30 mA	< 130 mA
	97 dB (A)		< 80 mA
	94 dB (A)		< 50 mA

Mechanical data		PAS 106 SYNC
Sound pressure level		100 dB (A), speech reproduction approx. 3–5 dB (A) lower, selectable via jumper
Duty cycle		100%
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 25 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66
Material		ABS, self-extinguishing, similar to UL 94 VO
Colour		similar to RAL 3000 (flame red), optional grey or white
Cable entry		M20
Weight	AC	1.00 kg
	DC	0.75 kg

Dimensions



Alarm tone table

Tone Nr.	Description – tones	Stage 2 + 3 tone selection		
		Tone A	Tone B	Tone C
1	Australian alert	5	8	4
2	evacuation tone – Netherlands	10	8	12
3	sweeping 800 / 1000 Hz, switching frequency 7 Hz	8	14	10
4	evacuation tone – Australia	1	8	5
5	simulated bell	10	13	2
6	sawtooth 1200 Hz / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	13	2	10
7	french AFNOR tone	10	5	9
8	continuous tone 1000 Hz	10	11	5
9	continuous tone 554 Hz	5	7	12
10	alternating tone 800 / 1000 Hz, switching frequency 2 Hz	8	6	11
tones 11 to 14 are only available for stage 2 or 3				
11	interrupted tone 1000 Hz, 0.5 s signal, 0.5 s gap	–	–	–
12	continuous tone 2400 Hz	–	–	–
13	continuous tone 800 Hz	–	–	–
14	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	–	–	–

External tone / speech reproduction possible

	Stage 1	Stage 2	Stage 3	
Mode 1	tone – message 1	tone – message 2	tone – message 3	Stage 1 = factory setting Stage 2 & 3 can be selected externally via ground connection. Each stage can contain a different time interval.
Mode 2	message 1	message 2	message 3	
Mode 3	tone – message 1 – message 1	tone – message 2 – message 2	tone – message 2 – message 3	
	(tones 1–10 possible)	(tones 1–14 possible)		

Important: total speech reproduction max. 16 s!

Ordering details

Article numbers	PAS 106 SYNC	
Rated voltage	230 V AC	24 V DC
PAS 106 SNYC	230 81 10 0 027	230 81 80 0 027

Options / accessories

GOST

Pro-gram-ming device

Microphone integrated, possible to connect an external sound source (availbale for weekly rental)

Article number:
293 23 00 0 000

Memory module

Article number:
293 23 00 0 010

Loudspeaker 122 dB (A) / 125 dB (A)
PS15R / PS15B / PS50B

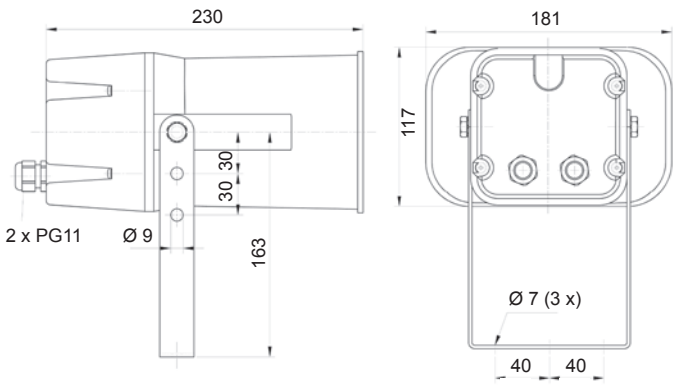
- powerful loudspeaker, up to 125 dB (A)
- adjustable volume
- sturdy IP 54 and IP 66 implementation
- for industrial and workshop applications both indoors and outdoors
- excellent transmission of speech, music and tones

PS15R/B	PS50B	PS15R/B	PS50B	PS15R/B	PS50B
r = 200 m	r = 316 m	IP 54	IP 66	+ 40 °C / - 10 °C	+ 50 °C / - 25 °C
max. signal reception range	max. signal reception range	Protection system	Protection system	Operating temperature	Operating temperature

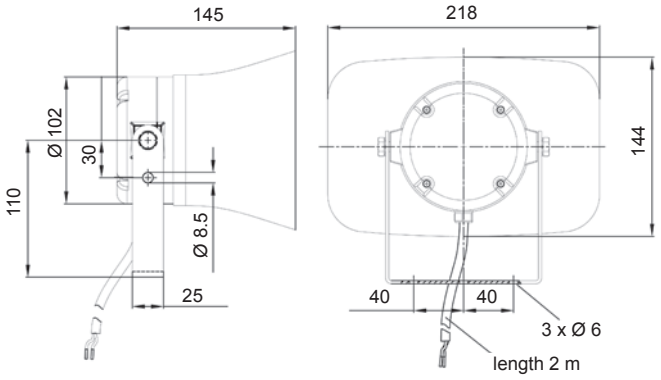
Mechanical data		PS15R	PS15B	PS50B
Sound pressure level		122 dB (A) @ 25 W		125 dB (A) @ 50 W
Volume control		potentiometer		–
Rated power		25 W		50 W
Frequency range		350 Hz up to 8,000 Hz		600 Hz – 5,000 Hz
Dispersion		90°		90°
Impedance		16 Ω		16 Ω
Operating temperature		- 10 °C ... + 40 °C		- 25 °C ... + 50 °C
Storage temperature		- 30 °C ... + 60 °C		- 30 °C ... + 60 °C
Relative humidity		90%		100%
Protection system according to EN 60529		IP 54		IP 66
Duty cycle		100%		100%
Material	housing	acrylonitrile-butadiene-styrene (ABS)		polycarbonate (PC)
	mounting bracket	aluminium		steel, galvanised
Colour		red	black	black
Type of connection		2 x max. 2.5 mm²		connecting cable (2 m)
Cable entry		2 x (1 x blanking plug enclosed) for cable Ø 6–11 mm		–
Weight		1.6 kg		1.3 kg

Dimensions

PS15R / PS15B



PS50B



Ordering details

Article numbers	PS15R	PS15B	PS50B
	231 93 00 0 000	231 92 00 0 000	231 95 00 0 000

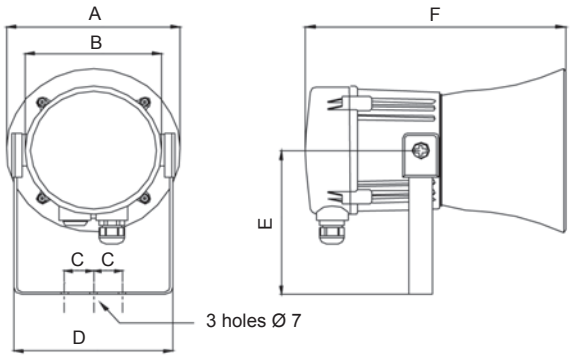
Loudspeaker 118 dB (A) / 121 dB (A)
PML 15 / PML 25

- very sturdy loudspeaker especially for outdoor use
- sound power 15/25 Watt
- 118/121 dB (A) at full power
- transmission of music and tones
- stainless steel mounting bracket for 360° positioning

PML 15	PML 25		
r = 141 m	r = 200 m	IP 66 IP 67	+ 55 °C / - 25 °C
Signal reception range (EN 54)	Signal reception range (EN 54)	Protection system	Operating temperature

Mechanical data		PML 15	PML 25
Sound pressure level		118 dB (A) @ 15 W	121 dB (A) @ 25 W
Rated power		15 W	25 W
Transformer/ power taps	70 V	15 W / 7.5 W / 3 W / 1 W taps (Z = 336.67 Ω / 653.33 Ω / 1.6 kΩ / 4.9 kΩ)	25 W / 12.5 W / 6 W / 2 W taps (Z = 196 Ω / 392 Ω / 816.67 Ω / 2.54 kΩ)
	100 V	15 W / 7.5 W / 3 W / 1 W taps (Z = 666.87 Ω / 1.34 kΩ / 3.34 kΩ / 10 kΩ)	25 W / 12.5 W / 6 W / 2 W taps (Z = 400 Ω / 800 Ω / 1.67 kΩ / 5 kΩ)
Impedance		8 Ω or 16 Ω	
Dispersion		120° @ 1 kHz / 32° @ 4 kHz	130° @ 1 kHz / 30° @ 4 kHz
Frequency range		400 Hz up to 8,000 Hz	300 Hz up to 8,000 Hz
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Material		UL 94 VO & 5VA classified ABS, grey (RAL 7038)	
Mounting		metal bracket	
Cable entry		2 x M20 (with 1 blanking plug)	
Connecting terminals		0.5 – 4.0 mm²	
Weight		70 V & 100 V connection: 3.0 kg / low-resistance connection: 2.5 kg	

Dimensions



	PML 15	PML 25
A	Ø 181	Ø 220
B	Ø 142	
C	30	
D	166	
E	160	
F	270.6	321

Ordering details

Article numbers	PML 15	PML 25
8 Ω	230 95 00 0 300	230 96 00 0 300
16 Ω	230 95 00 0 302	230 96 00 0 302
100 V transformer	230 95 00 0 304	230 96 00 0 304

Panel Mount Buzzers
P 22 DBZ / P 28 DMC / P 28 DMB

- acoustic signaling device for 22.5 mm and 28.6 mm mounting holes
- available with 2 different types of signals in one device (continuous and pulsating tone)
- guaranteed high protection system (IP 65) to the housing
- also availbale wih easily adjustable volume control

P22 DBZ

max. signal reception range

P28 series

max. signal reception range

Protection system

Operating temperature

Electrical data	P 22 DBZ			
Rated voltage	24 V AC/DC	48 V AC/DC	115 V AC	230 V AC
Rated current consumption	15 – 30 mA			

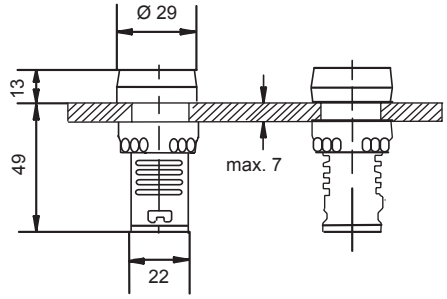
Electrical data	P 28 DMC948	P 28 DMC201	P 28 DMC301	P 28 DMB530
Rated voltage	48 V DC	110 V AC	230 V AC	30 V DC
Functional range	9 V – 48 V	30 V – 120 V	130 V – 230 V	5 V – 30 V
Rated current consumption	5 mA @ 9 V 20 mA @ 48 V	7 mA @ 30 V 40 mA @ 120 V	20 mA @ 130 V 40 mA @ 220 V	2 mA @ 5 V 20 mA @ 30 V

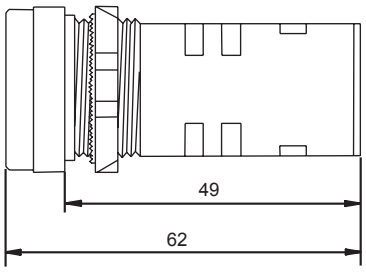
Mechanical data	P 22 DBZ	P 28 DMC948	P 28 DMC201	P 28 DMC301	P 28 DMB530
Operation mode	pulsating tone	continuous tone	continuous tone	continuous tone	continuous tone / pulsating tone
Sound pressure level	80 dB (A) @ 10 cm	91 dB (A) @ 48V	91 dB (A) @ 120V	91 dB (A) @ 230V	91 dB (A) @ 30V
Sound level reduction	–	up to 20 dB			
Service life	> 50,000 h	> 50,000 h			
Operating temperature	- 25 °C ... + 50 °C	- 25 °C ... + 65 °C			
Storage temperature		- 40 °C ... + 85 °C			
Relative humidity	90% @ + 20 °C	90% @ + 40 °C			
Protection system according to EN 60529	IP 65	IP 65			
Material housing	polycarbonate (PC)	plastic “NORYL® N-190”, UL 49-VO, black			
Mounting	panel mount: Ø 22.5 mm	panel mount: Ø 28.6 mm			
Type of connection	screw terminals 1.5 mm^2	quick connect blades, 6.3 mm wide, 0.8 mm thick			
Weight	30 g	40 g			

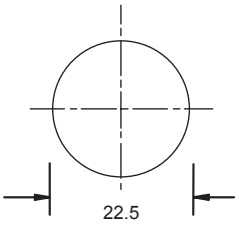
Dimensions

Panel cutouts

P 22 DBZ

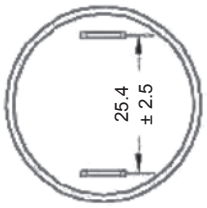




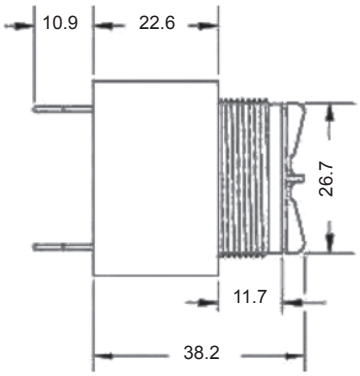


P 28 DMC948 / P 28 DMC201 / P 28 DMC301

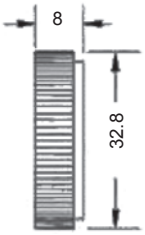
Rear view



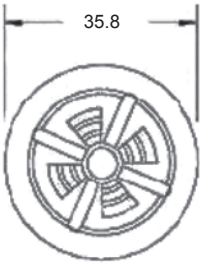
Side view

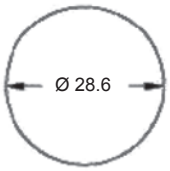


Ring



Front view

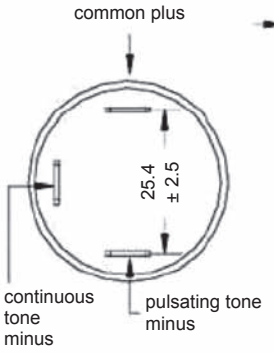




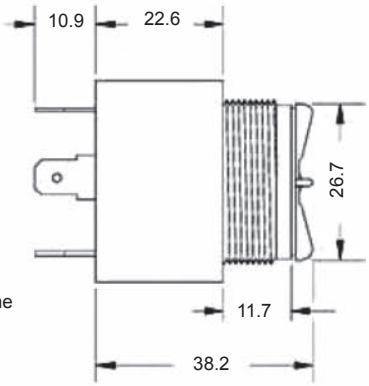
for mounting panels up to 6.3 mm thick

P 28 DMB350

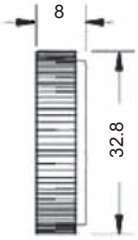
Rear view



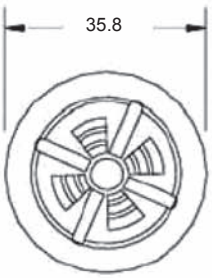
Side view

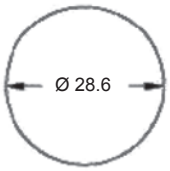


Ring



Front view





for mounting panels up to 6.3 mm thick

Ordering details

	P 22 DBZ			
Rated voltage	24 V AC/DC	48 V AC/DC	115 V AC	230 V AC
	232 70 80 0 000	232 70 70 0 000	232 70 15 0 000	232 70 10 0 000
Article numbers	**P 28 DMC948**	**P 28 DMC201**	**P 28 DMC301**	**P 28 DMB350**
Rated voltage	48 V DC	110 V AC	230 V AC	30 V DC
	232 60 70 0 000	232 60 16 0 000	232 60 11 0 000	232 65 80 0 000

Options / accessories

Label holder — **25 x 10 mm** only for P 22 DBZ

Article number:
232 92 00 0 000

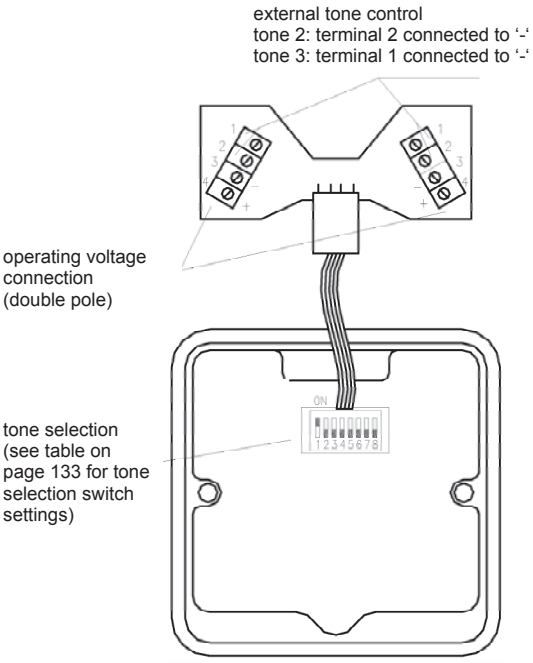
Label holder — **25 x 18 mm** only for P 22 DBZ

Article number:
232 91 00 0 000

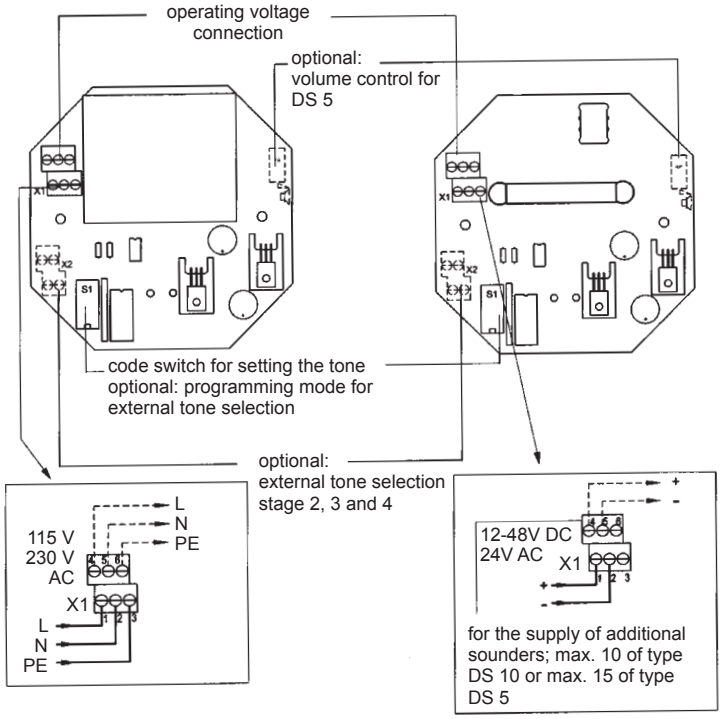
See page 93 for illustrations

Connection diagrams

SON 2

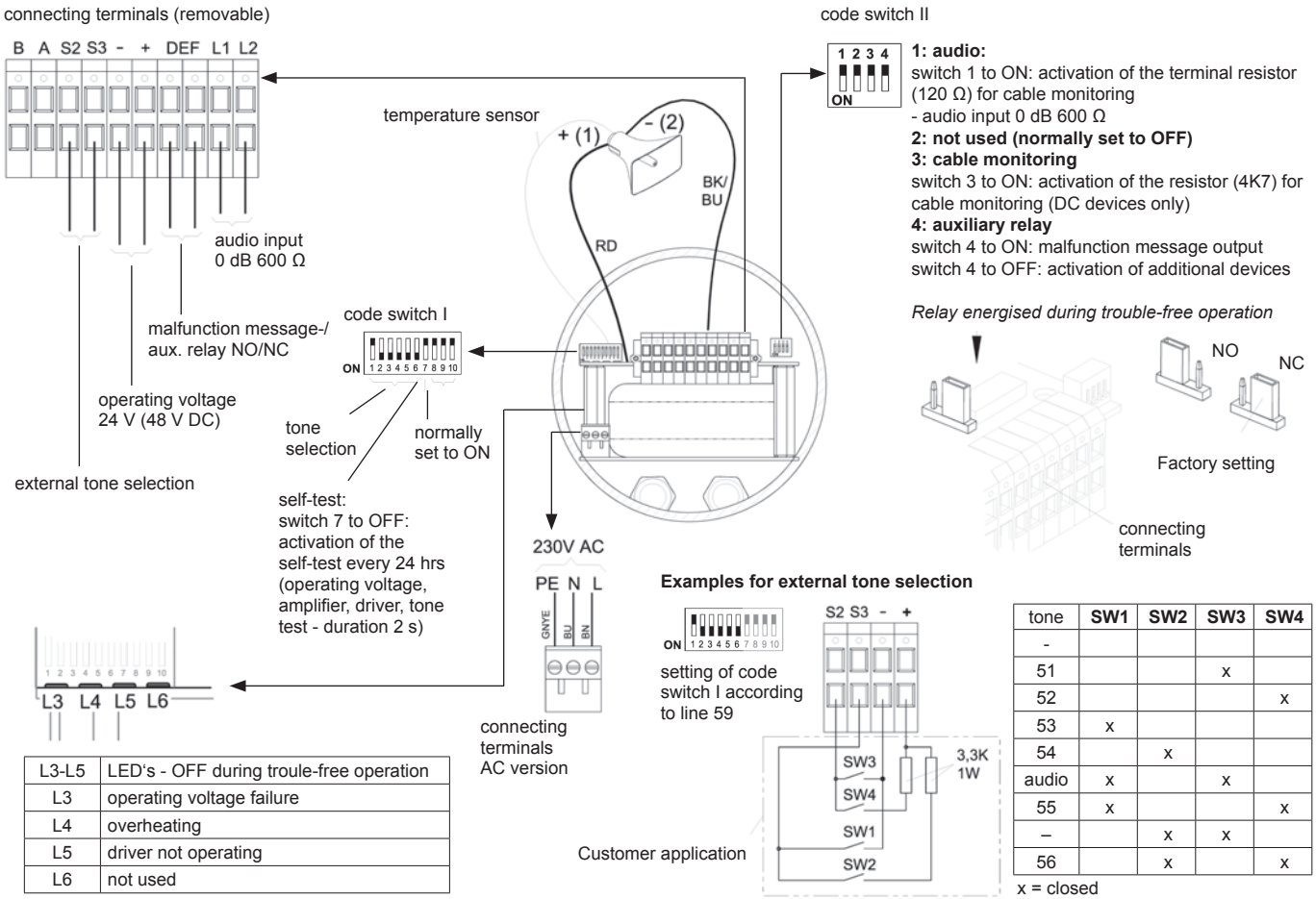


DS 5 / DS 10 AC version



DS 5 / DS 10 DC version

PA 130

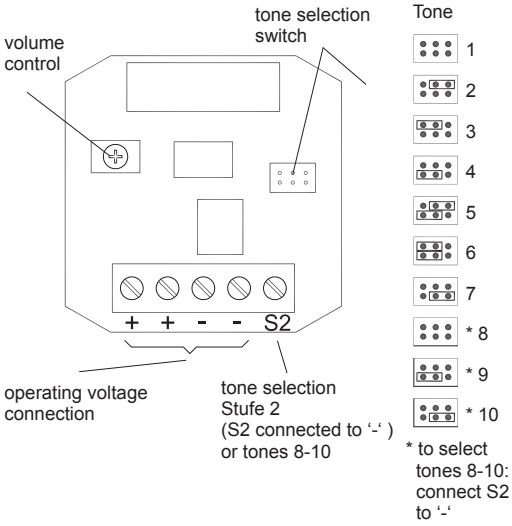


L3-L5	LED's - OFF during troule-free operation
L3	operating voltage failure
L4	overheating
L5	driver not operating
L6	not used

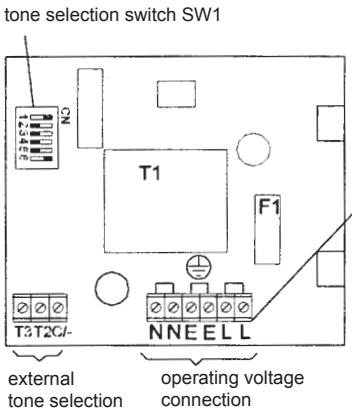
tone	SW1	SW2	SW3	SW4
-				
51			x	
52				x
53	x			
54		x		
audio	x		x	
55	x			x
–		x	x	
56		x		x

x = closed

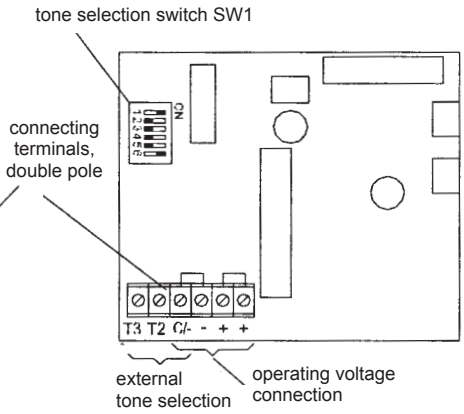
SON F1



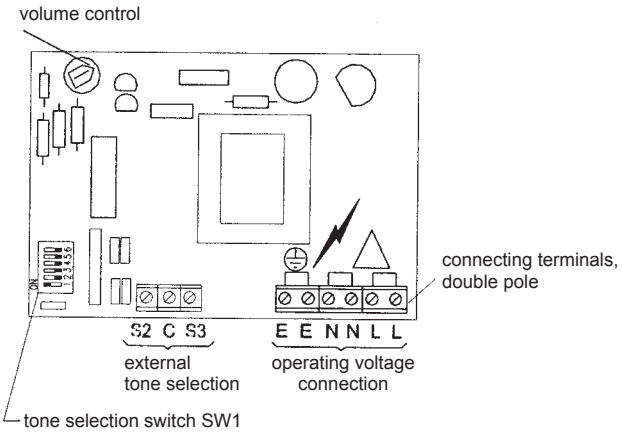
PA 110 / PAB 110 AC version



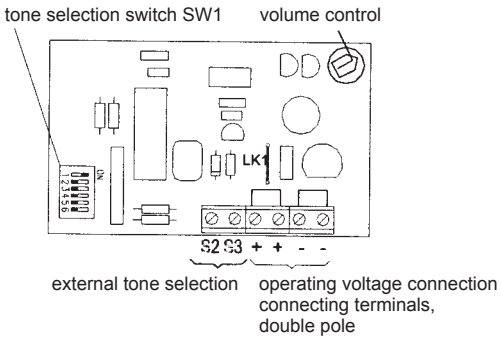
PA 110 / PAB 110 DC version



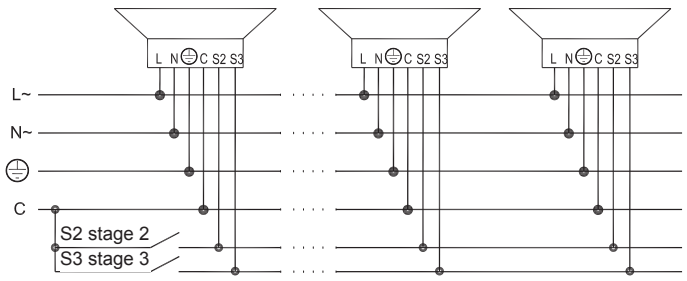
PA 100 / PA 106 AC version



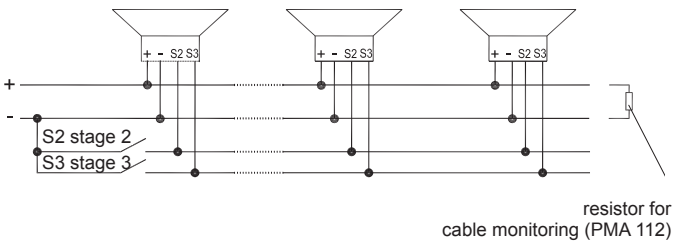
PA 100 / PA 106 DC version

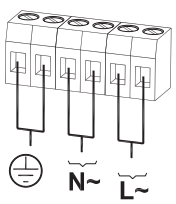


PMA 112 / PMA 121 AC version

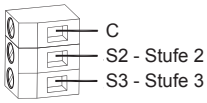


PMA 112 / PMA 121 DC version

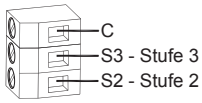




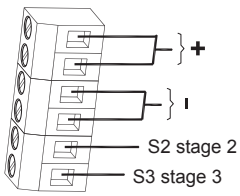
PMA 112



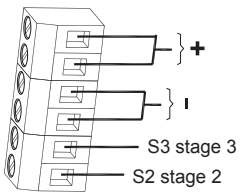
PMA 121



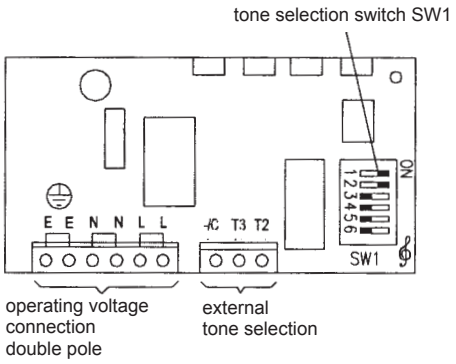
PMA 112



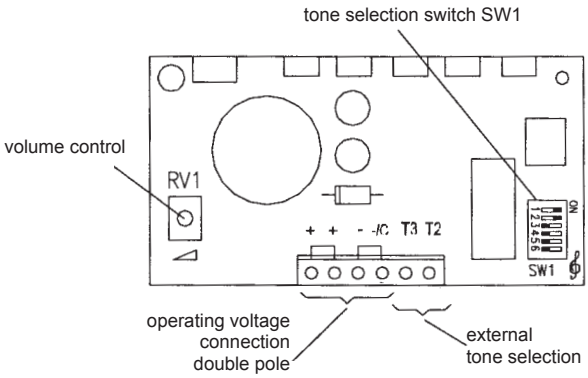
PMA 121



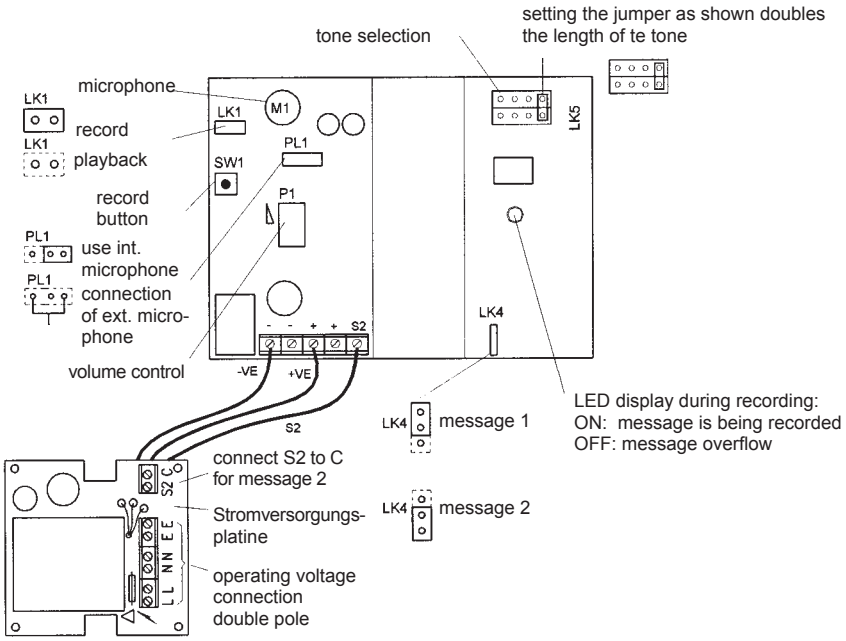
PA 120 / PAB 120 AC version



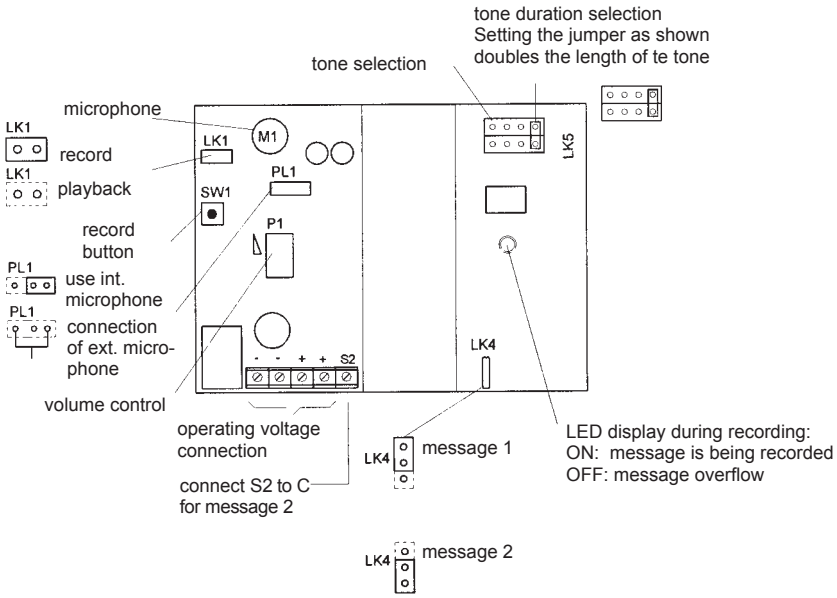
PA 120 / PAB 120 DC version



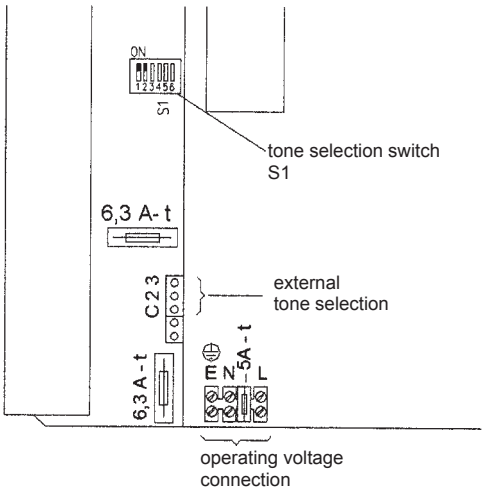
PAS 106 / PAS 110 AC version



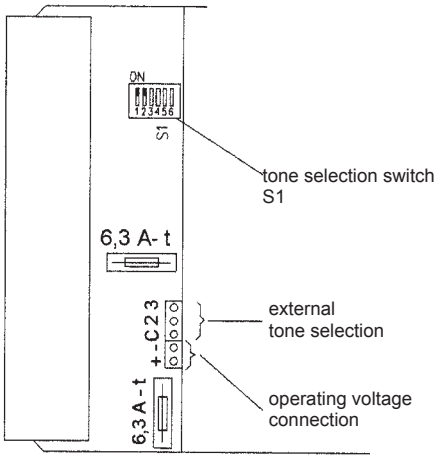
PAS 106 / PAS 110 DC version



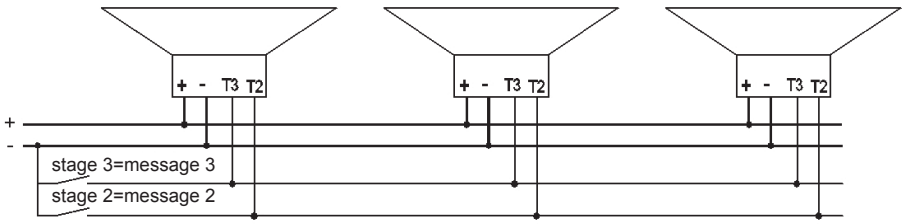
PA 140 AC version

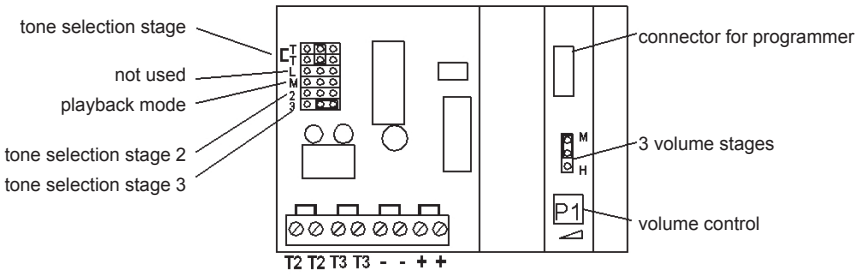


PA 140 DC version

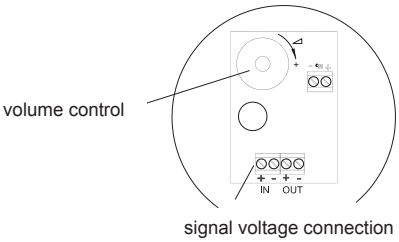


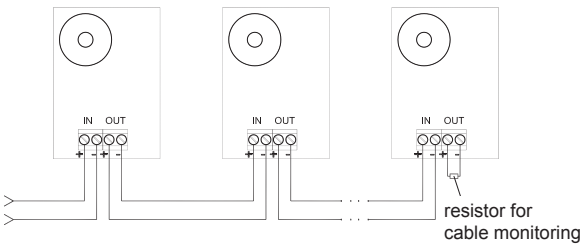
PAS 106 SYNC



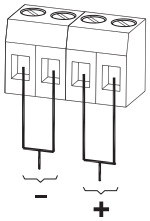


PS15R / PS15B

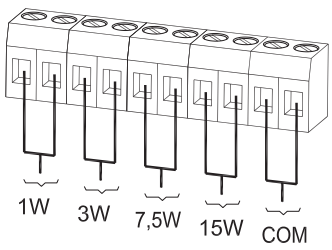




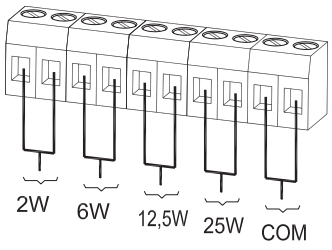
PML 15 / PML 25

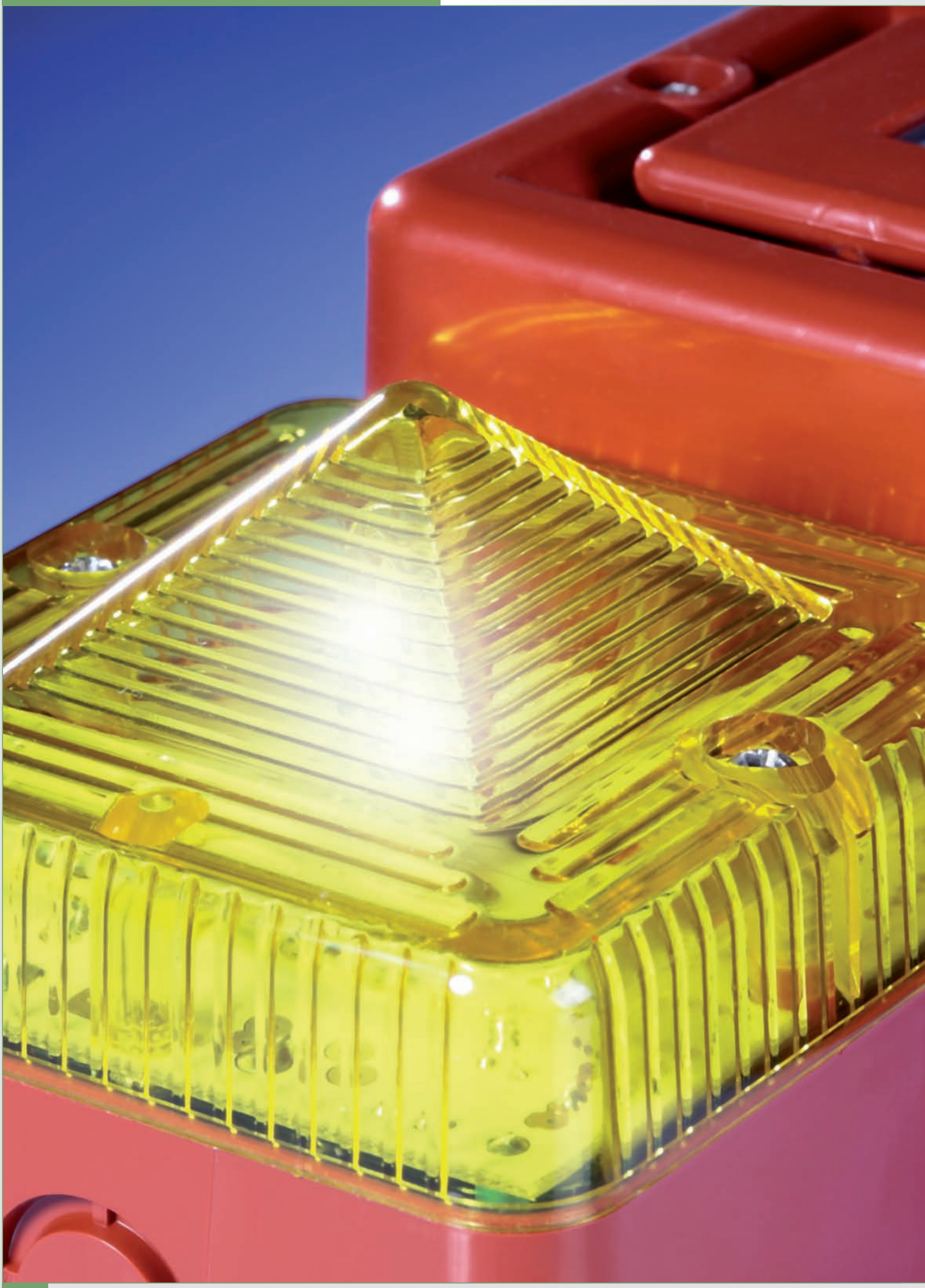


PML 15 100V



PML 25 100V





Seeing and hearing – double alarms warn better!

Visual-audible signaling devices offer double the amount of safety in one package

There are many industrial areas of use for signaling devices that are associated with adverse environmental conditions and higher demands, making the mutual assistance of acoustic and visual signals necessary. For example, when signals need to be noticed at great distances.

Two scenarios make this clear. Visual signals, for example, are easily recognisable in the dark. However, as soon as there is sunlight, other lights, the factory lighting or welding flashes, the observer is faced with a barely distinguishable light smog. Therefore, acoustic assistance of the visual signal is necessary.

The same applies to acoustic signals that have to penetrate through machine noise, environmental noise, voice noise, echoes, running motors and hearing protection. They are only reliable in being noticed with visual assistance.

All visual-audible signaling devices at a glance

	Type	Maximum signal reception range for a 65 dB ambient noise level in metres [1]					Sound pressure level (tone) / Light power	Protection system	Dimensions (HxWxD) mm	Approvals / standards					Page
		2.5	5	25	75	150				GL	GOST	UL	VdS	EN 54-3	
	P 22 DBF						80 dB (A) @ 10 cm	IP 65	Ø 29 x 52						163
	SON 4						100 dB (A) 5 Joules	IP 55	86 x 86 x AC: 120 DC: 102		○		●	●	164
	SON 4L						100 dB (A)				○		●	●	
	SON FL1						100 dB (A) 5 Joules	IP 55	172 x 86 x 83		○	●			166
	DSF 5						105 dB (A) 13 Joules	IP 66 IP 67	263.5 x 133.5 x 143		●				168
	DSF 10						110 dB (A) 13 Joules				●				
	PAB 100						100 dB (A) 5 Joules	IP 56	174 x 87 x 83		●	●			170
	PAB 106						105 dB (A) 5 Joules	IP 56	213 x 130 x 132		●	●			170
	PAB 110						110 dB (A) 5 Joules	IP 56	252 x 168 x 168		●	●			172
	PAB 120						120 dB (A) 5 Joules	IP 56	273 x 190 x 191.5		●	●			172
	PMCA 112-05						112 dB (A) 5 Joules	IP 67	Ø 181 x 385.1		○				174
	PMCA 112-L1						112 dB (A)				○				176

[1] The specification for the alarm signal reception range assumes an existing ambient noise level of 65 dB (A). In accordance with applicable regulations, the calculated alarm range for the sound level 65 dB (A) was given + 10 dB (A) = 75 dB (A).

● available
○ in preparation

Further information can be found on the Internet:
www.pfannenberg.com · www.pfannenberg-spareparts.com
Keep up to date. Subscribe to our newsletter now:
newsletter.pfannenberg.com

Blinking LED Panel Mount Indicator with buzzer P 22 DBF

- indicator lamp/buzzer combination for 22.5 mounting hole
- guaranteed high protection system (IP 65) to the housing
- superior design, therefore, high signaling effect on all sides
- space-saving combination of buzzer and blinking LED indicator for increasing the effect of the signal
- easy to mount label holders available as an accessory
- simple electrical connection by means of screw terminals

r = 2 m
Acoustic range according to EN 54

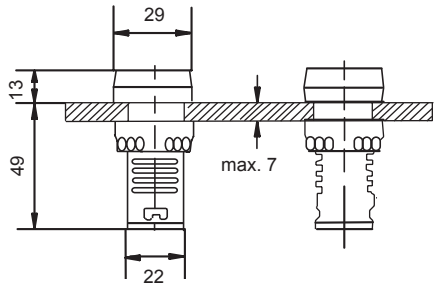
IP 65
Protection system

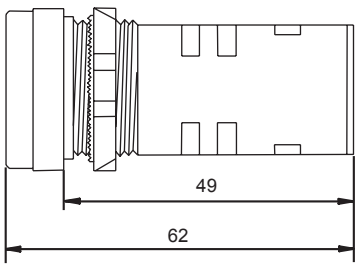
+ 50 °C
- 25 °C
Operating temperature

Electrical data	P 22 DBF			
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
Rated current consumption	18 – 30 mA	18 – 30 mA	20 – 80 mA	20 – 80 mA

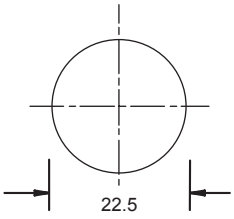
Mechanical data	P 22 DBF
Operating mode	1 Hz blinking light with buzzer (pulsating tone)
Sound pressure level	80 dB (A) @ 10 cm
Light source	LED array
Service life of the light source	> 50.000 hrs
Lens colours	red
Operating temperature	- 25 °C ... + 50 °C
Relative humidity	90% @ + 20 °C
Protection system according to EN 60529	IP 65 (to housing)
Mounting	panel-mounting: Ø 22.5 mm
Type of connection	screw terminals 1.5 mm²
Weight	90 g

Dimensions





Panel cut-out



Ordering details

Article numbers					
Lens colour	Rated voltage	230 V AC	115 V AC	115 V AC	24 V AC/DC
red		232 72 10 5 000	232 72 15 5 000	232 72 15 5 000	232 72 80 5 000

Options / accessories

Label holder
25 x 10 mm
Article number:
232 92 00 0 000

Label holder
25 x 18 mm
Article number:
232 91 00 0 000

See page 93
for illustrations

Flashing Sounder 100 dB (A) / 0.25 Joules SON 4
LED Blinking Sounder 100 dB (A) SON 4L

- automatic synchronisation in system mode
- volume control
- reverse polarity protection
- choice of 32 different tones
- 2 additional externally selectable tones
- ideal for fire alarm systems due to low power consumption

r = 18 m	IP 55	+ 55 °C / - 25 °C	EN 54-3	VdS G209080
Acoustic range	Protection system	Operating temperature	Standard	

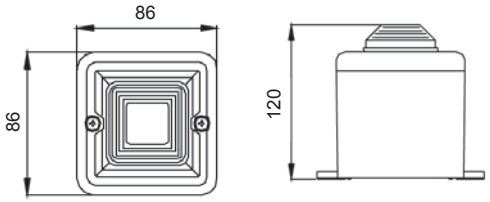
Electrical data	SON 4			
Rated voltage	230 V AC	115 V AC	24 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	± 10%	± 10%	± 10%	± 25 %
Rated current consumption	30 mA	50 mA	180 mA	150 mA

Electrical data	SON 4L					
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10%	± 10%	± 10%	± 25 %	± 25 %	± 25 %
Rated current consumption	20 mA	25 mA	60 mA	40 mA	50 mA	50 mA

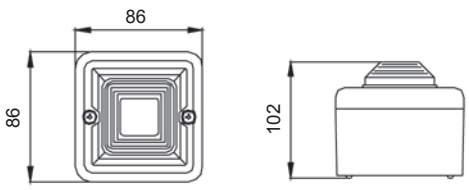
Mechanical data		SON 4	SON 4L
Sound pressure level		100 dB (A)	
Alarm tones		32, 3-stage alarm	
Flash energy		0.25 Joules	
Flash rate / Blinking frequency		1 Hz	2 Hz
Light source		xenon flash tube	5 high output LEDs
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55	
Duty cycle		100%	
Material	lens	polycarbonate (PC)	
	housing	UL 94 VO & 5VA classified ABS	
Colour	housing	RAL 3000 (flame red), optionally grey or white	
Cable entry		4 disruptions prepared on the side and bottom	
Connecting terminals		0.5 – 2.5 mm²	
Weight		AC: 400 g / DC: 300 g	

Dimensions

SON 4 / SON 4L AC version



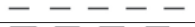
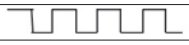
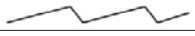
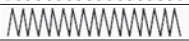
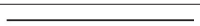
SON 4 / SON 4L DC version



Options / accessories

IP 56
Protection system

Alarm tone table SON 4

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	sweeping 500 / 1200 / 500 Hz, switching frequency 0.3 Hz		tone 2	tone 5
tone 9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.		tone 15	tone 2
tone 10	alternating tone 2400 / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 32	tone 26
tone 31	sweeping 660 / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	Australian evacuation alarm, 500 Hz / 1200 Hz, 3.75 s signal, 0.25 s gap		tone 30	tone 26

EN 54-3 tested frequencies: tone 2, 3, 9, 15, 16 and 17.

Alarm tone table SON 4L

Stage 1	Description - Frequency	dB @ 1 m		Stage 2
tone 1	alternating tone 800 / 1000 Hz, alternation every 0.25 s	99 dB @ 1 m		tone 8
tone 2	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s	100 dB @ 1 m		tone 1
tone 3	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	99 dB @ 1 m		tone 8
tone 4	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	97 dB @ 1 m		tone 9
tone 5	simulated bell	95 dB @ 1 m		tone 1
tone 6	sweeping 800 / 1000 Hz, switching frequency 7 Hz	99 dB @ 1 m		tone 8
tone 7	Australian evacuation alarm, 500 Hz / 1200 Hz, 3.75 s signal, 0.25 s gap	100 dB @ 1 m		tone 10
tone 8	continuous tone 1000 Hz – PFEER toxic gas	100 dB @ 1 m		–
tone 9	continuous tone 554 Hz	97 dB @ 1 m		–
tone 10	interrupted tone 420 Hz, every 0.625 s – Australian alert	97 dB @ 1 m		–

EN 54-3 tested frequencies: tone 1, 2, 3, 4, 8 and 9.

Ordering details

Article numbers		SON 4			SON 4L		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
amber		232 40 10 4 010	232 40 15 4 010	232 40 80 4 010	232 41 10 4 010	232 41 15 4 010	232 41 80 4 010
red		232 40 10 5 010	232 40 15 5 010	232 40 80 5 010	232 41 10 5 010	232 41 15 5 010	232 41 80 5 010

Article numbers for other voltages and versions on request

Flashing Sounder 100 dB (A) / 5 Joules SON FL1
LED Blinking Sounder 100 dB (A) / SON FL1L

- choice of 10 different tones
- 1 additional externally selectable tone
- automatic synchronisation in system mode
- reverse polarity protection
- volume control
- ideal for fire alarm systems due to low power consumption

Acoustic range

Protection system

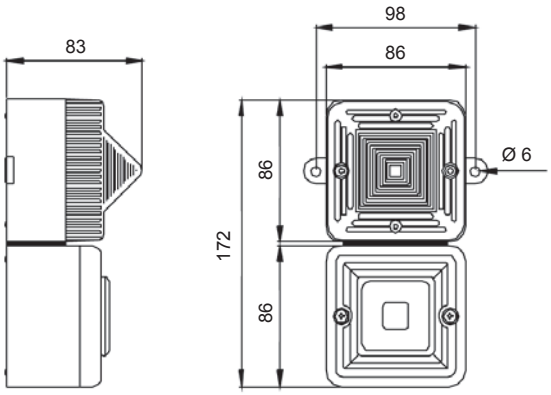
Operating temperature

Standard

Electrical data	SON FL1		SON FL1L
Rated voltage	24 V DC	12 V DC	24 V DC
Operating range	20 V – 28 V	10 V – 14 V	20 V – 28 V
Rated current consumption	275 mA	525 mA	125 mA

Mechanical data		SON FL1	SON FL1L
Sound pressure level		100 dB (A)	
Alarm tones		10, 2-stage alarm	
Flash energy		5 Joules	
Flash / blink frequency		1 Hz	2 Hz, can be set to blinking or continuous light
Light source		xenon flash tube	8 high output LED
Lens colours		clear, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 55	
Duty cycle		100%	
Material	lens	polycarbonate (PC)	
	housing	UL 94 VO & 5VA classified ABS	
Colour	housing	RAL 3000 (flame red), optionally grey or white	
Cable entry		4 disruptions prepared on the side and bottom	
Connecting terminals		0.5 – 2.5 mm^2	
Weight		260 g	460 g

Dimensions



Alarm tone table

Stage 1	Description - Frequency	dB @ 1 m		Stage 2
tone 1	alternating tone 800 / 1000 Hz, alternation every 0.25 s	99 dB @ 1 m		tone 8
tone 2	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s	100 dB @ 1 m		tone 1
tone 3	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	99 dB @ 1 m		tone 8
tone 4	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	97 dB @ 1 m		tone 9
tone 5	simulated bell	95 dB @ 1 m		tone 1
tone 6	sweeping 800 / 1000 Hz, switching frequency 7 Hz	99 dB @ 1 m		tone 8
tone 7	Australian evacuation alarm, 500 Hz / 1200 Hz, 3.75 s signal, 0.25 s gap	100 dB @ 1 m		tone 10
tone 8	continuous tone 1000 Hz – PFEER toxic gas	100 dB @ 1 m		–
tone 9	continuous tone 554 Hz	97 dB @ 1 m		–
tone 10	interrupted tone 420 Hz, every 0.625 s – Australian alert	97 dB @ 1 m		–

EN 54-3 tested frequencies: tone 1, 2, 3, 4, 8 and 9.

Ordering details

Article numbers		SON FL1	SON FL1L
Lens colour	**Rated voltage**	24 V DC	24 V DC
amber		232 52 80 4 010	232 53 80 4 010
red		232 52 80 5 010	232 53 80 5 010

Article numbers for other voltages and versions on request

Options / accessories

IP 56
Protection system

C UL US LISTED

Flashing Sounders 105 dB (A) / 110 dB (A) / 13 Joules DSF 5 / DSF 10

The powerful flashing sounder

- extremely bright and loud due to 13 Joules, 105 dB (A) or 110 dB (A)
- high reliability and long service life
- 31 different sound signals can be set
- up to four externally selectable tones (optional)

Further detailed specifications for the Quadro flashing light on page 44.

DSF 5	DSF 10			
r = 32 m	r = 56 m	IP 66	IP 67	+ 55 °C / - 25 °C
Acoustic range	Acoustic range	Protection system	Protection system	Operating temperature

Electrical data	DSF 5			DSF 10		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	195 V – 253 V	95 V – 127 V	19 V – 29 V	195 V – 253 V	95 V – 127 V	19 V – 29 V
Rated current consumption	0.19 A	0.40 A	0.98 A	0.22 A	0.46 A	1.12 A

Mechanical data		DSF 5	DSF 10
Sound pressure level		105 dB (A)	110 dB (A)
Flash energy		13 Joules	
Lens colour		clear, yellow, amber, red, green, blue	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66, IP 67	
Impact resistance of the flashing light		IK 08 (as per EN 50102)	
Duty cycle		100%	
Service life of the light source		light emission still 70% after 8,000,000 flashes	
Material	sounder	die-cast aluminium GD-Al Si12 Cu	
	flashing light	polycarbonate (PC)	
Surface coating	sounder	epoxy resin paint RAL 3000, flame red	
Cable bushing		2 x M20 x 1.5	
Clamping range of the cable screw fitting		8 – 12 mm	
Connecting terminal cross-section		max. 2.5 mm²	
Mounting		do not direct the opening of the sound horn upwards	
Weight		2.6 kg	

Ordering details

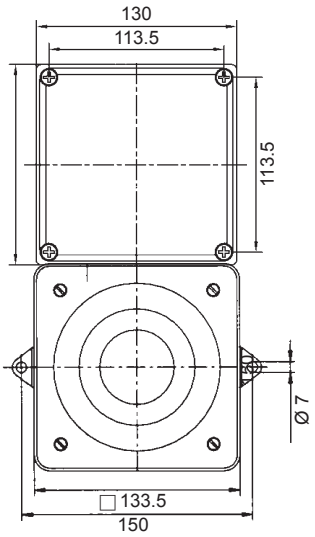
Article numbers		DSF 5			DSF 10		
Version	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard; red lens		231 07 10 5 000	231 07 15 5 000	231 07 80 5 000	231 12 10 5 000	231 12 15 5 000	231 12 80 5 000
TAS (external tone selection); red lens		231 07 10 5 152	231 07 15 5 152	231 07 80 5 152	231 12 10 5 152	231 12 15 5 152	231 12 80 5 152

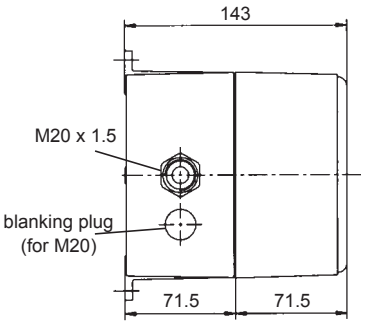
Options / accessories

External tone selection (4 variants)

GOST

Dimensions





Alarm tone table

Tone	Code switch 1	2	3	4	5	6	Description - Basic tone (preset: tone no. 1)	Stage 2	Stage 3	Stage 4
0							no tone	1	5	4
1					●		emergency signal DIN 33 404, part 3	3	2	4
2				●			emergency evacuation signal as per ISO 8201	1	4	3
3				●	●		alternating tone	1	2	4
4			●				continuous tone	1	3	5
5			●		●		interrupted tone	1	4	3
6			●	●			siren	1	4	9
7			●	●	●		fire alarm France – NFS21-001 –	3	10	4
8		●					emergency signal Sweden – SS 031711 –	2	3	4
9		●			●		horn	1	3	4
10		●		●			continuous tone	27	9	26
11		●		●	●		continuous tone - Bayer	1	17	9
12		●	●				continuous tone	27	9	26
13		●	●		●		continuous tone	1	5	3
14		●	●	●			continuous tone	1	4	10
15		●	●	●	●		interrupted tone	1	24	12
16	●						interrupted tone	1	24	15
17	●				●		interrupted tone - Bayer	1	11	9

Tone	Code switch 1	2	3	4	5	6	Description - Basic tone (preset: tone no. 1)	Stage 2	Stage 3	Stage 4
18	●			●			interrupted tone	19	7	4
19	●			●	●		alternating tone	27	13	23
20	●		●				interrupted tone IMO SOLAS III/50 + SOLAS III/6.4	9	21	26
21	●		●		●		interrupted tone – leave ship –	20	9	26
22	●		●	●			sweep up sawtooth with gap	19	14	2
23	●		●	●	●		siren	27	12	2
24	●	●					alternating tone	1	16	12
25	●	●			●		alternating tone	1	14	5
26	●	●		●			alternating tone	4	9	27
27	●	●		●	●		siren	13	23	19
28	●	●	●				siren	7	10	4
29	●	●	●		●		siren – Hoechst –	1	30	9
30	●	●	●	●			interrupted tone	1	4	26
31	●	●	●	●	●		siren – NF C 48-265 –	3	14	4
32	○	○	○	○	○	●	selection of available tone combinations in stages 2, 3 and 4			

Conformity to standards

DIN EN 54-3: 2001 + DIN EN 54-3/A1: 2001	Fire alarm systems - part 3: fire alarm devices; Audible signaling devices and annex A1
EN 50 130-4: 1996	Stability of system components for fire and burglar alarm systems
EN 61 000-6-2	EMV, stability for industrial areas
EN 61 000-6-3	EMV, emission standard for residential commercial, and light-industrial environments
EN 60 947-1: 2003	Low voltage switchgear standard
EN 60 529: 2000	Protection system by enclosure (IP code)
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
DIN 33 404/3: 1982	Alarms for workplaces, unified emergency signal
ISO 8201: 1987	Evacuation alarm
DIN EN 981: 1997	System of acoustic and visual alarm signals and information signals
ISO 11 429: 1996	System of acoustic and visual alarm signals and information signals

Flashing Sounders 100 dB (A) / 105 dB (A) / 5 Joules PAB 100 / PAB 106

In loud workplaces, the addition of visual alarms to support acoustic alarms is meaningful and is even required if limit values are exceeded.

The flash colour ‘yellow’ is specified in accident prevention regulations as the warning signal. The sounder’s 32 different warning signals allow adaptation to individual internal alarm structures.

- flashing light and sounder can be connected separately
- automatic synchronisation when controlling several devices
- generates 3 different tones by means of external control

PAB 100

Acoustic range according to EN 54

PAB 106

Acoustic range according to EN 54

Protection system

Operating temperature

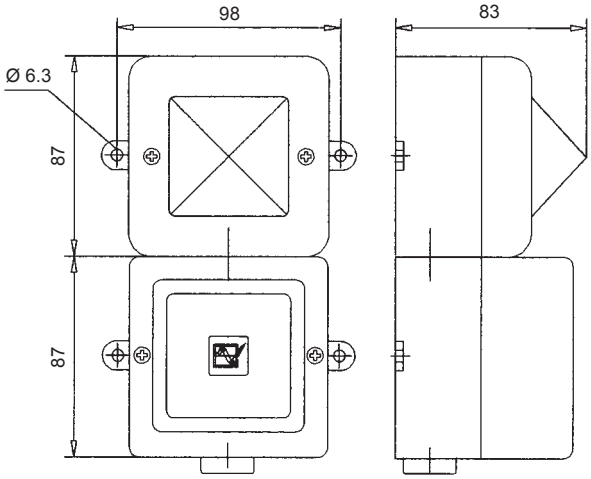
Electrical data	PAB 100				
Rated voltage	230 V AC	110 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	± 10%	42 V – 54 V	20 V – 28 V
Rated current consumption	65 mA	120 mA	405 mA	225 mA	275 mA
Electrical data	**PAB 106**				
Rated voltage	230 V AC	110 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	± 10%	42 V – 54 V	20 V – 28 V
Rated current consumption	65 mA	120 mA	405 mA	225 mA	275 mA

Mechanical data		PAB 100	PAB 106
Sound pressure level		100 dB (A)	105 dB (A)
Sound level reduction		by - 15 dB via potentiometer	
Flash energy		5 Joules	
Flash rate		1 Hz = 60 flashes/min.	
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 56	
Material	sounder	ABS, self-extinguishing, similar to UL 94 VO	
	flashing light body	ABS, self-extinguishing, similar to UL 94 VO	
	flashing light lens	polycarbonate (PC)	
Colour	housing	similar to RAL 3000 (flame red)	
	flashing light lens	clear, white, yellow, amber, red, green, blue	
Cable entry		M20 diaphragm nipple	
Weight	AC	570 g	1200 g
	DC	460 g	460 g

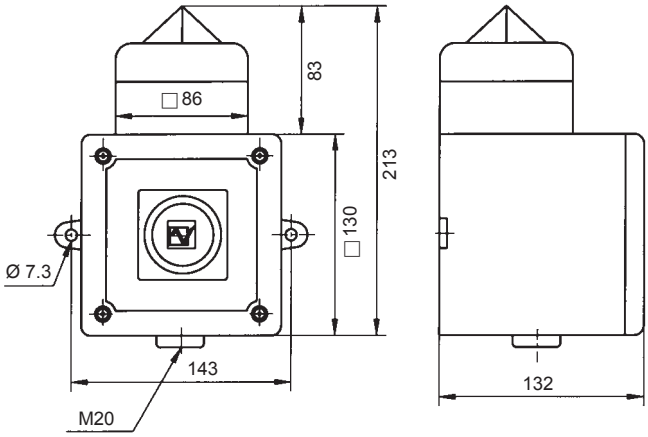
Options / accessories

Dimensions

PAB 100



PAB 106



Alarm tone table

Basic tone no.	Description - tones	Stage 2	Stage 3
1	continuous tone 340 Hz	2	5
2	alternating tone 800 / 1000 Hz, alternation every 0.25 s	17	5
3	slow whoop 500-1000 Hz, 3 s signal, 0.5 s gap	2	5
4	sweeping 800 / 1000 Hz, switching frequency 1 Hz	6	5
5	continuous tone 2400 Hz	3	20
6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz	7	5
7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	10	5
8	siren 500 / 1200 / 500 Hz, duration 3 s	2	5
9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	15	2
10	alternating tone 2400 / 2900 Hz, alternation every 0.25 s	7	5
11	interrupted tone 1000 Hz, 0.5 s signal, 0.5 s gap	2	5
12	alternating tone 800 / 1000 Hz, alternation every 1.14 s	4	5
13	interrupted tone 2400 Hz, 0.5 s signal, 0.5 s gap	15	5
14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	4	5
15	continuous tone 800 Hz	2	5
16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	18	5

Basic tone no.	Description - tones	Stage 2	Stage 3
17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) (NF S 32-001)	2	27
18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	2	5
19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s (NF C 48-265)	2	5
20	continuous tone 660 Hz	2	5
21	alternating tone 554 / 440 Hz, alternation every 0.5 s	2	5
22	interrupted tone 660 Hz, 0.875 s signal, 0.875 s gap	2	5
23	800 Hz, 0.25 s signal, 0.25 s gap	6	5
24	sweeping 800 / 1000 Hz, switching frequency 50 Hz	29	5
25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz	29	5
26	simulated bell	2	15
27	continuous tone 554 Hz	26	5
28	continuous tone 440 Hz	2	5
29	sweeping 800 / 1000 Hz, switching frequency 7 Hz	7	5
30	continuous tone 300 Hz	2	5
31	siren 660 / 1200 Hz, switching frequency 1 Hz	26	5
32	2-tone bell sound	26	5

Tone selection via DIP switch. Two alternative tones (stage 2 and 3) can be generated by means of external control.

Ordering details

Article numbers		PAB 100			PAB 106		
Version	**Rated voltage**	230 V AC	110 V AC	24 V DC	230 V AC	110 V AC	24 V DC
yellow lens		230 50 10 3 000	230 50 16 3 000	230 50 80 3 000	230 56 10 3 000	230 56 16 3 000	230 56 80 3 000
amber lens		230 50 10 4 000	230 50 16 4 000	230 50 80 4 000	230 56 10 4 000	230 56 16 4 000	230 56 80 4 000
red lens		230 50 10 5 000	230 50 16 5 000	230 50 80 5 000	230 56 10 5 000	230 56 16 5 000	230 56 80 5 000
yellow lens, UL		230 50 10 3 002	230 50 16 3 002	230 50 80 3 002	230 56 10 3 002	230 56 16 3 002	230 56 80 3 002
amber lens, UL		230 50 10 4 002	230 50 16 4 002	230 50 80 4 002	230 56 10 4 002	230 56 16 4 002	230 56 80 4 002
red lens, UL		230 50 10 5 002	230 50 16 5 002	230 50 80 5 002	230 56 10 5 002	230 56 16 5 002	230 56 80 5 002

Article numbers for other voltages and versions on request

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731 ‘Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals’.

The requirement for an acoustic alarm signal can be found in the harmonised standards:
EN 60204-1 Electrical equipment of machines
EN 60825-1 Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Flashing Sounders 110 dB (A) / 120 dB (A) / 5 Joules PAB 110 / PAB 120

In loud workplaces, the addition of visual alarms to support acoustic alarms is meaningful and is even required if limit values are exceeded.

The flash colour ‘yellow’ is specified in accident prevention regulations as the warning signal. The sounder’s 45 different warning signals allow adaptation to individual internal alarm structures.

- flashing light and sounder can be connected separately
- generates 3 different tones by means of external control

PAB 110

Acoustic range

PAB 120

Acoustic range

Protection system

Operating temperature

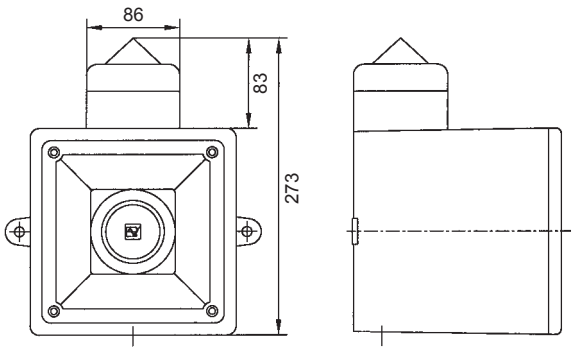
Electrical data	PAB 110				
Rated voltage	230 V AC	110 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	± 10%	42 V – 54 V	20 V – 28 V
Rated current consumption	95 mA	170 mA	800 mA	295 mA	450 mA
Electrical data	**PAB 120**				
Rated voltage	230 V AC	110 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	± 10%	42 V – 54 V	20 V – 28 V
Rated current consumption	155 mA	310 mA	1300 mA	775 mA	1200 mA

Mechanical data		PAB 110	PAB 120
Sound pressure level		110 dB (A)	120 dB (A)
Sound level reduction		by -12 dB via potentiometer	by -10 dB via potentiometer
Flash energy		5 Joules	
Flash rate		1 Hz = 60 flashes/min.	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 40 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 56	
Duty cycle		100%	
Material	sounder	ABS, self-extinguishing, similar to UL 94 VO	
	flashing light body	ABS, self-extinguishing, similar to UL 94 VO	
	flashing light lens	polycarbonate (PC)	
Colour	housing	similar to RAL 3000 (flame red)	
	flashing light lens	clear, white, yellow, amber, red, green, blue	
Cable entry		M20 diaphragm nipple	
Weight	AC	2.3 kg	2.9 kg
	DC	2.0 kg	2.3 kg

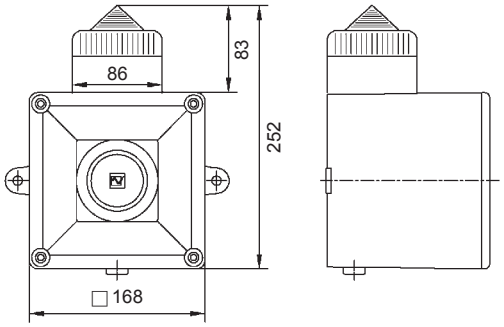
Options / accessories

Dimensions

PAB 120



PAB 110



Alarm tone table

Basic tone no.	Description - tones	Stage 2	Stage 3
1	continuous tone 340 Hz	2	5
2	alternating tone 800 / 1000 Hz, alternation every 0.25 s	17	5
3	slow whoop 500-1000 Hz, 3 s signal, 0.5 s gap	2	5
4	sweeping 800 / 1000 Hz, switching frequency 1 Hz	6	5
5	continuous tone 2400 Hz	3	20
6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz	7	5
7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	10	5
8	siren 500 / 1200 / 500 Hz, duration 3 s	2	5
9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	15	2
10	alternating tone 2400 / 2900 Hz, alternation every 0.25 s	7	5
11	interrupted tone 1000 Hz, 0.5 s signal, 0.5 s gap	2	5
12	alternating tone 800 / 1000 Hz, alternation every 1.14 s	4	5
13	interrupted tone 2400 Hz, 0.5 s signal, 0.5 s gap	15	5
14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	4	5
15	continuous tone 800 Hz	2	5
16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	18	5
17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) (NF S 32-001)	2	27
18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	2	5
19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s (NF C 48-265)	2	5
20	continuous tone 660 Hz	2	5
21	alternating tone 554 / 440 Hz, alternation every 0.5 s	2	5
22	interrupted tone 660 Hz, 0.875 s signal, 0.875 s gap	2	5

Basic tone no.	Description - tones	Stage 2	Stage 3
23	800 Hz, 0.25 s signal, 0.25 s gap	6	5
24	sweeping 800 / 1000 Hz, switching frequency 50 Hz	29	5
25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz	29	5
26	simulated bell	2	15
27	continuous tone 554 Hz	26	5
28	continuous tone 440 Hz	2	5
29	sweeping 800 / 1000 Hz, switching frequency 7 Hz	7	5
30	continuous tone 300 Hz	2	5
31	siren 660 / 1200 Hz, switching frequency 1 Hz	26	5
32	2-tone bell sound	26	5
33	interrupted tone 745 Hz, 0.5 s signal, 0.5 s gap	2	–
34	alternating tone 1000 / 2000 Hz, alternation every 0.5 s	38	45
35	interrupted tone 420 Hz, every 0.625 s	36	5
36	slow whoop 500 Hz up to 1200 Hz within 0.375 s, 0.25 s gap	35	5
37	continuous tone 1000 Hz	9	45
38	continuous tone 2000 Hz	34	45
39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	23	17
40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) (NF S 32-001)	31	27
41	motor siren, slowly rising to 1200 Hz	2	5
42	motor siren, slowly rising to 800 Hz	2	5
43	continuous tone 1200 Hz	2	5
44	motor siren, slowly rising to 2400 Hz	2	5
45	1000 Hz, 1 s signal, 1 s gap	38	34

Tone selection via DIP switch. Two alternative tones (stage 2 and 3) can be generated by means of external control.

Ordering details

Article numbers		PAB 110			PAB 120		
Version	Rated voltage	230 V AC	110 V AC	24 V DC	230 V AC	110 V AC	24 V DC
yellow lens		230 60 10 3 000	230 60 16 3 000	230 60 80 3 000	230 65 10 3 000	230 65 16 3 000	230 65 80 3 000
amber lens		230 60 10 4 000	230 60 16 4 000	230 60 80 4 000	230 65 10 4 000	230 65 16 4 000	230 65 80 4 000
red lens		230 60 10 5 000	230 60 16 5 000	230 60 80 5 000	230 65 10 5 000	230 65 16 5 000	230 65 80 5 000
yellow lens, UL		230 60 10 3 002	230 60 16 3 002	230 60 80 3 002	230 65 10 3 002	230 65 16 3 002	230 65 80 3 002
amber lens, UL		230 60 10 4 002	230 60 16 4 002	230 60 80 4 002	230 65 10 4 002	230 65 16 4 002	230 65 80 4 002
red lens, UL		230 60 10 5 002	230 60 16 5 002	230 60 80 5 002	230 65 10 5 002	230 65 16 5 002	230 65 80 5 002

Article numbers for other voltages and versions on request

Conformity to standards

The acoustic parameters conform to the European standard DIN EN ISO 7731 ‘Ergonomic – alarm signals for public areas and workplaces – acoustic alarm signals’.

The requirement for an acoustic alarm signal can be found in the harmonised standards:
EN 60204-1 Electrical equipment of machines
EN 60825-1 Radiation safety of laser devices, identical to IEC 825 and DIN-VDE 0837

Flashing Sounder 112 dB (A) / 5 Joules
PMCA 112-05

- 3-stage alarm (2 additional stages)
- stage control possible via minus or plus
- volume control
- automatic synchronisation or alternating flash mode
- can be operated via common or separate voltage supplies

Acoustic range

Protection system

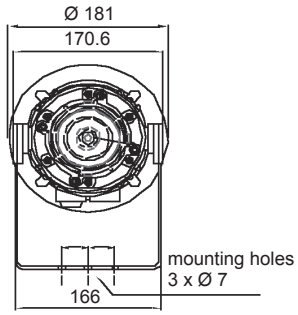
Protection system

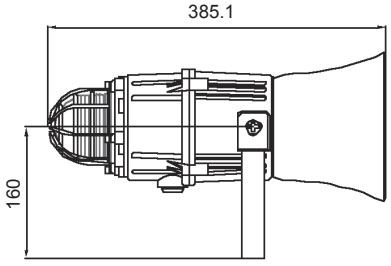
Operating temperature

Electrical data	PMCA 112-05 sounder			
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	35 V – 60 V	10 V – 30 V
Rated current consumption	60 mA	110 mA	120 mA	200 mA
Electrical data	**PMCA 112-05 flashing light**			
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	42 V – 54 V	20 V – 28 V
Rated current consumption	55 mA	140 mA	180 mA	300 mA

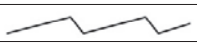
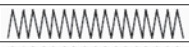
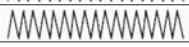
Mechanical data		PMCA 112-05
Sound pressure level		112 dB (A) ± 3 dB
Alarm tones		45 (conforms to UKOOA/PFEER)
Flash energy		5 Joules
Flash rate		1 Hz = 60 flashes/min.
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66, IP 67
Material	lens	borosilicate glass
	housing	UL 94 VO & 5VA classified ABS
	protective cage	stainless steel
Colour	lens	clear, white, yellow, amber, red, green, blue
	housing	grey (RAL 7038)
Cable entry		2 x M20 (with 1 blanking plug)
Connecting terminals		0.5 – 4.0 mm²
Weight		AC version: 3.5 kg; DC version: 3.0 kg

Dimensions





Alarm tone table

Stage 1	Description - Frequency	dB @ 1 m		Stage 2	Stage 3
tone 1	continuous tone 340 Hz	107 dB @ 1 m		tone 2	tone 5
tone 2	alternating tone 800 / 1000 Hz, alternation every 0.25 s	112 dB @ 1 m		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s	113 dB @ 1 m		tone 2	tone 5
tone 4	sweeping 800 / 1000 Hz, switching frequency 1 Hz	113 dB @ 1 m		tone 6	tone 5
tone 5	continuous tone 2400 Hz	113 dB @ 1 m		tone 3	tone 20
tone 6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz	119 dB @ 1 m		tone 7	tone 5
tone 7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	119 dB @ 1 m		tone 10	tone 5
tone 8	sweeping 500 / 1200 / 500 Hz, switching frequency 0.3 Hz	113 dB @ 1 m		tone 2	tone 5
tone 9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	113 dB @ 1 m		tone 15	tone 2
tone 10	alternating tone 2400 / 2900 Hz, switching frequency 2 Hz	119 dB @ 1 m		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz	112 dB @ 1 m		tone 2	tone 5
tone 12	alternating tone 800 / 1000 Hz, switching frequency 0.875 Hz	112 dB @ 1 m		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz	119 dB @ 1 m		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	113 dB @ 1 m		tone 4	tone 5
tone 15	continuous tone 800 Hz	113 dB @ 1 m		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	109 dB @ 1 m		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	109 dB @ 1 m		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	109 dB @ 1 m		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265	114 dB @ 1 m		tone 2	tone 5
tone 20	continuous tone 660 Hz	109 dB @ 1 m		tone 2	tone 5
tone 21	alternating tone 554 / 440 Hz, switching frequency 1 Hz	109 dB @ 1 m		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap	109 dB @ 1 m		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz	113 dB @ 1 m		tone 6	tone 5
tone 24	sweeping 800 / 1000 Hz, switching frequency 50 Hz	112 dB @ 1 m		tone 29	tone 5
tone 25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz	116 dB @ 1 m		tone 29	tone 5
tone 26	simulated bell	108 dB @ 1 m		tone 2	tone 15
tone 27	continuous tone 554 Hz	109 dB @ 1 m		tone 26	tone 5
tone 28	continuous tone 440 Hz	106 dB @ 1 m		tone 2	tone 5
tone 29	sweeping 800 / 1000 Hz, switching frequency 7 Hz	112 dB @ 1 m		tone 7	tone 5
tone 30	continuous tone 300 Hz	107 dB @ 1 m		tone 2	tone 5
tone 31	siren 660 / 1200 Hz, switching frequency 1 Hz	112 dB @ 1 m		tone 26	tone 5
tone 32	2-tone bell sound	108 dB @ 1 m		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz	109 dB @ 1 m		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s – Singapore	114 dB @ 1 m		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert	108 dB @ 1 m		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 0.375 s, 0.25 s gap	113 dB @ 1 m		tone 35	tone 5
tone 37	continuous tone 1000 Hz – PFEER toxic gas	112 dB @ 1 m		tone 9	tone 45
tone 38	continuous tone 2000 Hz	116 dB @ 1 m		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	113 dB @ 1 m		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	112 dB @ 1 m		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz	113 dB @ 1 m		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz	114 dB @ 1 m		tone 2	tone 5
tone 43	continuous tone 1200 Hz	113 dB @ 1 m		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz	118 dB @ 1 m		tone 2	tone 5
tone 45	1000 Hz, 1 s signal, 1 s gap – PFEER general alarm	112 dB @ 1 m		tone 38	tone 34

Ordering details

Article numbers		PMCA 112-05		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC
red lens		230 93 10 5 000	230 93 15 5 000	230 93 80 5 000

Article numbers for other voltages and versions on request

Marine series LED Flashing Sounder 112 dB (A) PMCA 112-L1

- 3-stage acoustic alarm (2 additional stages)
- tone stage control possible via minus or plus
- volume control
- 3-stage visual operation (2 additional stages) with a total of 9 different operating modes, externally selectable or can be set internally (see also LED light PMBL 1, page 82)
- automatic synchronized operation of visual alarm
- can be operated via common or separate voltage supplies

r = 71 m — Acoustic range

IP 66 — Protection system

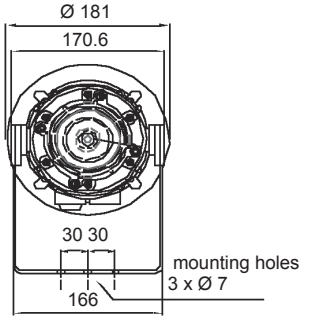
IP 67 — Protection system

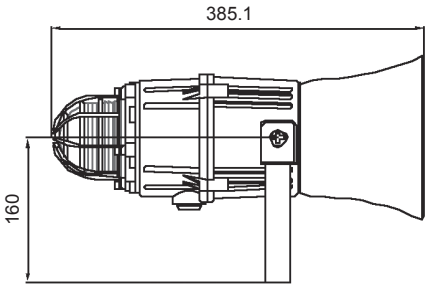
+ 55 °C / - 25 °C

Electrical data	PMCA 112-L1 sounder				
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	± 10%	35 V – 60 V	10 V – 30 V
Rated current consumption	60 mA	110 mA	500 mA	120 mA	200 mA
Electrical data	**PMCA 112-L1 LED light**				
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10%	± 10%	± 10%	42 V – 54 V	20 V – 28 V
Rated current consumption	70 mA	140 mA	380 mA	230 mA	400 mA

Mechanical data		PMCA 112-L1
Sound pressure level		112 dB (A) ± 3 dB
Alarm tones		45 (conforms to UKOOA/PFEER)
Light source		high output LED array; 32 pieces
Operating temperature		- 25 °C ... + 55 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66, IP 67
Material	lens	borosilicate glass
	housing	UL 94 VO & 5VA classified ABS
	protective cage	stainless steel
Colour	lens	amber, red, green, blue
	housing	grey (RAL 7038)
Cable entry		2 x M20 (with 1 blanking plug)
Connecting terminals		0.5 – 4.0 mm²
Weight		AC version: 3.5 kg; DC version: 3.0 kg

Dimensions





LED light operating modes

Mode	Stage 1	Stage 2	Stage 3
1	all on	9	8
2	rotation 3 LED fast “ON“	7	1
3	rotation 6 LED fast “ON“	8	1
4	rotation 3 LED slow “ON“	9	1
5	rotation 6 LED slow “ON“	6	1
6	double flash 1 Hz	9	1
7	single flash 2 Hz	3	1
8	double flash 2 Hz	3	1
9	alternating flash 1:1 2 Hz	3	1

Alarm tone table

Stage 1	Description - Frequency	dB @ 1 m		Stage 2	Stage 3
tone 1	continuous tone 340 Hz	107 dB @ 1 m		tone 2	tone 5
tone 2	alternating tone 800 / 1000 Hz, alternation every 0.25 s	112 dB @ 1 m		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s	113 dB @ 1 m		tone 2	tone 5
tone 4	sweeping 800 / 1000 Hz, switching frequency 1 Hz	113 dB @ 1 m		tone 6	tone 5
tone 5	continuous tone 2400 Hz	113 dB @ 1 m		tone 3	tone 20
tone 6	sweeping 2400 / 2900 Hz, switching frequency 7 Hz	119 dB @ 1 m		tone 7	tone 5
tone 7	sweeping 2400 / 2900 Hz, switching frequency 1 Hz	119 dB @ 1 m		tone 10	tone 5
tone 8	sweeping 500 / 1200 / 500 Hz, switching frequency 0.3 Hz	113 dB @ 1 m		tone 2	tone 5
tone 9	sawtooth 1200 / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.	113 dB @ 1 m		tone 15	tone 2
tone 10	alternating tone 2400 / 2900 Hz, switching frequency 2 Hz	119 dB @ 1 m		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz	112 dB @ 1 m		tone 2	tone 5
tone 12	alternating tone 800 / 1000 Hz, switching frequency 0.875 Hz	112 dB @ 1 m		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz	119 dB @ 1 m		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	113 dB @ 1 m		tone 4	tone 5
tone 15	continuous tone 800 Hz	113 dB @ 1 m		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	109 dB @ 1 m		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	109 dB @ 1 m		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	109 dB @ 1 m		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265	114 dB @ 1 m		tone 2	tone 5
tone 20	continuous tone 660 Hz	109 dB @ 1 m		tone 2	tone 5
tone 21	alternating tone 554 / 440 Hz, switching frequency 1 Hz	109 dB @ 1 m		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap	109 dB @ 1 m		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz	113 dB @ 1 m		tone 6	tone 5
tone 24	sweeping 800 / 1000 Hz, switching frequency 50 Hz	112 dB @ 1 m		tone 29	tone 5
tone 25	sweeping 2400 / 2900 Hz, switching frequency 50 Hz	116 dB @ 1 m		tone 29	tone 5
tone 26	simulated bell	108 dB @ 1 m		tone 2	tone 15
tone 27	continuous tone 554 Hz	109 dB @ 1 m		tone 26	tone 5
tone 28	continuous tone 440 Hz	106 dB @ 1 m		tone 2	tone 5
tone 29	sweeping 800 / 1000 Hz, switching frequency 7 Hz	112 dB @ 1 m		tone 7	tone 5
tone 30	continuous tone 300 Hz	107 dB @ 1 m		tone 2	tone 5
tone 31	siren 660 / 1200 Hz, switching frequency 1 Hz	112 dB @ 1 m		tone 26	tone 5
tone 32	2-tone bell sound	108 dB @ 1 m		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz	109 dB @ 1 m		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s – Singapore	114 dB @ 1 m		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert	108 dB @ 1 m		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 0.375 s, 0.25 s gap	113 dB @ 1 m		tone 35	tone 5
tone 37	continuous tone 1000 Hz – PFEER toxic gas	112 dB @ 1 m		tone 9	tone 45
tone 38	continuous tone 2000 Hz	116 dB @ 1 m		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	113 dB @ 1 m		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	112 dB @ 1 m		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz	113 dB @ 1 m		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz	114 dB @ 1 m		tone 2	tone 5
tone 43	continuous tone 1200 Hz	113 dB @ 1 m		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz	118 dB @ 1 m		tone 2	tone 5
tone 45	1000 Hz, 1 s signal, 1 s gap – PFEER general alarm	112 dB @ 1 m		tone 38	tone 34

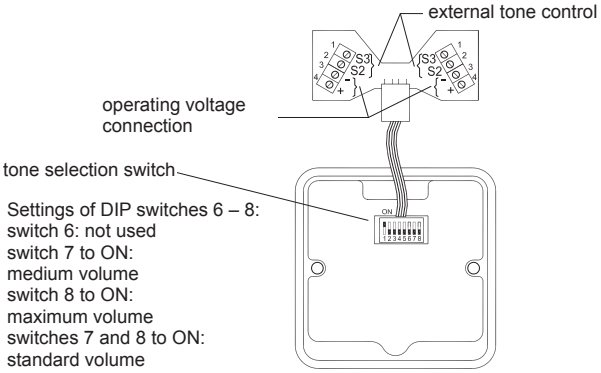
Ordering details

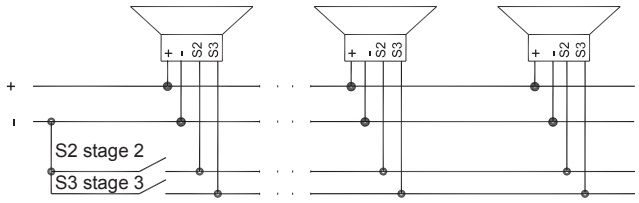
Article numbers		PMCA 112-L1		
Version	**Rated voltage**	230 V AC	115 V AC	24 V DC
red lens		230 94 10 5 000	230 94 15 5 000	230 94 80 5 000

Article numbers for other voltages and versions on request

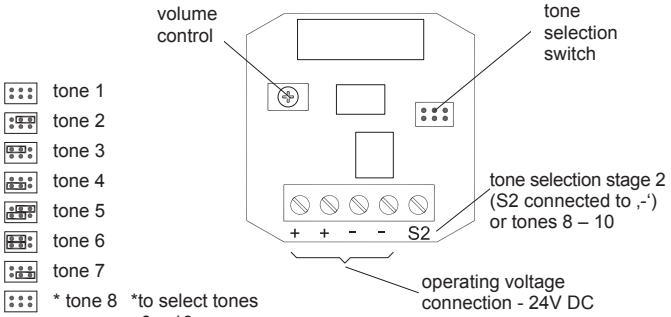
Connection diagrams

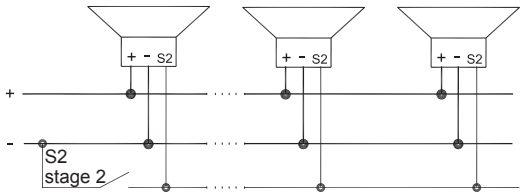
SON 4



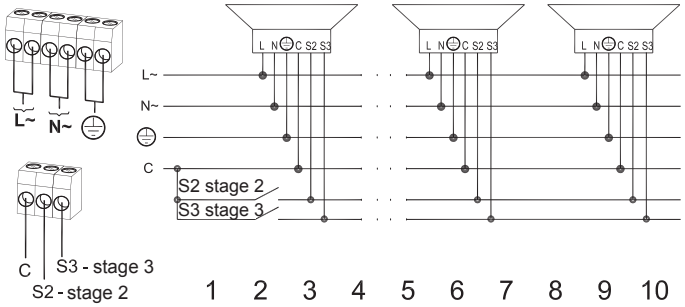


SON FL1



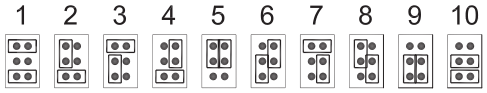


SON 4L AC version

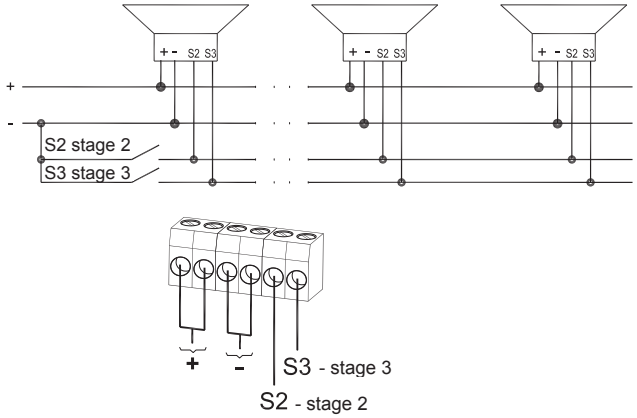


Ton

Tone selection:
to select a tone, place the jumper in the positions shown above

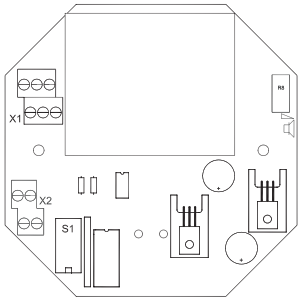


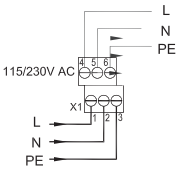
SON 4L DC version



DSF 5 / DSF 10 sounder

AC version





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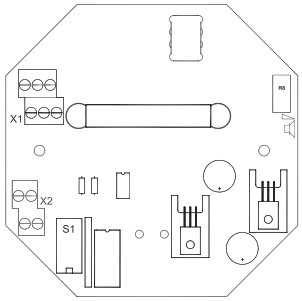
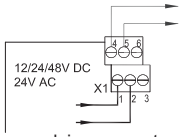
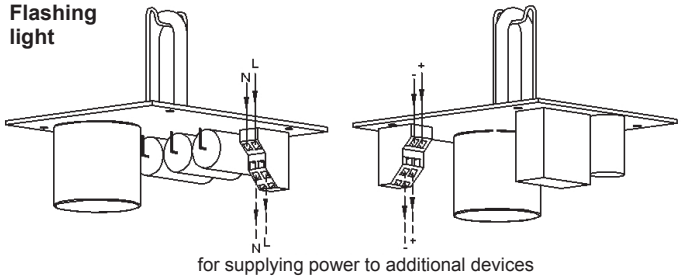




for supplying power to additional sounders; max. 10 of type DS 10 or max. 15 of type DS 5

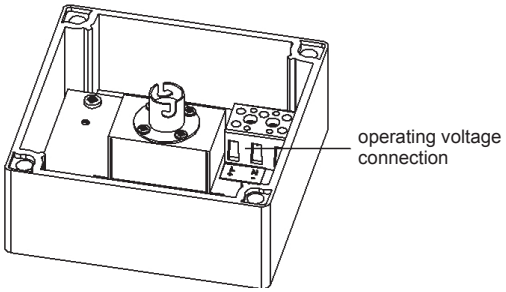
DSF 5 / DSF 10 flashing/continuous light

Flashing light

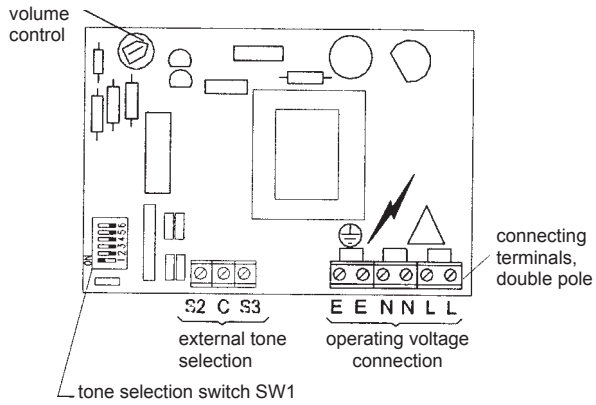


for supplying power to additional devices

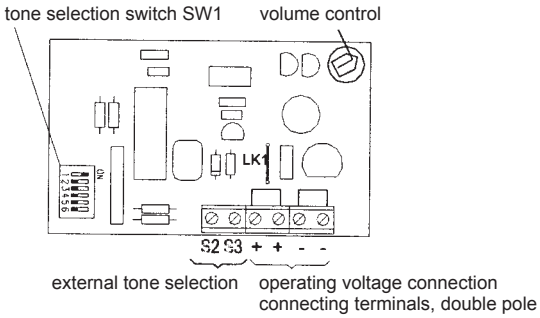
Continuous light



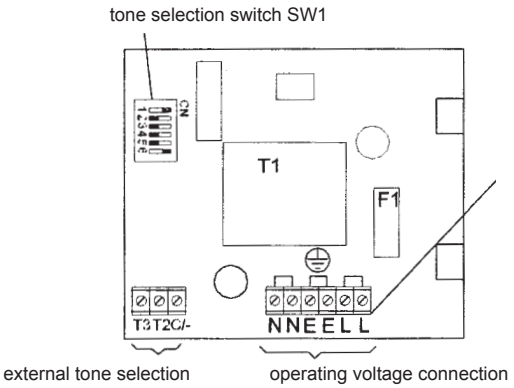
PAB 100 / PAB 106 sounder AC version



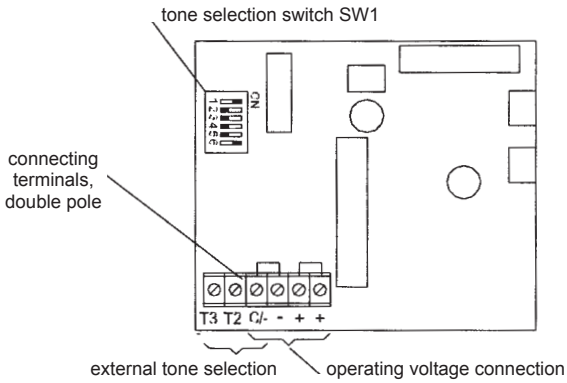
PAB 100 / PAB 106 sounder DC version



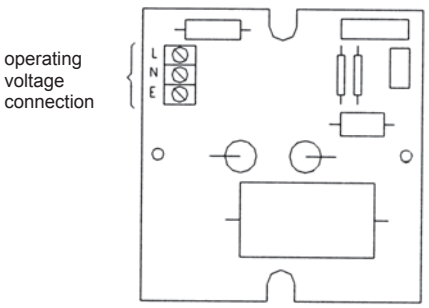
PAB 110 / PAB 120 sounder AC version



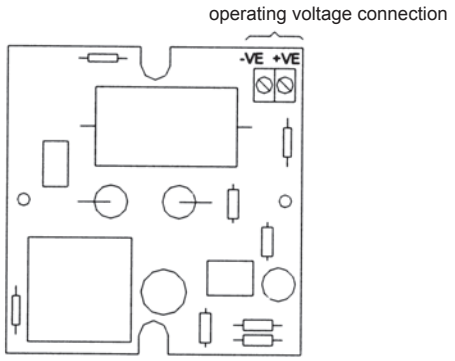
PAB 110 / PAB 120 sounder DC version



PAB 100 / PAB 106 / PAB 110 / PAB 120 flashing light AC version

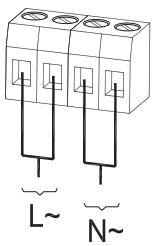


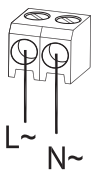
PAB 100 / PAB 106 / PAB 110 / PAB 120 flashing light DC version



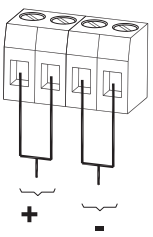
PMCA 112-05

AC version



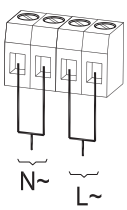


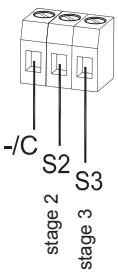
DC version

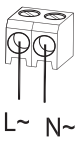


PMCA 112-L1

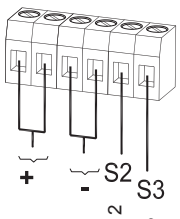
AC version



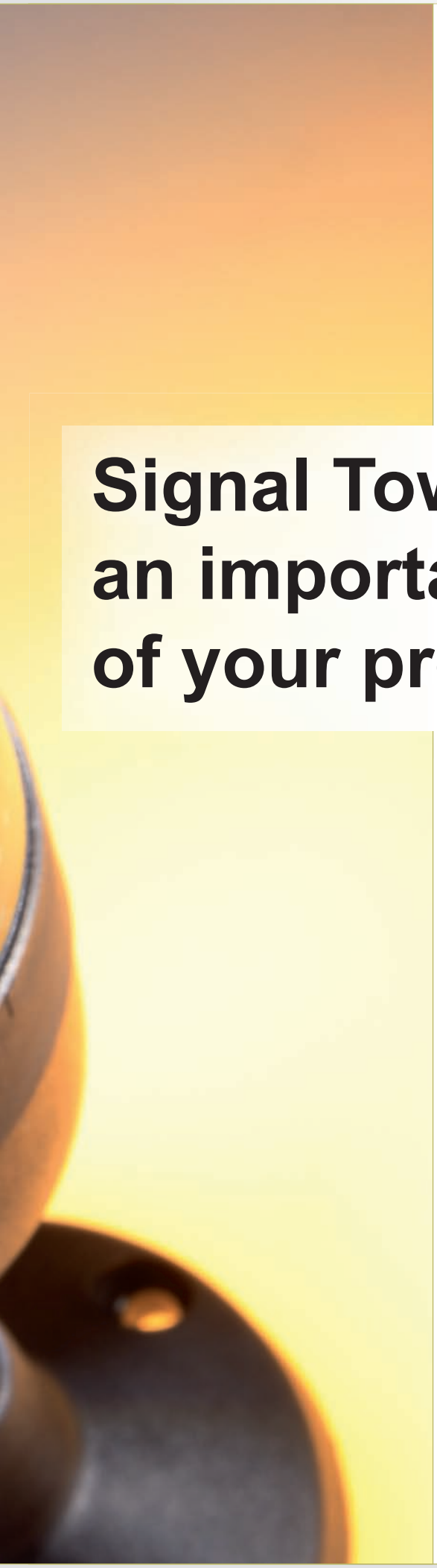




DC version




BR 50



Signal Towers – an important component of your process reliability!

Benefit from the versatile uses of our range of signal towers

Just imagine a simple traffic light, equipped with the shining colours red, yellow and green. Everybody knows what the colours mean; a particular situation in the road traffic process. This traffic light could theoretically also be equipped with acoustic assistance. If the light is red, a tone is heard that means ‚stop'; if it's yellow, ‚attention: get ready to go' is signalled acoustically etc.

You can assemble Pfannenberg signal lights with their stable stainless steel tubular stands individually according to this example and exactly as your machine pool demands it. One look at the signal tower and the observer knows and hears instantly which process state the machine in question is in. For example, 'start', 'warm-up phase', 'optimum operating temperature', 'overheating' etc.
Signal technology can be as intelligent as that.

Our signal lights can be supplied as continuous, LED, blinking or flashing lights for safety-relevant applications and carry UL and GOST approvals in addition to the obligatory CE marking.

Signal tower ∅ 54 mm
BR 50

IP 54 — Protection system

IP 65 — Option

UL

+ 50 °C / - 25 °C — Operating temperature

- modular design with sturdy housing for all indoor and outdoor applications in tough conditions
- wherever machine status needs to be displayed and warning signals given
- high protection system IP 54 (optionally IP 65)
- flexible building kit system guarantees easy handling
- up to 5 modules with 6 lens colours can be combined as desired by simply plugging together, even retrospectively
- mechanical and electronic components are uncoupled, resulting in a more stable structure that is less sensitive to vibration
- many different variations are possible, can be fixed by means of tubular stand, tube or direct mounting
- made of environmentally-friendly materials as per DIN ISO 14000
- monitored module for greater safety; the light bulb has two separate LED strands. If one strand fails, the alarm contact is activated and the second strand continues to light

Technical data		BR 50 (standard modules)					
Modules		continuous light		blinking light 1.5 Hz		flashing light	sounder
Colours		clear, yellow, amber, red, green, blue					
Segment stages (total)		max. 5 (order and colour can be selected individually)					
Angle of radiation		360°					
Light source		bulb A15d [1]	LED [1]	bulb A15d [1]	LED [1]		
Rated power	per stage	7 W	depending on voltage	7 W	depending on voltage		
	per stage if 5 stages	5 W		5 W			
Flash energy	230 V / 115 V AC					0.6 Joules	
	24 V AC/DC					24 V: 1 Joules	
Flash frequency						approx. 1 Hz	
Sound pressure level							85 dB (A)
Tones							7
Rated current consumption (50/60 Hz)	230 V AC	35 mA	15 mA	35 mA	–	10.5 mA	15 mA
	115 V AC	64 mA	15 mA	–	–	20 mA	15 mA
	operating range	- 15% ... + 10%				- 10% ... + 15%	- 15% ... + 10%
Rated current consumption	24 V	DC: 300 mA	DC: 30 mA	DC: 250 mA	DC: 30 mA	AC/DC: 100 mA	12 mA
	operating range	- 15% ... + 20%		10 V – 30 V		AC: 10 V – 27 V DC: 10 V – 35 V	- 15% ... + 20%
Operating temperature	with bulb	- 25 °C ... + 50 °C		- 25 °C ... + 50 °C			- 10 °C ... + 45 °C
	with LED	- 30 °C ... + 60 °C					
Relative humidity		90%					
Protection system according to EN 60529		IP 54					IP 43
Duty cycle		100%					
Service life of light sources		approx. 1,500 h	approx. 50,000 h	approx. 1,500 h	approx. 50,000 h	light emission still 70% after 8,000,000 flashes	
Material	base	acrylonitrile butadiene styrene (ABS)					
	lens	polycarbonate (PC)					
	tube	stainless steel					
Tube thread		30 mm, M16 x 1.5					
Mounting		vertical or horizontal					
Mounting information		the sounder module or the monitored module is always the uppermost module; a maximum of 1 monitored module may be used per signal tower					
Weight	module	80 g		90 g		90 g	230 g
	base	mounting stand: approx. 220 g / tube mounting: approx. 200 g / direct mounting: approx. 180 g					

[1] Please order light source separately

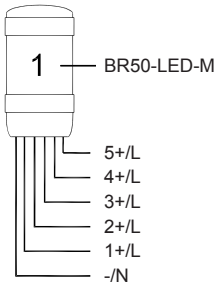
Technical data		monitored continuous light module	BR 50 AS-i Bus slave	
Modules			AS-i	AS-i-AB
Module types		monitored continuous light	LED module, sounder module, continuous light module, blinking light module	
Colours		yellow, red		
Segment stages (total)		max. 3	max. 4	max. 3
Angle of radiation		360°		
Light source		2 x 8 LED (not exchangeable)		
AS-i profile			S-8.F.E	S-8.A.E
AS-i specification			AS-i 3. / EN 50295	
Programming			DC-Jack, Ø 1.3 mm	
max. slave/master			31	62
Alarm output		max. 230 V / 80 mA, R_{ONmax} = 35 Ω (closed at error-free operation)		
Rated voltage		24 V DC		
Rated current consumption		approx. 35 mA	< 0.25 A	
Operating range		- 15% ... + 20%	26.5 V – 31.6 V	
Operating temperature		- 30 °C ... + 60 °C		
Relative humidity		90%		
Protection system according to EN 60529		IP 54		
Duty cycle		100%		
LService life of light sources		50,000 hrs @ 24 °C, 40% R.H.		
Material	base	acrylonitrile butadiene styrene (ABS)		
	lens	polycarbonate (PC)		
Montage		vertical or horizontal		
Mounting information		the monitored module is always the uppermost module; a maximum of 1 monitored module may be used per signal tower	the AS-i / AS-i-AB module is always used as the lowest module	
Weight		90 g		

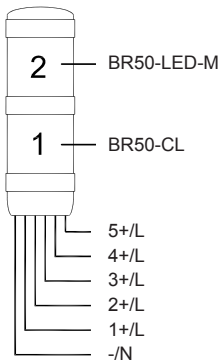
Connection configuration / connection diagrams for monitored module

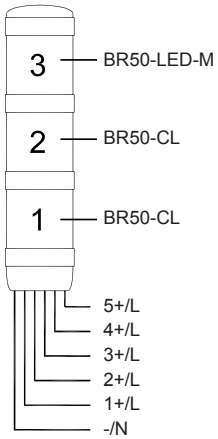
Base module + 1st stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of monitored module
2+/L	potential-free alarm output contact 1
3+/L	potential-free alarm output contact 2
4+/L	n.c.
5+/L	n.c.

Base module + 1st stage not monitored, 2nd stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage
2+/L	supply voltage (+), activation of 2nd stage (monitored)
3+/L	potential-free alarm output contact 1
4+/L	potential-free alarm output contact 2
5+/L	n.c.

Base module + 1st/2nd stage not monitored, 3rd stage monitored	
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1st stage
2+/L	supply voltage (+), activation of 2nd stage
3+/L	supply voltage (+), activation of 3rd stage (monitored)
4+/L	potential-free alarm output contact 1
5+/L	potential-free alarm output contact 2



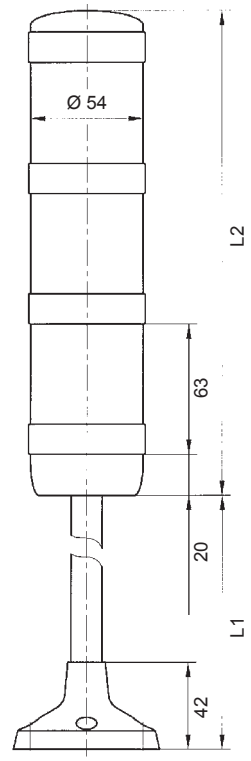


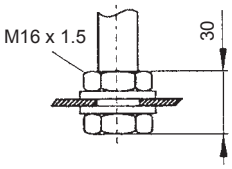


Dimensions

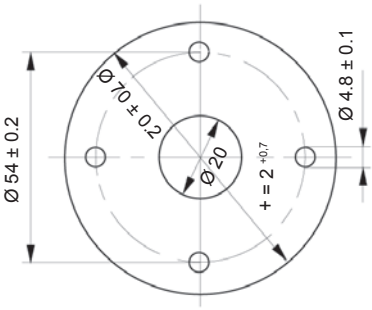
	L1 tube mounting	L1 mounting stand
Tube length 100	78	88
Tube length 250	228	238
Tube length 400	378	388

	L2
1-stage	107
2-stage	170
3-stage	233
4-stage	296
5-stage	359





Stand mounting gasket



Bayonet connection allows fast, simple mounting

Base and end module

Light module clear

Light module yellow

Light module amber

Light module red

Light module green

Light module blue

AS-i module

Sounder module

Configuration alternatives

Sounder module

Stage 5

flashing light module

Stage 4

continuous light module with LED

Stage 3

blinking light module

monitored module

Stage 2

continuous light module

AS-i module

Stage 1

Mounting variants

Ordering details

Article numbers			BR 50 modules		
Version		Rated voltage	230 V AC	115 V AC	24 V DC
Base and end module		BR50-BC	282 50 01 0 000		
Continuous light module	clear	BR50-CL-CL	282 50 04 0 010		
	yellow	BR50-CL-YE	282 50 04 0 030		
	amber	BR50-CL-AM	282 50 04 0 040		
	red	BR50-CL-RE	282 50 04 0 050		
	green	BR50-CL-GR	282 50 04 0 060		
	blue	BR50-CL-BL	282 50 04 0 070		
Blinking light module	clear	BR50-BL-CL	282 50 05 1 010	282 50 05 1 610	282 50 05 8 010
	yellow	BR50-BL-YE	282 50 05 1 030	282 50 05 1 630	282 50 05 8 030
	amber	BR50-BL-AM	282 50 05 1 040	282 50 05 1 640	282 50 05 8 040
	red	BR50-BL-RE	282 50 05 1 050	282 50 05 1 650	282 50 05 8 050
	green	BR50-BL-GR	282 50 05 1 060	282 50 05 1 660	282 50 05 8 060
	blue	BR50-BL-BL	282 50 05 1 070	282 50 05 1 670	282 50 05 8 070
Flashing light module	clear	BR50-FL-CL	282 50 07 1 010	282 50 07 1 610	282 50 07 8 010
	yellow	BR50-FL-YE	282 50 07 1 030	282 50 07 1 630	282 50 07 8 030
	amber	BR50-FL-AM	282 50 07 1 040	282 50 07 1 640	282 50 07 8 040
	red	BR50-FL-RE	282 50 07 1 050	282 50 07 1 650	282 50 07 8 050
	green	BR50-FL-GR	282 50 07 1 060	282 50 07 1 660	282 50 07 8 060
	blue	BR50-FL-BL	282 50 07 1 070	282 50 07 1 670	282 50 07 8 070
LED module, monitored	yellow	BR50-LED-M-YE	–	–	282 50 06 8 030
	red	BR50-LED-M-RE	–	–	282 50 06 8 050
Sounder module		BR50-SM	282 50 08 1 000	282 50 08 1 600	282 50 08 8 000
AS-i module		BR50-AS-i	282 50 14 8 300		
AS-i-AB module		BR50-AS-i-AB	282 50 17 8 300		
Information module		BR50-IM	282 50 27 0 000		
Tubular stand with plinth	100 mm	BR50-S100	282 50 15 0 010		
	250 mm	BR50-S250	282 50 15 0 020		
	400 mm	BR50-S400	282 50 15 0 040		
Tube with thread and bracket (excl. seal and cable)	100 mm	BR50-T100	282 50 16 0 010		
	250 mm	BR50-T250	282 50 16 0 020		
	400 mm	BR50-T400	282 50 16 0 040		

Light bulbs for constant light and blinking light modules must be ordered separately

Options / accessories

Lamp remover
Article number:
282 50 25 0 000

Wall bracket for mounting stand
Article number:
282 50 20 0 000

Mounting kit for direct mounting
Article number:
282 50 21 0 000

Gaskets IP 65
Article number:
282 50 22 0 000
282 50 23 0 000


Light source

c UL us LISTED

GOST

See pages 190/191 for further information

Signal tower ∅ 35 mm
BR 35

- modular design with six different colour elements and four mounting methods offers endless combination possibilities
- high protection system
- the light is amplified by the internal prisms of the impact-proof, heat-resistant and dustproof polycarbonate lens and can be easily identified from all sides
- appealing design with a diameter of just 35 mm
- the BR 35 signal tower is the attractive icing on the cake for machine and production lines
- for use in electronic production, in laboratories, in medical technology and in all other indoor applications
- the technically and economically optimum solution for every application
- registered design no. Nr. 9706583.8, utility patent no. 29716867.3

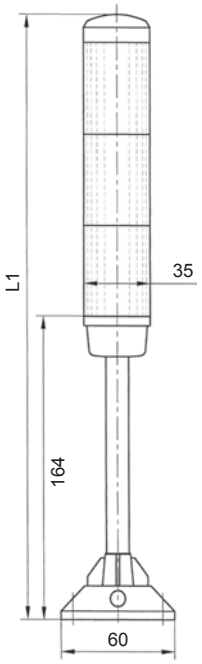
IP 54	+ 55 °C - 35 °C	+ 45 °C - 35 °C
Protection system	LED	Filament lamp

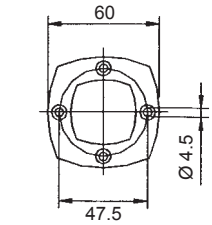
Electrical data	BR 35			
Rated voltage	230 V AC	115 V AC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	- 15% / + 10%	- 15% / + 10%	- 15% / + 20%	- 15% / + 20%
Capacity of light source	3 W	3 W	4 W	4 W

Mechanical data		BR 35
Light source	AC	BA9s, 3 W
	DC	BA9s, max. 4 W
Number of modules		max. 5 (max. 4 light modules and 1 sounder module)
Lens colours		clear, yellow, amber, red, green, blue
Sound pressure level, sounder module		75 dB (A)
Operating temperature	LED	- 35 °C ... + 55 °C
	filament lamp	- 35 °C ... + 45 °C
Storage temperature		- 45 °C ... + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 54
Duty cycle		100%
Servie life of light sources		approx. 1,000 h
Material	housing	acrylonitrile butadiene styrene (ABS)
	lens	polycarbonate (PC)
	tube	stainless steel
Type of connection		cable length 0.5 m tube mounting; 0.65 panel mounting
Terminal cross-section		single wire: 1.5 mm², fine wire: 0.14 – 1.5 mm²
Mounting information		just one screw is sufficient for exchanging beacon filters or light source
Mounting methods		mounting stand, plinth mounting, tube mounting, panel mounting (see drawings on page 188)

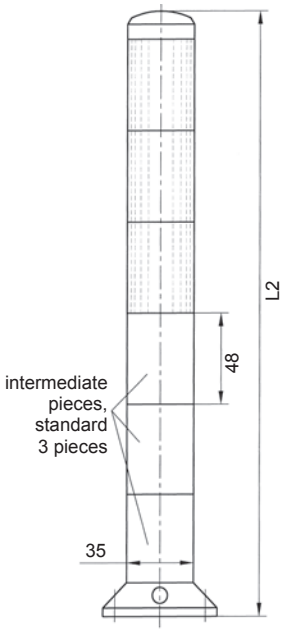
Dimensions

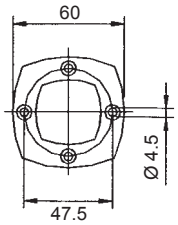
Stand mounting



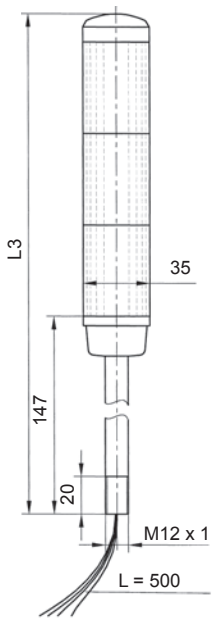


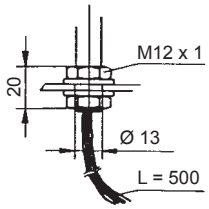
Plinth mounting



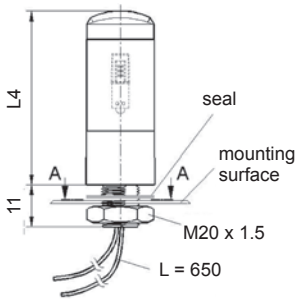


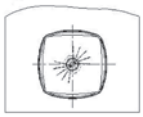
Tube mounting



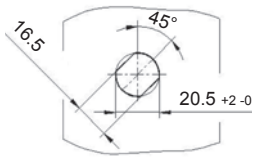


Panel mounting





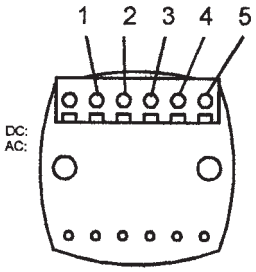
Mounting cut-out



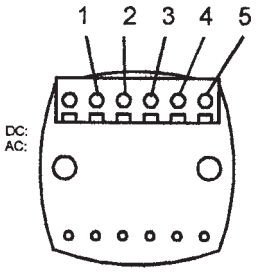
	L1	L2	L3	L4
1-stage	228	228	210	91
2-stage	276	276	258	142
3-stage	324	324	306	190
4-stage	372	372	354	238
5-stage	420	420	402	286

Connection diagrams

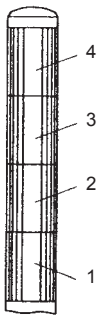
Stand mounting

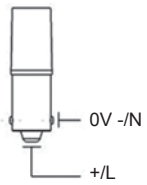


Plinth mounting



Tube mounting / Panel mounting





Wire-number	Light segment
1	1
2	2
3	3
4	4
N	-/N

Ordering details

Article numbers		BR 35 mounting stand	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-S		220 80 10 1 000	220 80 80 1 000
2-stage BR 35-2-S		220 80 10 2 000	220 80 80 2 000
3-stage BR 35-3-S		220 80 10 3 000	220 80 80 3 000
4-stage BR 35-4-S		220 80 10 4 000	220 80 80 4 000
3-stage with fixed colour order: top: red, middle: yellow, bottom: green		220 80 10 0 000	220 80 80 0 000
Article numbers		**BR 35 plinth mounting**	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-P		220 81 10 1 000	220 81 80 1 000
2-stage BR 35-2-P		220 81 10 2 000	220 81 80 2 000
3-stage BR 35-3-P		220 81 10 3 000	220 81 80 3 000
4-stage BR 35-4-P		220 81 10 4 000	220 81 80 4 000
Article numbers		**BR 35 tube mounting**	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-T		220 82 10 1 000	220 82 80 1 000
2-stage BR 35-2-T		220 82 10 2 000	220 82 80 2 000
3-stage BR 35-3-T		220 82 10 3 000	220 82 80 3 000
4-stage BR 35-4-T		220 82 10 4 000	220 82 80 4 000
Article numbers		**BR 35 panel mounting**	
Version	**Rated voltage**	230 V AC	24 V DC
1-stage BR 35-1-PM		220 83 10 1 000	220 83 80 1 000
2-stage BR 35-2-PM		220 83 10 2 000	220 83 80 2 000
3-stage BR 35-3-PM		220 83 10 3 000	220 83 80 3 000
4-stage BR 35-4-PM		220 83 10 4 000	220 83 80 4 000

Article numbers for other voltages on request

Optionen / Zubehör

Mounting bracket for stand- or plinth mounting (plastic)
Article number: **282 35 20 0 020**

Mounting bracket for tube mounting (metal)
Article number: **282 35 20 0 010**

Assembly kit sounder module
Article number: **282 35 80 8 000**

Short foot plinth-mounted device with short foot

Light source

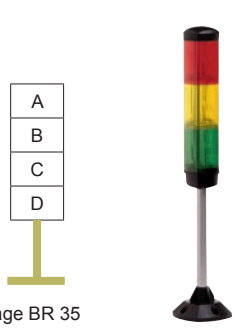
cULus LISTED

GOST

See page 191 for further information

Ordering examples

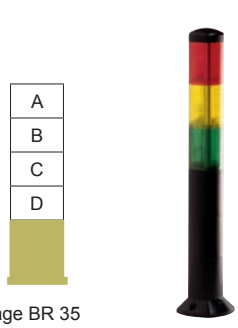
Stand mounting



3-stage BR 35
with mounting stand
24 V DC, colour order: A = red
B = yellow
C = green

Article number:
220 80 80 3 000

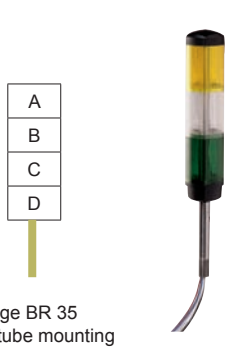
Plinth mounting



3-stage BR 35
with plinth mounting
230 V AC, colour order: A = red
B = yellow
C = green

Article number:
220 81 10 3 000

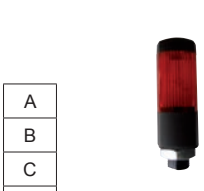
Tube mounting



3-stage BR 35
with tube mounting
24 V DC, colour order: A = yellow
B = clear
C = green

Article number:
220 82 80 3 000

Panel mounting



1-stage BR 35
for panel mounting
230 V AC, colour order: A = red

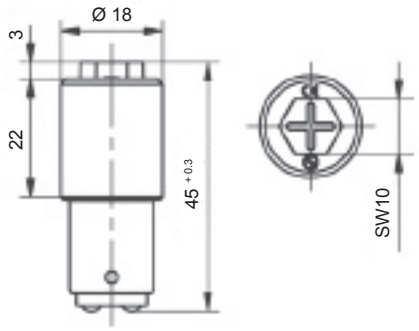
Article number:
220 83 10 1 000

Accessories for BR 50

Multi-LED BA15d filament lamps

Energy and cost-saving high output SMD LEDs replace filament lamps

- extremely long service life (> 50,000 hrs)
- low power consumption (e.g. 30 mA at 24 V)
- shock/vibration-resistant
- same brightness for all voltages
- resistant to environmental influences
- option ‘plus’ = extra bright



Ordering details

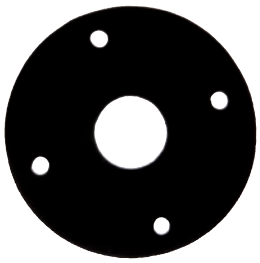
Article numbers		LED BA15d		
Version	Rated voltage	230 V AC	115 V AC	24 V AC/DC
white	standard plus	282 13 00 0 013	282 13 00 0 021	
white	standard	282 13 00 0 014	282 13 00 0 022	282 13 00 0 006
yellow	standard plus			282 13 00 0 007
yellow	standard	282 13 00 0 015	282 13 00 0 023	282 13 00 0 008
red	standard plus			282 13 00 0 009
red	standard	282 13 00 0 016	282 13 00 0 024	282 13 00 0 010
green	standard plus	282 13 00 0 017	282 13 00 0 025	
green	standard	282 13 00 0 018	282 13 00 0 026	282 13 00 0 011
blue	standard plus	282 13 00 0 019	282 13 00 0 027	
blue	standard	282 13 00 0 020	282 13 00 0 028	282 13 00 0 012
Article numbers		**Filament lamps BA15d**		
BR50-L	7 W	282 13 00 0 004	282 13 00 0 002	282 13 00 0 000
BR50-L	5 W	282 13 00 0 005	282 13 00 0 003	282 13 00 0 001

Lamp remover

Lamp remover for simple bulb replacement.

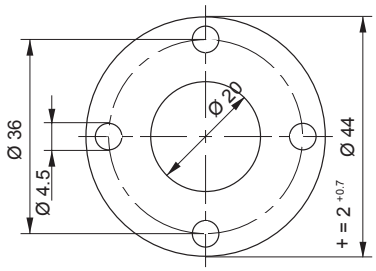
Ordering details

Article numbers	Lamp remover
BR50-LS	282 50 25 0 000



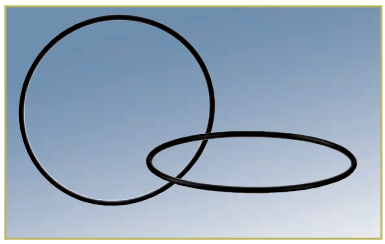
Direct mounting set

Gasket and mounting materials for direct mounting.



Ordering details

Article number	Direct mounting set
BR50-BG	282 50 21 0 000

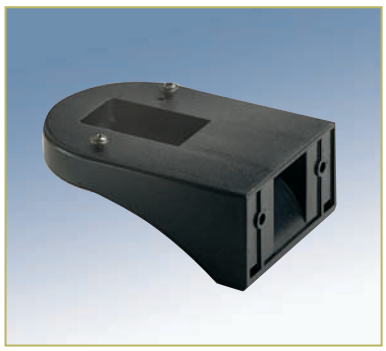


Option IP 65

Gaskets for higher protection system IP 65.

Ordering details

Article numbers	IP 65 gaskets
Module gasket BR50-MG (1 x per light module plus 1 x base module)	282 50 22 0 000
Tube gasket BR50-TG (for tubular stand or tube mounting only)	282 50 23 0 000

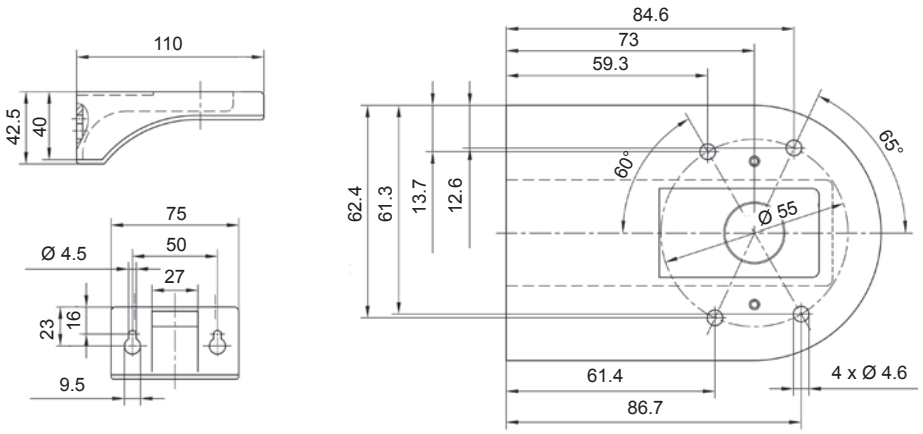


Wall bracket with hood

Plastic wall holder for mounting the BR 50 on a tubular stand.

Dimensions

BR 50-W



Ordering details

Article number	BR50-W
Plastic wall bracket with hood	282 50 20 0 000

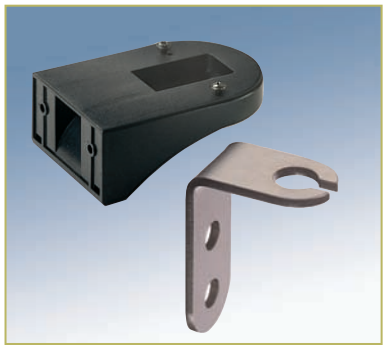
Accessories for BR 35

Light source

Filament lamps and LEDs for signal towers from the BR 35 series.

Ordering details

Article numbers		LED
Colour	Rated voltage	12 V / 24 V DC
white		286 13 00 0 000
yellow		286 13 00 0 001
red		286 13 00 0 002
green		286 13 00 0 003
blue		286 13 00 0 004
Article numbers		**Filament lamps BA9s**
Rated voltage		pack of 5
12 V DC 4 W		288 13 00 0 003
24 V DC 4 W		288 13 00 0 002
115 V AC 3 W		288 13 00 0 001
230 V AC 3 W		288 13 00 0 000



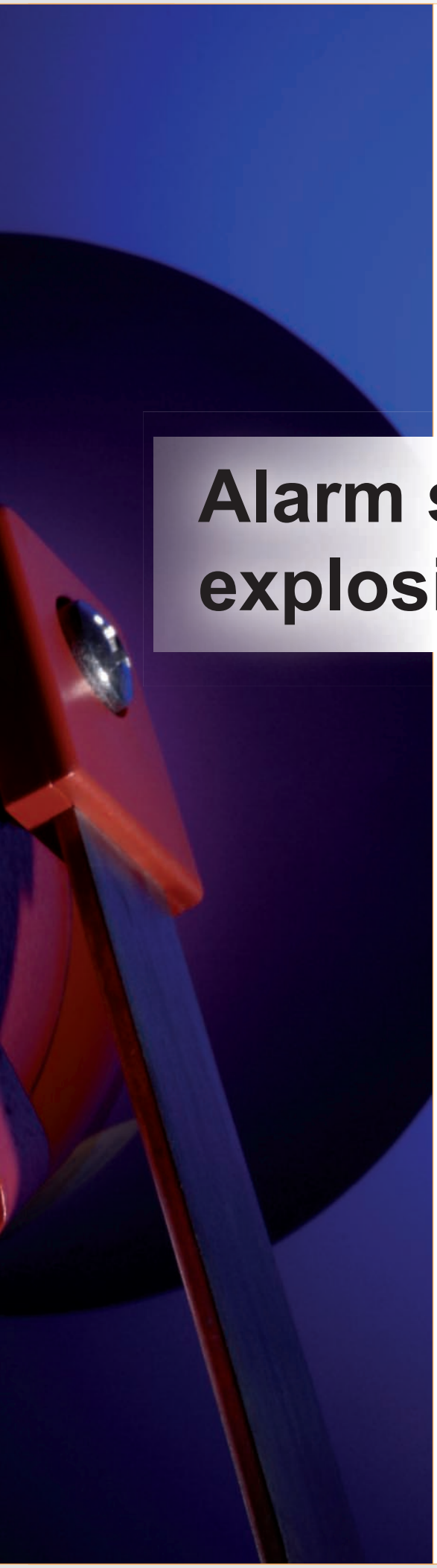
Mounting bracket

Bracket for mounting the BR 35.

Ordering details

Article numbers		Mounting bracket
Plastic bracket for mounting on tubular stand or plinth	BR35-W	282 35 20 0 020
Metal bracket for tube mounting	BR35-A	282 35 20 0 010


BExS120E
ALARMSCHALLGEBER
NENNSPANNUNG: 24V DC
NENNSTROM: 800mA
II 2G Ex de IIC T4 für Ta -50° bis +55°C
Ex de IIB T4 für Ta -50° bis +70°C
KEMA 99ATEX7906
CE 0344
Kabeleinführung
M20x1,5
Jahr / Serien Nummer
09 / 3S22000641
"WARNUNG"
DECKELSCHRAUBEN KLASSE A4-80
NICHT ÖFFNEN, WENN EXPLOSIVE
ATMOSPHÄREN VORHANDEN SIND
NUR HITZEBESTÄNDIGE KABEL UND
KABELVERSCHRAUBUNGEN (ZUGELASSEN BIS +110°C) BEI
UMGEBUNGSTEMPERATUREN ÜBER +40°C VERWENDEN
D-21035 Hamburg, Germany
www.pfannenberg.com
Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY



Alarm safety even in explosive areas

Ex signaling devices are used wherever explosive gases, vapours and dusts can become dangerous

Our Ex-series visual and acoustic signaling devices stand out with their particularly sturdy construction and insensitivity to environmental influences and chemicals.

These are information, warning and emergency signals for safety, hazard and fire alarm systems; for building, industrial and commercial automation; for disaster warnings and for hazardous areas.

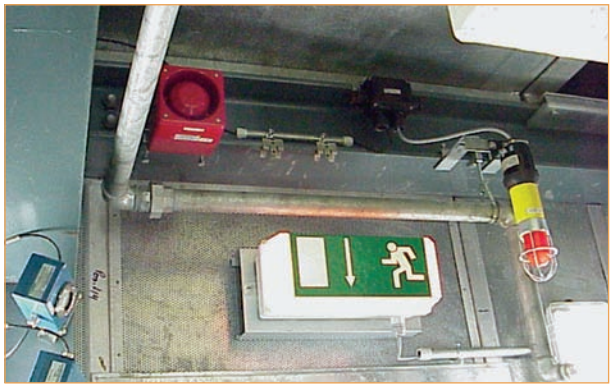
Your safety – worldwide – is safe in our hands

As a globally operative company, Pfannenberg is present wherever the safety of man, machine and environment is concerned.

All Ex signaling devices by Pfannenberg are ATEX certified and offer unlimited quality and safety. The needs of the customer are Pfannenberg's utmost priority. Inventiveness and numerous product innovations have made Pfannenberg one of the market leaders in the Ex alarm product sector.

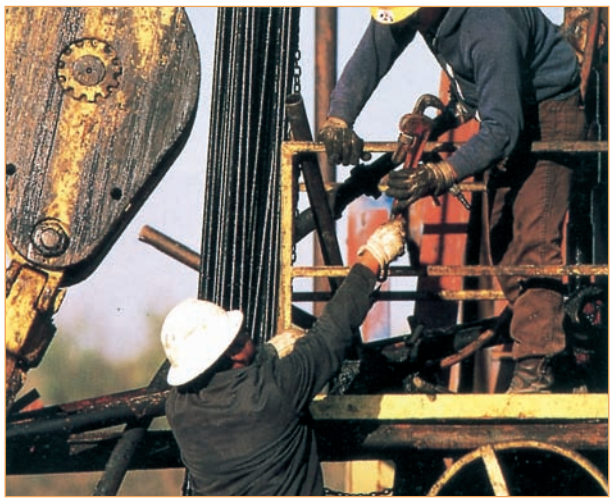
Many customers, from the most diverse industries where explosive atmospheres can be formed, have been placing their trust in Pfannenberg's know-how, quality and flexibility for decades.

On the following pages we have gathered together numerous new products, applications and references, intended to provide you with ideas for the tasks that you need to solve in the Ex area.



Gas detection with visual and acoustic alarms: DS 10 ATEX Ex sounder and CWB-ATEX Ex flashing light

Acoustic alarm in a gas-fired power station: BExS 120 ATEX Ex sounder



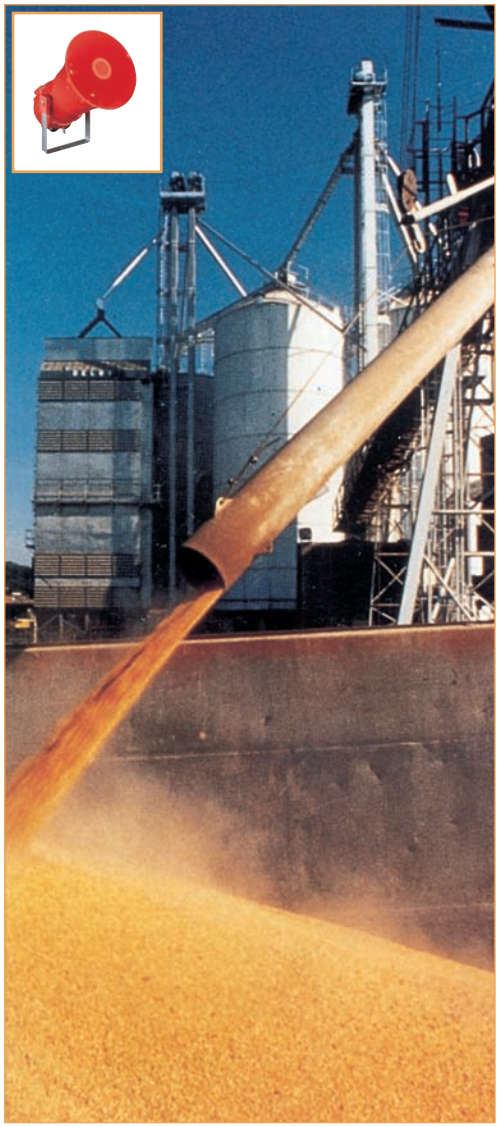
Safety has no limits

There is a danger of explosion wherever combustible gases, vapours, fluids or dusts occur and can mix with air, oxygen or another reactive gas. The danger can arise in very diverse locations, e.g. in the petrochemical and chemical industry or at filling stations and oil/gas rigs. However, facilities such as corn silos and coating plants are also potentially at risk of an explosion. Explosions endanger man and the environment.

For this reason, international measures have been developed that are intended to prevent explosions or to minimise their effects.

Our Ex signaling devices meet the toughest requirements and are subjected to the most stringent checks. Their quality and safety are checked by responsible bodies for compliance with the highest quality standards.

Visual alarm on a gas turbine generator: CWB-ATEX Ⓔx flashing light



The CWB-ATEX Ⓔx flashing light and the BExS 120 ATEX Ⓔx sounder signal danger here without becoming a danger themselves – highly visible and highly audible

Safety for man, machine and the environment

If it's about safety, Pfannenberg is always the right choice, because the Pfannenberg brand stands for 'safety for man, machine and the environment'.

Global references speak a clear language. Ex-protected visual and acoustic signaling devices by Pfannenberg are subjected to the toughest demands every day and are in use wherever explosive atmospheres can be formed, e.g. in oil and gas drilling in the North Sea - by Shell DEA, Exxon Mobil ...- or in refineries and chemical plants - at BASF, Bayer, Degussa …

Regardless of whether it's about corrosion, vibration, shock or alternating climates, you are always on the safe side with Ex alarm products by Pfannenberg!

Process gas analysis: CWB-ATEX Ⓔx flashing light

Oil and gas drilling in the sea. Man and technology in the most confined space. BExS 120 ATEX Ⓔx sounder, Ex-PEX 2010 ATEX Ⓔx flashing light

Photo: © Dieter Schütz/PIXELIO

ATEX guarantees your safety

Directives

In the Ex-Directive 94/9/EU, the European Union has provided a basis for binding uniform requirements for characteristics with regard to the protection of systems, appliances and components against explosion. With these standards, the manufacturer can assume when designing and assessing the explosion protection that he is developing explosion-protected systems, appliances and components that conform to the Ex-Directive 94/9/EU and which are then subjected to uniform binding test procedures by an appointed body of the European Union.

A uniform classification of explosion-endangered plants is the basis for the selection, assignment and installation of systems, appliances and components. In order to protect employees, the user is obliged by Directive 1999/92/EU to assess the explosion risk of the plant, to divide the plant into danger zones and to draw up an explosion protection document or a series of documents, which fulfil the requirements contained in this directive, and to keep them up to date.

Through directives 94/9/EU and 1999/92/EU, the prerequisites have been created for a complete unification of the regulations for protection against explosion in the European Union and form a closed system, with which explosions can be effectively avoided in order to protect man, machine and environment.

Selecting suitable Ex alarm products

The selection of suitable alarm products is essentially governed by two factors, which can be distinguished as follows:

a) Ex environmental requirements
b) Functional requirements

Ex environmental requirements

Groups and gases

Explosion-protected products are catalogued with regard to their different purposes of use. The first distinguishing criteria is whether usage is underground or above ground:

Group I: operating equipment for underground mining with a ‘firedamp risk’
Group II: operating equipment for all other (non-group I) areas

A further distinction is made in Group II according to the types of gases present in the operation environment and the temperature class. On the one hand, this describes the maximum surface temperature of the explosion-protected device and, on the other, the minimum ignition temperature of the gas or vapour. For secure protection against explosion, it must be ensured that the surface temperature of the device (e.g. the flashing light) is always lower than the ignition temperature of the gas.

Classification of gases and vapours into temperature classes and gas groups

	T1 ≤ 450°C	T2 ≤ 300°C	T3 ≤ 200°C	T4 ≤ 135°C	T5 ≤ 100°C	T6 ≤ 85°C
I	Methane					
IIA	Acetone Ethane Ethyl acetate Benzene Acetic acid Ammonia Carbon monoxide Methane Toluene Propane Methanol	Ethyl alcohol i-amyl acetate n-butane n-butyl alcohol	Petrol Diesel Aviation fuel n-hexane Heating oil	Acetyl aldehyde		
IIB	Town gas	Ethylene		–		
IIC	Hydrogen	Acetylene		–		CS_2

The gases are classified in groups ABC according to their flammability. This in turn generates different requirements for the enclosures of electrical equipment. For explosion-proof enclosures, these include the dimensions of the closure gap. The gas groups are upwardly compatible, i.e. devices that are suitable for use in group IIC can also be used in the groups IIB or IIA. The same compatibility applies to the temperature classes, according to which devices from temperature class T6 can also be used in all other temperature classes. However, devices from temperature class T4 are adequate for most applications.

ATEX guarantees your safety

Zones and categories

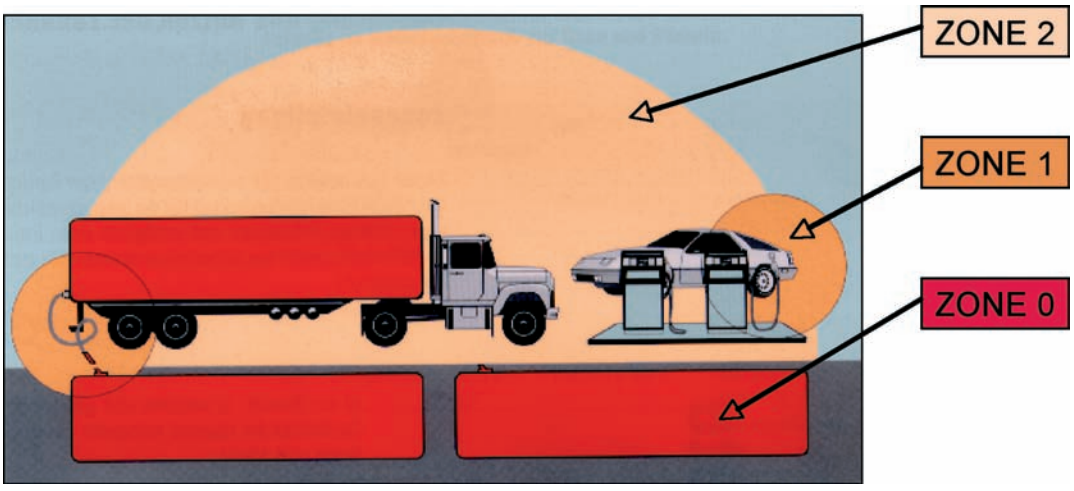
Potentially explosive areas are defined in section 2 of ElexV (Germany) as areas in which the atmosphere may be capable of explosion due to local and operational conditions.

It has proven to be useful to divide potentially explosive areas into zones, taking into account different hazards caused by explosive atmospheres.

Definition of the zones according to section 2 para. 4 ELX (96)

Potentially explosive areas due to combustible gases		
Zone 0	**Zone 1**	**Zone 2**
Areas in which an explosive atmosphere of gases, vapours or mists exists constantly, over long periods or frequently.	Areas in which an explosive atmosphere of gases, vapours or mists occasionally occurs.	Areas in which explosive atmospheres of gases, vapours and mists normally never occur, but if they do, then only rarely and only for short time periods.

Potentially explosive areas due to combustible dusts		
Zone 20	**Zone 21**	**Zone 22**
Areas in which an explosive dust atmosphere exists constantly, over long periods or frequently.	Areas in which an explosive dust atmosphere occasionally occurs.	Areas in which explosive dust atmospheres normally never occur, but if they do, then only rarely and only for short time periods.



The Ex devices are sub-divided analogue to the Ex zones into the following device categories

Device classification according to groups and categories:							
Group I		**Group II**					
Category M		**Category 1**		**Category 2**		**Category 3**	
		G	D	G	D	G	D
1	2	(gas) Zone 0	(dust) Zone 20	(gas) Zone 1	(dust) Zone 21	(gas) Zone 2	(dust) Zone 22

ATEX guarantees your safety

Types of protection systems

The European standards describe eight different explosion protection methods that can be applied in order to make electrical equipment suitable for use in the various ex zones. The different types of protection vary widely with regard to the degree of complexity and some of them are not usable with mobile equipment, for example. The type of ignition protection is selected with the greatest of care for Pfannenberg devices in order to guarantee the best possible cost-benefit ratio. Pfannenberg uses the following protection systems for its alarm equipment:

Flame proof enclosure **'d'**

In the case of pressure-resistant encapsulation, the actual operating equipment is built into a pressure-resistant housing. In the event of an explosion inside, the housing prevents an ignition breakthrough into the surrounding area. The explosion is therefore restricted to the interior of the device. On account of the necessary wall thickness, devices in this protection system are of a very sturdy construction and thus also often very well suited for adverse environmental conditions.

Photo: © Knase/PIXELIO

Enhanced safety 'e'

This type of enhanced protection is usable with only a few types of equipment/components (e.g. terminals). This type of protection is conveniently often combined with pressure-resistant encapsulation. In alarm products, this means that all essential components are housed in the pressure-resistant housing and only the connection terminals are accessible in the increased safety housing. For this reason Pfannenberg also offers most devices with an 'e connection box' in order to enable simple and safe electrical connections to be made. The sensitive electronic components are therefore protected against accidental damage during mounting.

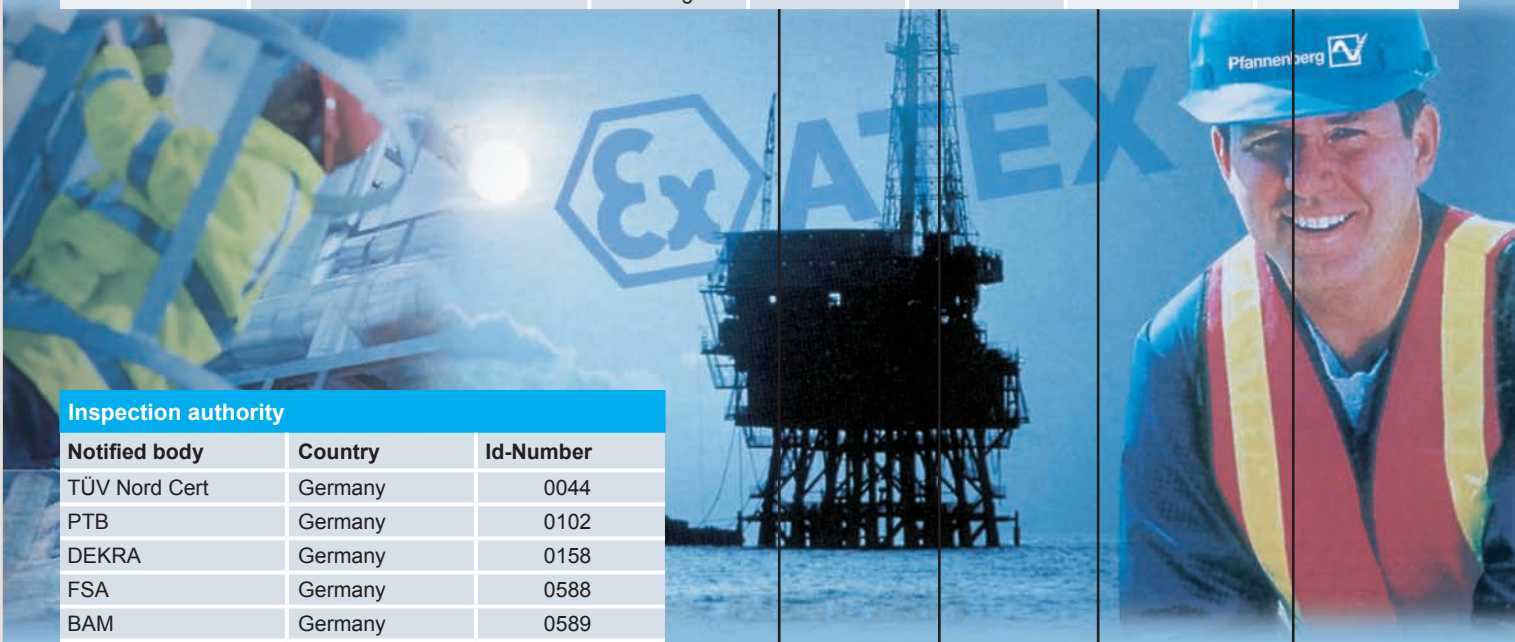
Intrinsically safety 'i'

In the ignition protection type 'i', the current and voltage of all energy storage devices as well as the complete device are limited to the extent that no ignition sparks and no excessively hot surfaces can be generated. An explosive atmosphere can develop, but it will not be ignited.

Photo: © emuman/aboutpixel

ATEX - Designation of electrical equipment for potentially explosive environments!

Conditions in potentially explosive areas						
Combustible substances	**Temporary behaviour of the combustible substance in the Ex area**	**Classification of the potentially explosive areas**			**Required marking of the operating equipment to be used according to CENELEC**	
		CENELEC/IEC	**US NEC 505**	**US NEC 500**	**Device group**	**Device category**
gases, vapours	are present constantly, for long periods or frequently	Zone 0	Class I Zone 0	Class I Division 1	II	1G
	occur occasionally	Zone 1	Class I Zone 1		II	2G or 1G
	probably do not occur, but if so, then only rarely or for short periods	Zone 2	Class I Zone 2	Class I Division 2	II	3G or 2G or 1G
dusts	are present constantly, for long periods or frequently	Zone 20	–	Class II Division 1	II	1D
	occur occasionally	Zone 21	–		II	2D or 1D
	probably do not occur due to swirling dust, but if so, then only rarely or for short periods	Zone 22	–	Class II Division 2	II	3D or 2D or 1D
methane, dust	– –	Mining Mining	– –	Mining –	I I	M1 M2 or M1



Inspection authority		
Notified body	**Country**	**Id-Number**
TÜV Nord Cert	Germany	0044
PTB	Germany	0102
DEKRA	Germany	0158
FSA	Germany	0588
BAM	Germany	0589
IBExU	Germany	0637
INERIS	France	0080
LCIE	France	0081
KEMA	Netherlands	0344
SP	Sweden	0402
LOM	Spain	0163
EECS (BASEEFA)	UK	1180
SIRA	UK	0518

NEC 500
NEC 505
IEC
CENELEC

CE 0158

Class I
Class I

II

Division 1
Zone 1

2G

TIP: This double page can be ordered free of charge from Pfannenberg as a poster (A2). Article number: 075000019

Temperature classes and highest permissible surface temperatures of the equipment

Highest permissible surface temperature	USA (NEC 500)	Usability of the equipment	Temperature classes according to CENELEC/IEC NEC 505	Max. surface temperature of the equipment	Ignition temperature of the combustible substances
450 °C	T1	T1	T1	450 °C	> 450 °C
300 °C	T2	T2	T2	300 °C	> 300 °C < 450 °C
280 °C	T2A	T3	T3	200 °C	> 200 °C < 300 °C
260 °C	T2B	T4	T4	135 °C	> 135 °C < 200 °C
230 °C	T2C	T5	T5	100 °C	> 100 °C < 135 °C
215 °C	T2D	T6	T6	85 °C	> 85 °C < 100 °C
200 °C	T3				
180 °C	T3A				
165 °C	T3B				
160 °C	T3C				
135 °C	T4				
120 °C	T4A				
100 °C	T5				
85 °C	T6				

Classification of gases and vapours into explosion groups and temperature classes

Classification into temperature classes / gas groups (extract)						
	T1	T2	T3	T4	T5	T6
I	Methane	–	–	–	–	–
IIA	Acetone Acetic acid Ammonia Propane *	Ethyl alcohol n-butane n-butyl alcohol	Petrols Heating oil Diesel	Acetaldehyde Ethyl ether	–	–
IIB	Town gas	Ethylene *		–	–	
IIC	Hydrogen *	Acetylene *		–	–	Carbon bisulphide

* typical ignitable gas

Protective systems

Protective system	Marking	Protection principle	Zone	IEC	EN	FM / UL	Applications
general requirements	–	–	–	60079-0	60079-0		all applications
flame proof enclosure	Ex d	transmission of an explosion to the outside is excluded	1 or 2	60079-1	60079-1	FM 3600 UL 60079-1	switchgear, controllers, motors, command and alarm devices, power electronics
enhanced safety	Ex e	avoidance of sparks and high temperatures	1 or 2	60079-7	60079-7	FM 3600 UL 60079-7	junction and terminal boxes, enclosures, motors, beacons, terminals
intrinsically safety	Ex i	limitation of the energy of sparks and temperatures	0, 1 or 2 [3]	60079-11	60079-11	FM 3610 UL 60079-11	measurement, control and regulating equipment, sensors, actuators, instrumentation
pressurized enclosure	Ex p	Ex atmosphere is kept away from the source of ignition	1 or 2	60079-2	60079-2	FM 3620 NFPA 496 UL 60079-2	power and control cabinets, motors, measurement and analysis devices, computers
encapsulation	Ex m	Ex atmosphere is kept away from the source of ignition	1 or 2	60079-18	60079-18	FM 3600 UL 60079-18	relay and motor coils, circuitry, solenoid valves, connecting systems
oil immersion	Ex o	Ex atmosphere is kept away from the source of ignition	1 or 2	60079-6	60079-6	FM 3600 UL 60079-6	transformers, relays, start-up controllers, switching devices
powder filling	Ex q	transmission of an explosion to the outside is excluded	1 or 2	60079-5	60079-5	FM 3600 UL 60079-5	transformers, relays, capacitors
type 'n' protection	Ex n [4]	various protection principles for Zone 2	2	60079-15	60079-15	FM 3600 UL 60079-15	all applications for Zone 2
protective enclosure	IP	Ex atmosphere is kept away from the source of ignition	0/21/22	61241-1	61241-1		all applications

[1] devices, [2] systems
[3] ia use in Zones 0, 1, 2 / ib use in Zones 1, 2
[4] nA = non-sparking, nC = sparking equipment (suitable protection), nR = vapour-proof enclosure, nL = energy-limited (differences between North America and Europe)

Additional conditions

Conditions	Marking
Equipment usable without restriction	–
Observe special conditions for use	X
Ex component with partial certification, not capable of operation alone; CE conformity is only certified after installation in complete equipment	

Group A, B, C, D

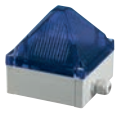
AEx de
Ex de
Ex de

IIC
IIC
IIC

T6
T6
T6

PTB 01 ATEX 1234 X

All Ex signaling devices at a glance

	Type	Suitable for use in zones						Maximum signal reception range as per EN 54-23 in metres (m) [1]					Light intensity / Sound pressure level	Protection system	Approvals / standards						Page
		0	1	2	20	21	22	5	25	50	100	125			GL	GOST	UL	VdS	EN 54-3	IEC	
	Visual signaling devices																				
	Quadro F12-3G/3D			●			●						7.5 Joules	IP 66 IK 08		○					204
	Quadro-LED Flex-3G/3D			●			●						9 cd	IP 66 IK 08							206
	E2xB 10			●									10 Joules	IP 66 IP 67							208
	E2xB 05			●									5 Joules								
	BR 50-LED 3G/3D			●			●							IP 65							210
	CWB-ATEX		●	●		●	●						5 Joules	IP 66	●	○					212
	BExBG 15		●	●		●	●						15 Joules	IP 66 IP 67		○					214
	BExBG 10		●	●		●	●						10 Joules			○					
	BExBG 05		●	●		●	●						5 Joules			○					
	BExBG L1		●	●		●	●						9 cd			○					216
	IS-mB1	●	●	●									6 cd	IP 65		●					218
	Audible signaling devices							**Sounder**													
	DS 10 3G/3D			●			●						110 dB (A)	IP 66 IP 67	●	●		●	●		220
	DS 5 3G/3D			●			●						105 dB (A)		●	●		●	●		
	E2xS 121			●									117 dB (A)	IP 66 IP 67			●				222
	E2xS 112			●									110 dB (A)				●				
	BExS 120 d/e		●	●									117 dB (A)	IP 66 IP 67		○		●[2]	●[2]	●[2]	224
	BExDS 120 d/e		●	●		●	●														
	BExS 110 d/e		●	●									110 dB (A)			○		●[2]	●[2]	●[2]	
	BExDS 110 d/e		●	●		●	●														

● available
○ in preparation

[2] 'd' version only

All Ex signaling devices at a glance

	Type	Suitable for use in zones						Maximum signal reception range for a 65 dB ambient noise level in metres (m) [1]					Sound pressure level / Light intensity	Protection system	Approvals / standards						Page
		0	1	2	20	21	22	5	25	50	100	125			GL	GOST	UL	VdS	EN 54-3	IEC	
	Audible signaling devices Sounder																				
	BExA 110 d/e		●	●									110 dB (A)	IP 66 IP 67		○					226
	IS-A105N	●	●	●									105 dB (A)	IP 66		○					228
	IS-mA1	●	●	●									100 dB (A)	IP 65		●					230
	Audible signaling devices Loudspeaker																				
	E2xL 15			●									118 dB (A)	IP 66 IP 67			●				232
	BExL 25 d/e		●	●									117 dB (A)	IP 66 IP 67		○					234
	BExL 15 d/e		●	●									113 dB (A)			○					
	Combined visual-audible signaling devices																				
	E2xCS 112-05			●									110 dB (A) 5 Joules	IP 66 IP 67			●				236
	BExCS 110-05D		●	●									110 dB (A) 5 Joules	IP 67		○					238
	BExDCS 110-05D		●	●		●	●									○					
	BExCA 110-05D		●	●												○					240
	BExCL 15-05D		●	●									113 dB (A) 5 Joules			○					
	IS-mC1	●	●	●									100 dB (A) / 6 cd	IP 65		●					242
	Accessories																				
	Zener barriers																				244

[1] The specification for the alarm signal reception range assumes an existing ambient noise level of 65 dB (A). In accordance with applicable regulations, the calculated alarm range for the sound level 65 dB (A) was given + 10 dB (A) = 75 dB (A).

● available
○ in preparation

Further information can be found on the Internet:
www.pfannenberg.com · www.pfannenberg-spareparts.com
Keep up to date. Subscribe to our newsletter now:
newsletter.pfannenberg.com

Flashing lights 7.5 Joules Quadro F12-3G/3D ATEX

The Quadro F12 3G/3D flashing light is designed for tough demands under industrial conditions and is usable as a visual alarm.
The flashing light, which is suitable for use both indoors and out, generates bright light impulses with a high attention-drawing effect.

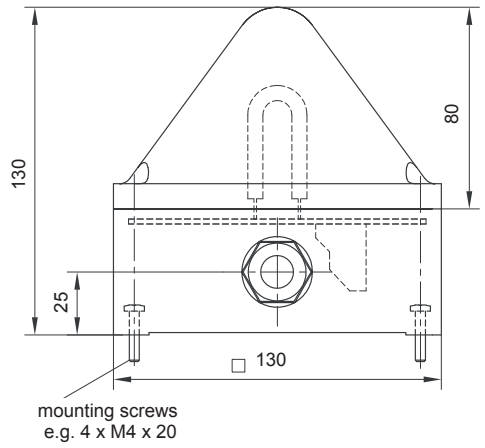
- for use in potentially explosive areas in Zone 2 as per EN 60079-10 and Zone 22 as per EN 61241-10
- the requirements of the EN 60079-0, EN 60079-15, EN 61241-0, EN 61241-0 (2007) and EN 61241-1 (2005) standards are fulfilled
- usable for gases in the temperature classes T1, T2, T3 and T4, as well as for non-conductive dusts, provided that the surface temperature of the equipment does not exceed + 105 °C

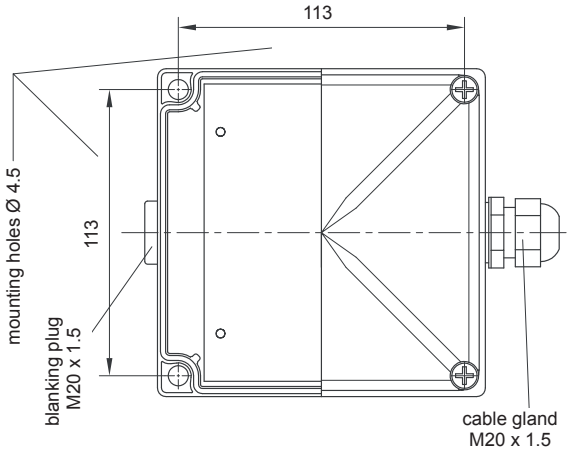
r = 15 m	IP 66	IK 08	+ 45 °C / - 20 °C
Range as per EN 54	Protection system	Impact-proof housing	Operating temperature

Electrical data	Quadro F12-3G/3D ATEX		
Rated voltage	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	195 V – 253 V	95 V – 127 V	18 V – 30 V
Nominal current consumption	90 mA	140 mA	360 mA
Initial current limited to	< 7 A / 150 µs	< 7 A / 150 µs	< 5 A / 2 ms

Mechanical data		Quadro F12-3G/3D ATEX
Explosion protection		II 3G Ex nR IIC T4 - 20 °C ≤ Ta ≤ + 45 °C II 3D Ex tD A22 IP66 T105 °C - 20 °C ≤ Ta ≤ + 45 °C
Category (area of use)		3G (Zone 2) 3D (Zone 22)
Conformity to standards		Guideline 94/9/EG (ATEX 100a)
Testing body		Pfannenberg
Special conditions		X: according to the requirements of prDIN EN 60 079-0, DIN EN 61241-0 (2007) and DIN EN 61241-1 (2005), the equipment is suitable for applications with a low degree of mechanical danger. It must therefore be ensured that the flashing light is mounted with sufficient protection against impacts. A protective cage is not mandatory.
Flash rate		0.83 Hz = 50 flashes/min.
Flash energy		7.5 Joules
Light intensity (DIN 5037)	clear lens	84 cd
Lens colours		clear, white, yellow, amber, red, green, blue
Operating temperature		- 20 °C ... + 45 °C
Storage temperature		- 40 °C ... + 70 °C
Relative humidity		100%
Protection system according to EN 60529		IP 66; mounting arbitrary
Impact resistance as per EN 50102		IK 08
Protection class		II
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	housing	polycarbonate (PC), RAL 7035 (optionally RAL 3000)
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm²
Cable entry		2 x M20 sideways (1 x blanking plug, 1 x cable gland)
Weight		600 g

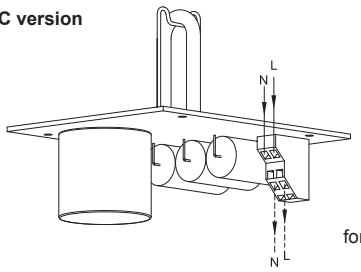
Dimensions



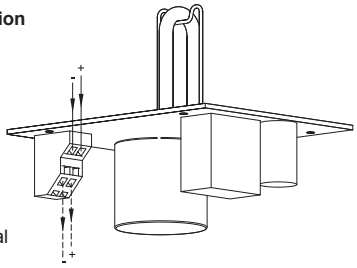


Connection diagrams

AC version



DC version



for supplying additional flashing lights

Ordering details

Article numbers		Quadro F12-3G/3D ATEX	
Lens colour	**Rated voltage**	230 V AC	24 V DC
clear		210 41 10 1 008	210 41 80 1 008
yellow		210 41 10 3 008	210 41 80 3 008
amber		210 41 10 4 008	210 41 80 4 008
red		210 41 10 5 008	210 41 80 5 008

Article numbers for other colours and voltages on request

Options / accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation
Quadro F12 3G/3D
has been developed and manufactured in accordance with the requirements as per EN 50014.

This declaration is based on compliance with the following regulations and standards:

DIN EN 60079-0	Electrical equipment for areas at risk of gas explosions – Part 0: General requirements
DIN EN 60079-15	Electrical equipment for areas at risk of explosions – Part 15: type of protection type 'n'
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust – General requirements
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust – protection by enclosure 'tD'
DIN EN 60598-1	Lights – Part 1: General requirements and tests
DIN EN 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN 60529	Types of protection by enclosure (IP code)
DIN EN 50102	Types of protection by enclosure for electrical equipment against external mechanical stresses (IK code)
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards, noise immunity for industrial areas
DIN EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards, interference emission for residential areas, business and commercial areas as well as small companies
DIN EN 981	Machine safety - System of acoustic and visual alarm signals and information signals
ISO 11429	System of acoustic and visual alarm signals and information signals
UVV-BGV A3(VBG4)	Electrical plants and equipment
GSGV	German Appliance Safety Act

The Quadro F12 3G/3D flashing lights are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

LED multifunction light Quadro-LED Flex-3G/3D

- designed for tough requirements under industrial conditions
- suitable for indoor and outdoor use
- suitable for use in potentially explosive areas in Zones 2 and 22
- extremely insensitive to shock and vibration
- maintenance-free service life exceeding 50,000 hrs
- internally and externally selectable operating mode as standard - one device for 4 different alarms:
  – continuous light
  – blinking light
  – flashing light
  – rotating light (non-wearing)
- 24 V AC/DC devices as standard with soft-start module
- can be operated and powered directly via 24 V transistor PLC output, no additional relay control necessary
- inexpensive and flexible; wide range power supply as standard

Range as per EN 54

Protection system

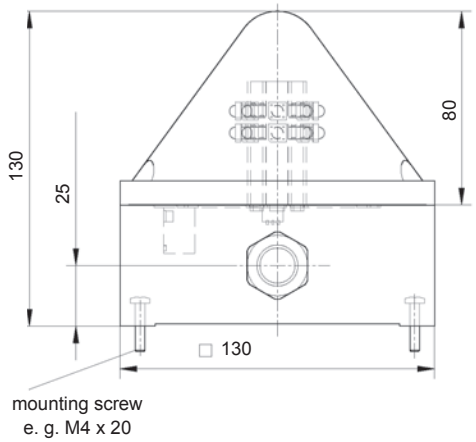
Impact-proof housing

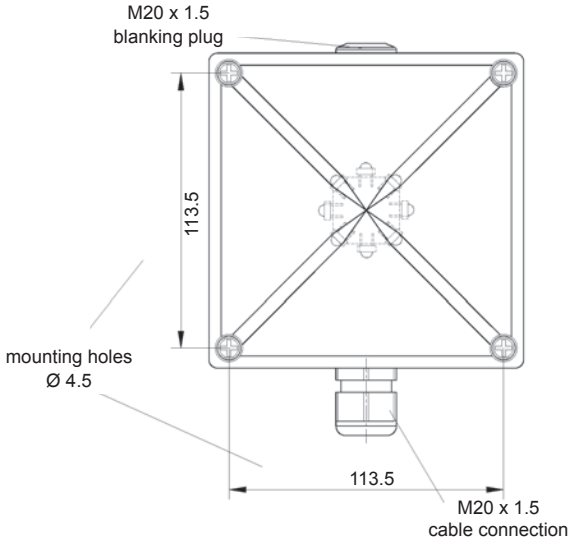
Operating temperature

Electrical data		Quadro-LED Flex 3G/3D ATEX	
Rated voltage		115 V / 230 V AC	24 V AC/DC
Rated frequency		50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	AC	95 V – 253 V	15 V – 40 V
	DC		10 V – 60 V
Current consumption in continuous light mode		60 mA	250 mA

Mechanical data		Quadro-LED Flex 3G/3D ATEX			
Explosion protection		II3G Ex nR II T5 X - 20 °C ≤ Ta ≤ + 55 °C II3G Ex nR II T6 X - 20 °C ≤ Ta ≤ + 50 °C II3D IP66 T 85°C X - 20 °C ≤ Ta ≤ + 55 °C			
Category (area of use)		3G (Zone 2) 3D (Zone 22)			
Conformity to standards		Guideline 94/9/EG (ATEX 100a)			
Testing body		Pfannenberg			
Special conditions		X: according to the requirements of prDIN EN 60 079-0, DIN EN 61241-0 (2007) and DIN EN 61241-1 (2005), the equipment is suitable for applications with a low degree of mechanical danger. It must therefore be ensured that the flashing light is mounted with sufficient protection against impacts. A protective cage is not mandatory.			
Operating mode (internally and externally selectable)		continuous light	blinking light	flashing light	rotating all-round light
Light alternation frequency			1.5 Hz	1 Hz	2.5 Hz
Light source		LED; 8 x 2 LEDs (3 chip version)			
Light intensity (DIN 5037)	clear lens	9 cd			
Lens colours		clear, white, yellow, amber, red, green, blue			
Operating temperature		- 20 °C ... + 50 °C (T6) / - 20 °C ... + 55 °C (T5)			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 66; mounting arbitrary			
Impact resistance as per EN 50102		IK 08			
Protection class		II			
Duty cycle		100%			
Service life of light source		min. 50 000 hrs			
Material	lens	polycarbonate (PC)			
	housing	polycarbonate (PC), light grey RAL 7035			
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm²			
Cable entry		2 x M20 x 1.5 (1 x blanking plug, 1 x cable gland)			
Weight		500 g			

Dimensions





Operating modes

S1			Selection via internal DIP switch	
1	2	3		
OFF	OFF	OFF	OFF	
OFF	OFF	ON	all-round light	2.5 Hz
OFF	ON	OFF	continuous light	
OFF	ON	ON	blinking light	1.5 Hz
ON	OFF	OFF	flashing light	1 Hz
ON	OFF	ON	all-round light	2.5 Hz
ON	ON	OFF	continuous light	
ON	ON	ON	blinking light	1.5 Hz

S1 -	X1 -				Selection via external control	
1	1	2	3	4		
(S1-2 = OFF, S1-3 = OFF)						
OFF	-/N	+/L			OFF (standby)	
OFF	-/N	+/L		+/L	all-round light	2.5 Hz
OFF	-/N	+/L	+/L		continuous light	
OFF	-/N	+/L	+/L	+/L	blinking light	1.5 Hz
ON	-/N	+/L			flashing light	1 Hz
ON	-/N	+/L		+/L	all-round light	2.5 Hz
ON	-/N	+/L	+/L		continuous light	
ON	-/N	+/L	+/L	+/L	blinking light	1.5 Hz

Ordering details

Article numbers		Quadro-LED Flex 3G/3D ATEX	
Lens colour	Rated voltage	115 V / 230 V AC	24 V AC/DC
yellow		211 04 64 3 009	211 04 63 3 009
amber		211 04 64 4 009	211 04 63 4 009
red		211 04 64 5 009	211 04 63 5 009

Article numbers for other colours and voltages on request

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation
Quadro-LED Flex 3G/3D
has been developed and manufactured in accordance with the requirements as per EN 60079.

This declaration is based on compliance with the following regulations and standards:

DIN EN 60079-0	Electrical equipment for areas at risk of gas explosions – Part 0: General requirements
DIN EN 60079-15	Electrical equipment for areas at risk of explosions – Part 15: type of protection type 'n'
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust – General requirements
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust – protection by enclosure 'tD'
DIN EN 60598-1	Lights – Part 1: General requirements and tests
DIN EN 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN 60529	Types of protection by enclosure (IP code)
DIN EN 50102	Types of protection by enclosure for electrical equipment against external mechanical stresses (IK code)
DIN EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards, noise immunity for industrial areas
DIN EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards, interference emission for residential areas, business and commercial areas as well as small companies
DIN EN 981	Machine safety - System of acoustic and visual alarm signals and information signals
ISO 11429	System of acoustic and visual alarm signals and information signals
UVV-BGV A3(VBG4)	Electrical plants and equipment
GSGV	German Appliance Safety Act

The Quadro-LED Flex 3G/3D multifunction lights are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

Flashing lights 5 Joules / 10 Joules
E2xB 05 / E2xB 10

- suitable for use in potentially explosive areas in Zone 2
- stainless steel protective cage and stainless steel mounting bracket for 360° positioning
- UL approval for operational area Class 1, Division 2 (optional)
- ATEX approval (standard)
- extremely sturdy, resistant to vibration and impact-proof
- automatic synchronisation in system mode
- sturdy device for tough industrial applications

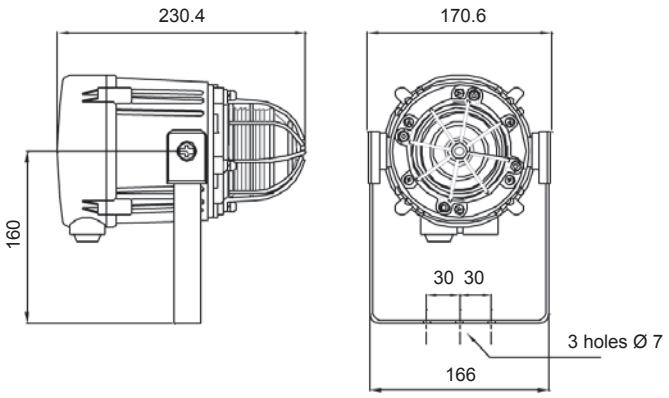
E2xB 05	E2xB 10		
r = 11 m	r = 17 m	IP 66 IP 67	+ 55 °C / - 20 °C
Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

Electrical data	E2xB 05				
Rated voltage	230 V AC	120 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	42 V – 58 V	20 V – 28 V	10 V – 14 V
Nominal current consumption	30 mA	80 mA	145 mA	275 mA	520 mA

Electrical data	E2xB 10			
Rated voltage	230 V AC	120 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10 %	± 10 %	42 V – 58 V	20 V – 28 V
Nominal current consumption	107 mA	185 mA	260 mA	560 mA

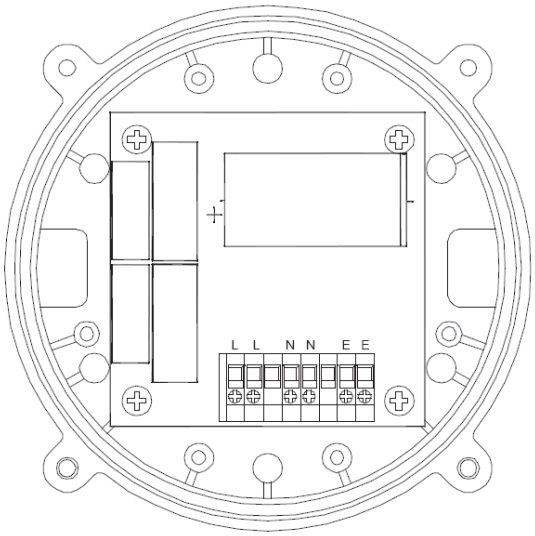
Mechanical data		E2xB 05	E2xB 10
Protection system		IP 67 / IP 66	
Explosion protection		II 3G EEx nA nL IIC T2 II 3G EEx nA nL IIC T3	II 3G EEx nA nL IIC T2
Category (area of use)		3G (Zone 2)	
Certificate of conformity		DEMKO 06 ATEX 0421554	
Testing body		DEMKO	
Flash energy		5 Joules	10 Joules
Flash rate		1 Hz	
Light intensity (DIN 5037)	clear lens	42 cd	110 cd
Lens colours		clear, yellow, amber, red, green, blue	
Temperature class T		IIC T2 @ Ta - 20 °C ... + 55 °C IIC T3 @ Ta - 20 °C ... + 40 °C	IIC T2 @ Ta - 20 °C ... + 55 °C
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Duty cycle		100%	
Material	lens	borosilicate glass	
	housing	UL94VO PPS	
	protective cage and bracket	stainless steel	
Connecting terminals		0.5 ... 2.5 mm²	
Cable entry		2 x M20 (with 1 blanking plug)	
	UL version	optionally 1 x 1/2" NPT	
Weight		1.48 kg	

Dimensions

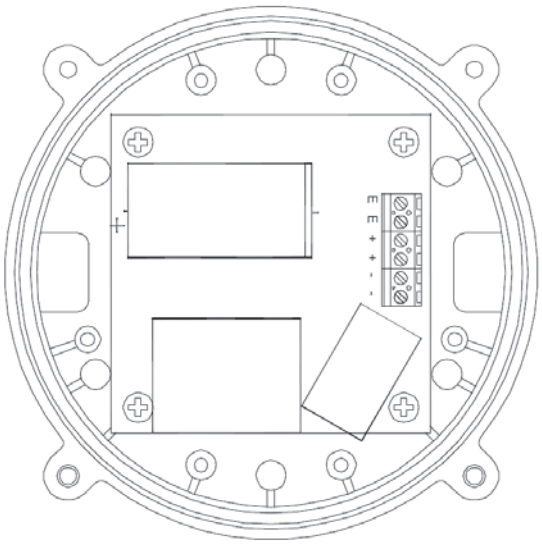


Connection diagrams

AC version



DC version



Ordering details

Article numbers		E2xB 10			E2xB 05		
Lens colour	**Rated voltage**	230 V AC	120 V AC	24 V DC	230 V AC	120 V AC	24 V DC
yellow		311 62 10 3 000	311 62 15 3 000	311 62 80 3 000	311 61 10 3 000	311 61 15 3 000	311 61 80 3 000
amber		311 62 10 4 000	311 62 15 4 000	311 62 80 4 000	311 61 10 4 000	311 61 15 4 000	311 61 80 4 000
red		311 62 10 5 000	311 62 15 5 000	311 62 80 5 000	311 61 10 5 000	311 61 15 5 000	311 61 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

Signal Tower BR 50-LED 3G/3D

BR 50 for Ex applications in the categories 3G and 3D for zones 2 and 22.

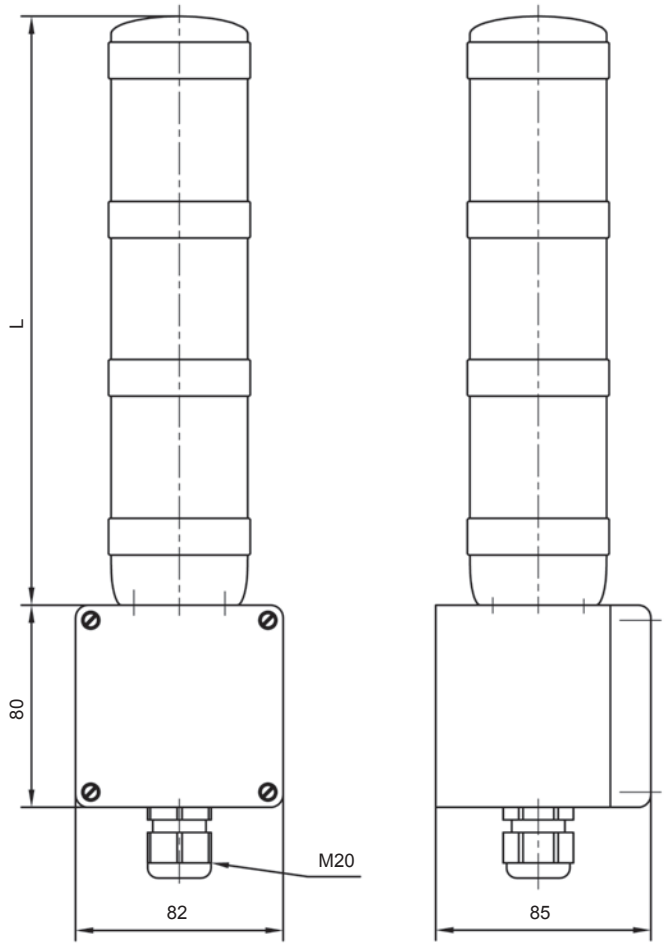
- extremely long service life (> 50,000 hrs)
- the light is amplified by the internal prisms of the impact-proof, heat-resistant and dustproof polycarbonate lens and can be easily recognized from all sides
- the technically and economically optimum solution for every application

IP 65	+ 50 °C - 20 °C
Protection system	Operating temperature

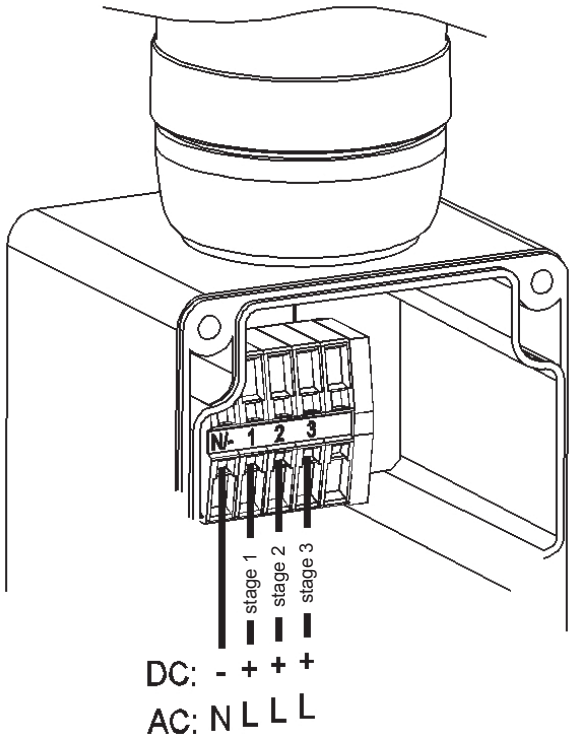
Electrical data		BR 50-LED 3G/3D			
Version		1-stage	2-stage		3-stage
Colour order		red	red / green	yellow / green	red / yellow / green
Rated current consumption	230 V AC 50/60 Hz	9 mA	16 mA	16 mA	24 mA
	24 V AC 50/60 Hz	60 mA	90 mA	80 mA	130 mA
	24 V DC	50 mA	80 mA	70 mA	120 mA
Operating range	230 V AC 50/60 Hz	195 V – 253 V			
	24 V AC 50/60 Hz	18 V – 28 V			
	24 V DC	18 V – 28 V			

Mechanical data		BR 50-LED 3G/3D
Explosion protection		II 3G Ex nA II T5 X - 20 °C ≤ Ta ≤ + 50 °C II 3D tDA22 IP65 T85°C X - 20 °C ≤ Ta ≤ + 50 °C
Category (area of use)		3G (Zone 2) 3D (Zone 22)
Testing body		Pfannenberg
Temperature class T		T5
Special conditions		X: according to the requirements of prDIN EN 60 079-0, DIN EN 61241-0 (2007) and DIN EN 61241-1 (2005), the equipment is suitable for applications with a low degree of mechanical danger. It must therefore be ensured that the flashing light is mounted with sufficient protection against impacts. A protective cage is not mandatory.
Light source		LED
Operating temperature		- 20 °C … + 50 °C
Storage temperature		- 40 °C … + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Service life of light source		> 50,000 h
Material	lens	polycarbonate (PC)
	housing	acrylonitrile butadiene styrene (ABS)
	connector housing	polycarbonate (PC), light grey RAL 7035
Mounting		arbitrary
Connecting terminals		spring-type terminal 0.08 – 2.5 mm²
Cable entry		M20 bottom side

Dimensions



Connection diagram



	L
1-stage	107
2-stage	170
3-stage	233
Mounting holes H 50 mm x W 70 mm Ø 4.2	

Ordering details

Article numbers	BR 50-LED 3G/3D	
Version	230 V AC	24 V AC/DC
1-stage red	220 93 10 1 000	220 93 40 1 000
2-stage red/green	220 93 10 2 300	220 93 40 2 300
2-stage yellow/green	220 93 10 2 301	220 93 40 2 301
3-stage red/yellow/green	220 93 10 3 000	220 93 40 3 000

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation
BR 50-LED 3G/3D
has been developed and manufactured in accordance with the requirements as per EN 60079-0.

This declaration is based on compliance with the following regulations and standards:
DIN EN 60079-15 Electrical equipment for areas at risk of explosions – type of protection type 'n'
DIN EN 50281-1-1 Electrical equipment for use in areas with combustible dust

The BR 50-LED 3G/3D signal towers are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

Flashing light 5 Joules CWB-ATEX

- the flashing lights from the CWB-ATEX series are explosion-protected equipment and serve as visual alarms in potentially explosive workplaces in Zones 1, 2, 21 and 22
- housing made of aluminium, therefore usable in all chemical and petrochemical plants as well as offshore plants
- high protection system and stable mechanical construction allow use under the toughest operating conditions
- various mounting brackets and a protective cage are available as accessories

r = 11 m
Range as per EN 54

IP 66
Protection system

+ 50 °C
- 20 °C
Operating temperature

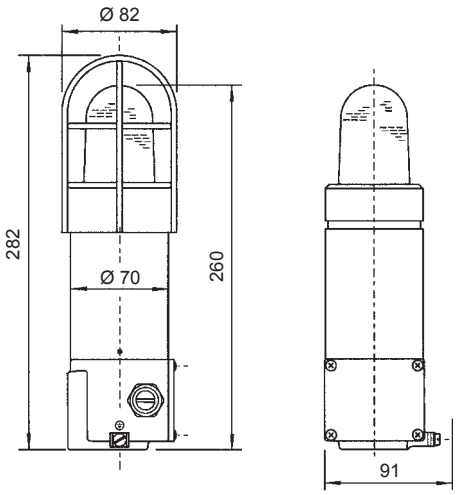
CCC

GL approval

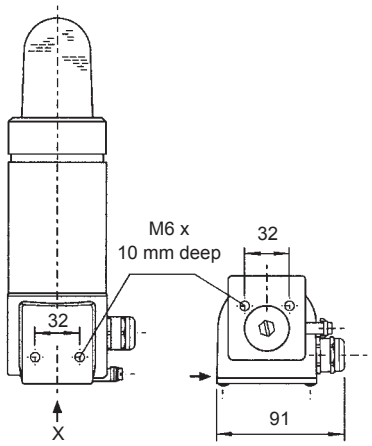
Electrical data	CWB-ATEX					
Rated voltage	230 V AC	110–127 V AC	24–42 V AC	60–80 V DC	12–48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	± 10 %	± 10 %	± 10 %	± 10 %
Nominal current consumption	0.08 A	0.11 A	0.5 ... 0.3 A	0.11 A ... 0.13 A	0.5 ... 0.3 A	0.4 A

Mechanical data		CWB-ATEX
Type of protection		'd' flame proof enclosure for light housing 'e' enhanced safety for terminal box
Explosion protection		II 2G Ex de IIC T6 II 2G Ex de IIC T5 IID Ex dt A21 IP 66 T80°C IID Ex dt A21 IP 66 T100°C
Category (area of use)		2G (Zone 1) / 3G (Zone 2) 2D (Zone 21) / 3D (Zone 22)
Certificate of conformity		LCIE 02 ATEX 6113
Testing body		LCIE
Flash energy		5 Joules
Flash rate		approx. 1 Hz
Lens colours		clear, yellow, amber, red, green, blue
Temperature class T		T6, II 2D T80°C - 20 °C ... + 40 °C T5, II 2D T100°C - 20 °C ... + 50 °C
Storage temperature		- 20 °C ... + 80 °C
Relative humidity		90%
Protection system according to EN 60529		IP 66 (when used for design purpose)
Duty cycle		100%
Service life of the flash tube		light emission still 70% after 8,000,000 flashes
Material	lens	polycarbonate (PC)
	protective cage	stainless steel
	housing	aluminium alloy yellow; plinth black
Type of connection		screw terminals
	terminal area	(max.) 2 x 4 mm² (single wire) 2 x 2.5 mm² (fine wire)
Cable entry		1 x cable gland M20 x 1.5, chrome-plated, clamping range 6 … 13 mm 1 x blanking plug, M20 x 1.5
Weight		approx. 1.24 kg

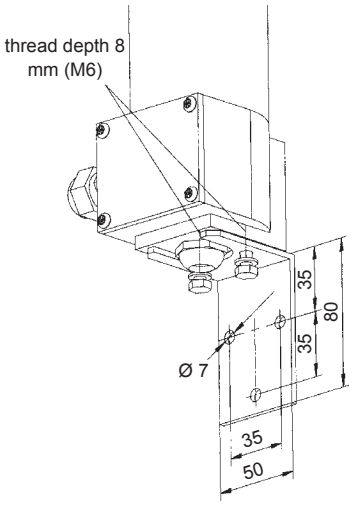
Dimensions



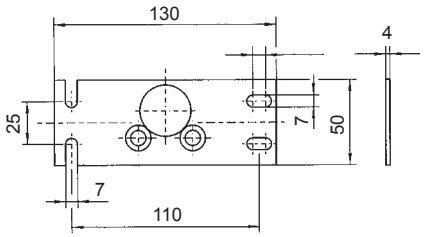
Direct mounting to wall/floor



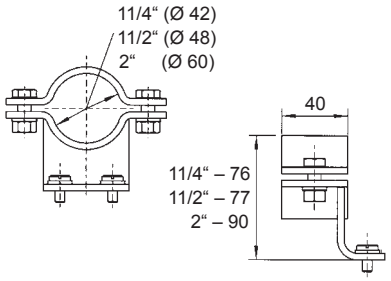
Standard bracket



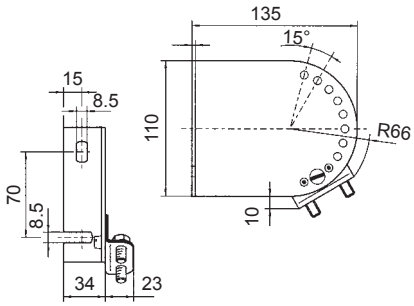
Mounting plate



Pipe clamp



Mounting bracket



Ordering details

Article numbers		CWB-ATEX			
Lens colour	**Rated voltage**	230 V AC	110–127 V AC	60–80 V DC	24–42 V AC / 12–48 V DC
yellow		310 06 10 3 000	310 06 13 3 000	310 06 58 3 000	310 06 90 3 000
amber		310 06 10 4 000	310 06 13 4 000	310 06 58 4 000	310 06 90 4 000
red		310 06 10 5 000	310 06 13 5 000	310 06 58 5 000	310 06 90 5 000

Article numbers for other colours on request

Options / accessories

Pipe clamps
stainless steel
Article number:
R1 1/4“: 38108101000
R1 1/2“: 38108101200
R2“: 38108102000

Mounting bracket
stainless steel
Article number:
38108100100

Mounting plate
stainless steel
Article number:
38108100000

Standard bracket set
stainless steel
Article number:
38108100150

stainless steel
Article number:
38108100200

GOST

Manufacturer’s declaration

We hereby declare that the explosion-protected flashing light with the type designation **Ex-CWB-ATEX** has been developed and manufactured in accordance with EN 60079-0.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 60079-0	Electrical equipment for areas at risk of explosions – General requirements
EN 60079-1	Pressure-resistant encapsulation ‘d’
EN 60079-7	Enhanced safety ‘e’
EN 61241-0	Electrical equipment for use in areas with combustible dust
EN 60598	Lights
EN 60529	Types of protection by enclosure (IP code)
EN 60400 / IEC 61	Lamp sockets for tube-shaped fluorescent lamps and starter sockets
2004/108/EG	‘Electromagnetic compatibility’

The flashing light is approved for use in potentially explosive areas in Zones 1, 2, 21 and 22 as per 94/9/EU.

Flashing lights 5 Joules / 10 Joules / 15 Joules BExBG05 / BExBG10 / BExBG15 ATEX

The flashing light is ideal for almost all mounting requirements: side, ceiling and floor mounting

- categories 2G (Zones 1 and 2), 2D (Zones 21 and 22)
- extremely bright at up to 15 Joules flash energy
- large connection box for simple mounting
- also available with connection box in increased safety version
- very sturdy, manufactured from seawater-resistant aluminium and stainless steel protection cage
- can be mounted in all operating positions

5 Joules	10 Joules	15 Joules		
r = 11 m	r = 17 m	r = 23 m	IP 67	+70 °C / - 50 °C
Range as per EN 54	Range as per EN 54	Range as per EN 54	Protection system	Operating temperature

Electrical data AC	BExBG05		BExBG10		BExBG15	
Rated voltage	230 V AC	115 V AC	230 V AC	115 V AC	230 V AC	115 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	± 10 %	± 10 %	± 10 %	± 10 %	± 10 %	± 10 %
Nominal current consumption	55 mA	140 mA	110 mA	250 mA	170 mA	360 mA

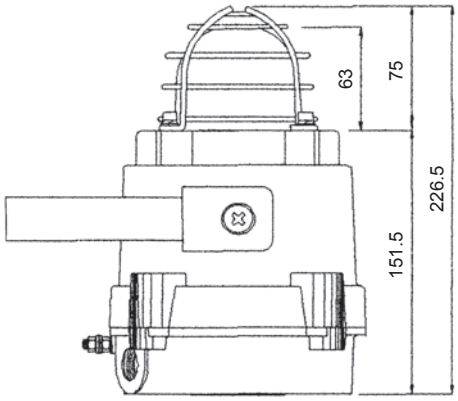
Electrical data DC	BExBG05			BExBG10			BExBG15	
Rated voltage	48 V DC	24 V DC	12 V DC	48 V DC	24 V DC	12 V DC	48 V DC	24 V DC
Operating range	± 25 %	± 25 %	± 25 %	± 25 %	± 25 %	± 25 %	± 25 %	± 25 %
Nominal current consumption	180 mA	300 mA	750 mA	340 mA	660 mA	1450 mA	480 mA	860 mA

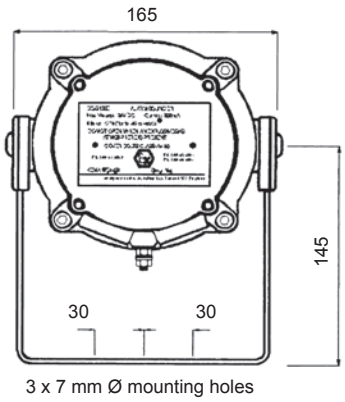
Mechanical data		BExBG05D/BExBG05E	BExBG10D/BExBG10E	BExBG15D/BExBG15E
Type of protection		Ex d IP 67 / Ex de IP 66		
Explosion protection [1]		II2G Ex d IIC T4, T5 or T6 II2G Ex de IIC T4, T5 or T6 II2D Ex tD A21 IP66 or IP67 T85, T100 or T115	II2G Ex d IIC T4 or T5 II2G Ex de IIC T4 or T5 II2D Ex tD A21 IP66 or IP67 T95, T110 or T125	
Category (area of use)		2G (Zone 1, 2) 2D (Zone 21, 22)		
Certificate of conformity		KEMA 01 ATEX 2030		
Testing body		KEMA		
Flash energy		5 Joules	10 Joules	15 Joules
Flash rate		60 flashes/min., stabilised		
Lens colours		clear, yellow, amber, red, green, blue		
Temperature class T		T4 / T135°C @ Ta - 50 °C ... + 70 °C T5 / T100°C @ Ta - 50 °C ... + 55 °C T6 / T85°C @ Ta - 50 °C ... + 40 °C	T4 / T125°C @ Ta - 50 °C ... + 70 °C T110°C @ Ta - 50 °C ... + 55 °C T5 / T85°C @ Ta - 50 °C ... + 40 °C	
Storage temperature		- 50 °C … + 70 °C		
Relative humidity		90%		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 8,000,000 flashes		
Material	lens	glass		
	housing	die-cast aluminium, resistant to salt water, marine grade LM6, red (RAL 3000)		
	protective cage and bracket	stainless steel		
Type of connection		1 x 4 mm² or 2 x 2.5 mm²		
Cable entry [1]		2 x M20, of which one open, optionally PG13.5 or 1/2“ NPT		
Weight	d version	2.45 kg		
	e version	2.75 kg		

[1] Ex cable gland not included

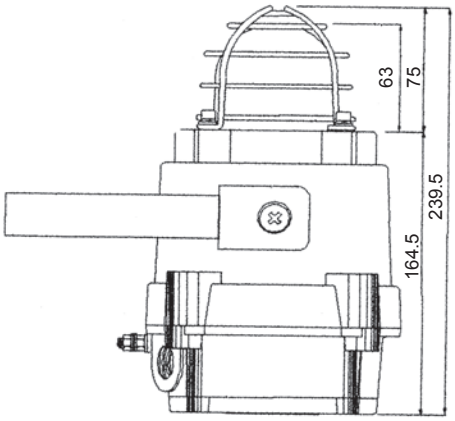
Dimensions

Ex d version | **Ex de version**





3 x 7 mm Ø mounting holes



Ordering details

Article numbers		BExBG05-E		BExBG05-D	
Lens colour	Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC
yellow		311 30 10 3 000	311 30 80 3 000	311 31 10 3 000	311 31 80 3 000
amber		311 30 10 4 000	311 30 80 4 000	311 31 10 4 000	311 31 80 4 000
red		311 30 10 5 000	311 30 80 5 000	311 31 10 5 000	311 31 80 5 000
Article numbers		**BExBG10-E**		**BExBG10-D**	
Lens colour	Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC
yellow		311 20 10 3 000	311 20 80 3 000	311 21 10 3 000	311 21 80 3 000
amber		311 20 10 4 000	311 20 80 4 000	311 21 10 4 000	311 21 80 4 000
red		311 20 10 5 000	311 20 80 5 000	311 21 10 5 000	311 21 80 5 000
Article numbers		**BExBG15-E**		**BExBG15-D**	
Lens colour	Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC
yellow		311 10 10 3 000	311 10 80 3 000	311 11 10 3 000	311 11 80 3 000
amber		311 10 10 4 000	311 10 80 4 000	311 11 10 4 000	311 11 80 4 000
red		311 10 10 5 000	311 10 80 5 000	311 11 10 5 000	311 11 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected flashing light with the type designation
BExBG05 ... 15 d or e ATEX
has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50019	Enhanced safety 'e'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust
EN 60529	Types of protection by enclosure (IP code)
89/336/EWG	'Electromagnetic compatibility'

The Ex-BExBG05 - 15 d or e flashing lights are approved for use in potentially explosive areas in Zones 1, 2, 21 and 22 as per 94/9/EU.

LED Light BExBG L1D ATEX

The LED light is ideal for almost all mounting requirements: side, ceiling and floor mounting

- categories 2G (Zones 1 and 2), 2D (Zones 21 and 22)
- large connection box for simple mounting
- also available with connection box in increased safety version
- very sturdy, manufactured from seawater-resistant aluminium and stainless steel protection cage
- can be mounted in all operating positions
- a total of 9 different operating modes can be set
- 2 additional operating modes can be controlled externally

Range as per EN 54

Protection system

Operating temperature

Electrical data	BExBG L1D
Rated voltage	230 V AC
Rated frequency	50 Hz / 60 Hz
Operating range	± 10 %
Nominal current consumption	70 mA

Mechanical data		BExBG L1D
Type of protection		Ex d IP 67
Explosion protection [1]		II 2G EEx d IIC T4 or T5 II 2G EEx de IIC T4 or T5 II 2D T135°C or T100°C
Category (area of use)		2G (Zone 1, 2) 2D (Zone 21, 22)
Certificate of conformity		KEMA 01 ATEX 2006X
Testing body		KEMA
Light source		32 LED's
Lens colours		clear, yellow, amber, red, green, blue
Temperature class T		T4 / T135°C @ Ta - 50 °C ... + 55 °C T5 / T100°C @ Ta - 50 °C ... + 40 °C
Storage temperature		- 50 °C … + 70 °C
Relative humidity		90%
Duty cycle		100%
Service life of the flash tube		> 50,000 h
Material	lens	glass
	housing	die-cast aluminium, resistant to salt water, marine grade LM6, red (RAL 3000)
	protective cage and bracket	stainless steel
Type of connection		1 x 4 mm² or 2 x 2.5 mm²
Cable entry [1]		2 x M20, of which one open, optionally PG13.5 or 1/2“ NPT
Weight		2.75 kg

[1] Ex cable gland not included

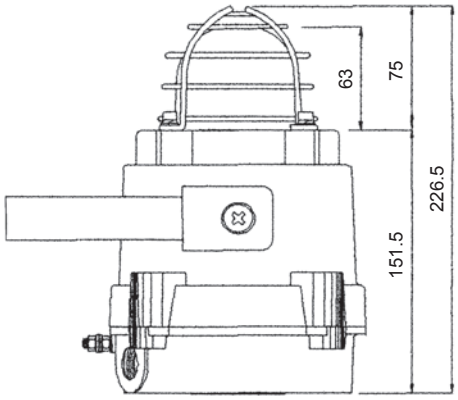
Operating modes

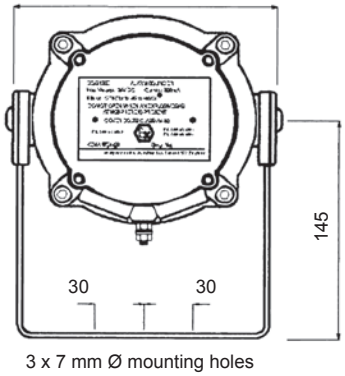
Mode	internal	external	
	stage 1	stage 2	stage 3
1	all on	9	8
2	rotation 3 LED fast “ON“	7	1
3	rotation 6 LED fast “ON“	8	1
4	rotation 3 LED slow “ON“	9	1
5	rotation 6 LED slow “ON“	6	1

Mode	internal	external	
	stage 1	stage 2	stage 3
6	double flash 1 Hz	9	1
7	single flash 2 Hz	3	1
8	double flash 2 Hz	3	1
9	alternating flash 1:1 2 Hz	3	1

Dimensions

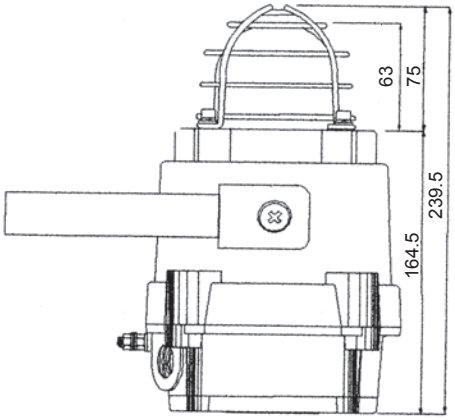
EEx d version





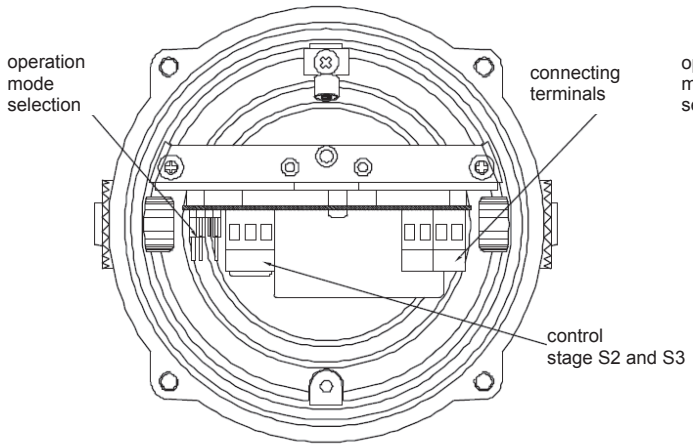
3 x 7 mm Ø mounting holes

EEx de version

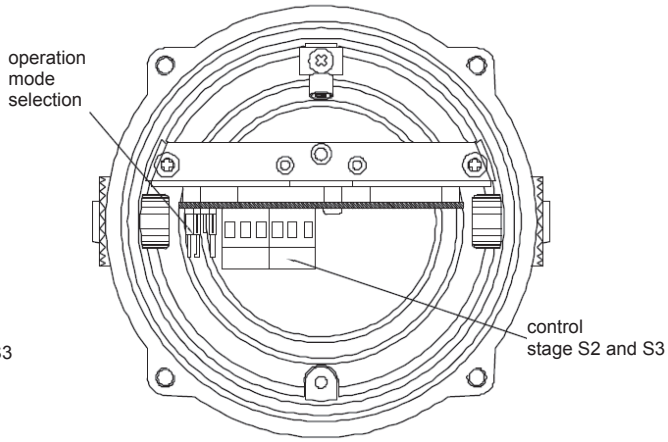


Connection diagrams

AC version



DC version



Ordering details

Article numbers		BExBG L1D
Lens colour	**Rated voltage**	230 V AC
amber		311 51 10 4 000

Article numbers for other colours and voltages on request

Options / accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected LED light with the type designation
BExBG L1D ATEX
has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50019	Enhanced safety 'e'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust
EN 60529	Types of protection by enclosure (IP code)
89/336/EWG	'Electromagnetic compatibility'

The BExBG L1D ATEX LED light is approved for use in potentially explosive areas in Zones 1, 2, 21 and 22 as per 94/9/EU.

IS-Mini series LED Blinking Light
IS-mB1

- very economical visual alarm
- certified for use in Ex-Zones 0, 1 and 2!
- compact design with a diameter of just 88 mm
- blinking light operated via certified zener barriers or galvanic isolators
- super-bright LEDs in red, green, blue and yellow/amber
- very well suited for fire alarm systems and direct control due to low power consumption

See pages 250 and 251 for suitable zener barriers

Range as per EN 54

Protection system

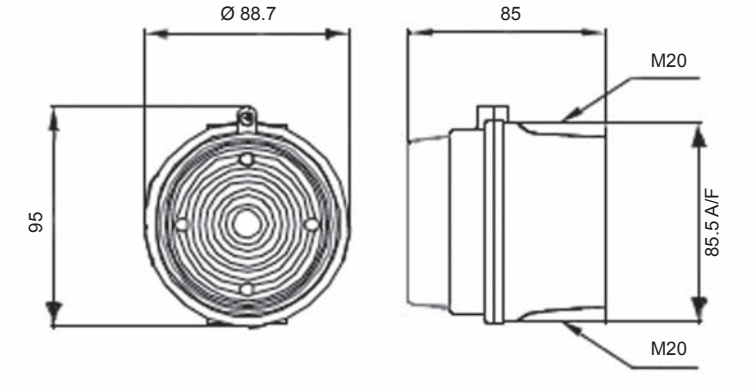
Operating temperature

Electrical data	IS-mB1
Rated voltage	24 V DC
Operating range	16 V – 28 V
Nominal current consumption	25 mA [1]

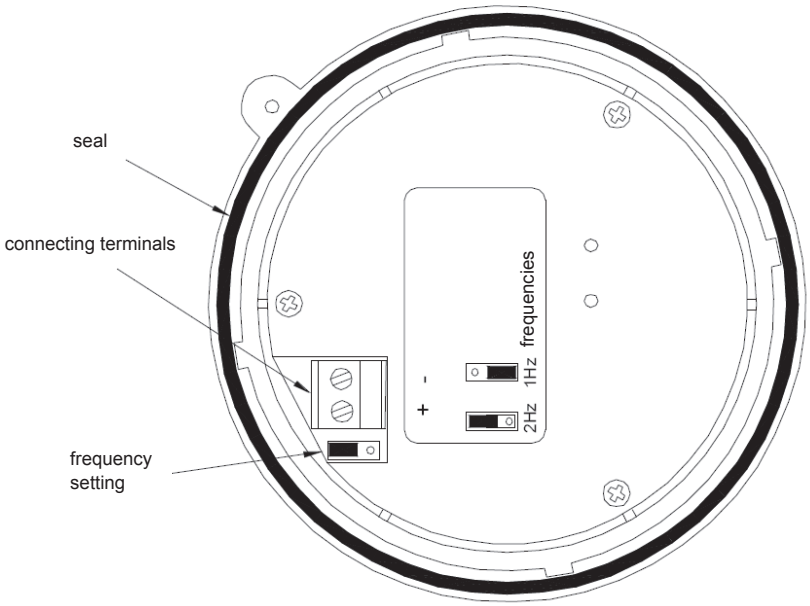
[1] typical for connection to 24 V DC via 28 V / 300 Ω zener barrier. Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 251

Mechanical data		IS-mB1
Type of protection		'ia' inherently safe
Explosion protection		II 1G EEx ia IIC T4
Category (area of use)		1G (Zone 0) 2G (Zone 1) 3G (Zone 2)
Certificate		SIRA 05 ATEX2084X
Testing body		SIRA
Flash rate		can be set to 2 Hz or 1 Hz
Lens colour		clear, with red, yellow/amber, blue or green LEDs
Temperature class T		T4 @ Ta - 40 °C ... + 60 °C
Storage temperature		- 40 °C … + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Material	lens	polycarbonate (PC)
	housing	ABS, self-extinguishing UL94V0 & 5VA, similar RAL 3000 (flame red)
Connecting terminals		0.5 – 2.5 mm²
Cable entry		2 x M20 (disruption prepared)
Weight		210 g

Dimensions



Connection diagram



Ordering details

Article numbers	IS-mB1
Colour / Rated voltage	24 V DC
yellow/amber	310 08 80 4 000
red	310 08 80 5 000
green	310 08 80 6 000
blue	310 08 80 7 000

Options / accessories

Zener barrier

See pages 250/251 for further information

Manufacturer's declaration

Developed and manufactured in accordance with the following regulations and standards:

EN 50014 Electrical equipment for areas at risk of explosions – General requirements
EN 50020 Electrical equipment for areas at risk of explosions – intrinsically safety 'i'
EN 50284 Special requirements for the design, testing and marking of electrical equipment in appliance group II, category 1G

Sounder 105 dB (A) / 110 dB (A) DS 5 / DS 10 3G/3D ATEX

Gas and dust protection

- the industrial sounder for tough applications. Proven 100,000 times over in shipping. ‘When nothing else works, this still does!‘ ‘Heavy duty’ but still light!
- for use as an acoustic alarm in potentially explosive workplaces of category 3G (Zone 2) and 3D (Zone 22)
- category for gas and dust protection
- IP 67 for safe operation under extreme environmental conditions
- individual selection of 32 different tones

optionally:

- 4-stage external tone selection (options: TAS, TAV)
- all tones can be individually combined with one another when externally controlled (programming function, tone 32)

DS 5 3G/3D	DS 10 3G/3D				
r = 32 m	r = 56 m	IP 66 IP 67	VdS G28609	EN 54-3	+ 55 °C / - 25 °C
max. signal reception range	max. signal reception range	Protection system		Standard	Operating temperature

Electrical data	DS 5 3G/3D				
Rated voltage	230 V AC	115 V AC	24 V AC[1]	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	195 V – 253 V	95 V – 127 V	19 V – 29 V	19 V – 29 V	10 V – 15 V
Nominal current consumption	0.03 A	0.06 A	0.28 A	0.28 A	0.28 A
Electrical data	**DS 10 3G/3D**				
Rated voltage	230 V AC	115 V AC	24 V AC[1]	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	195 V – 253 V	95 V – 127 V	19 V – 29 V	19 V – 29 V	10 V – 15 V
Nominal current consumption	0.06 A	0.12 A	0.42 A	0.42 A	0.30 A

[1] Temperature class T3

Mechanical data	DS 5 3G/3D	DS 10 3G/3D
Explosion protection	II 3G EEx nA II T4 (all voltages except 24 V AC) II 3G Ex nA II T3 (24 V AC only) II 3D Ex tD A22 IP 67 T135°C	
Category (area of use)	3G (Zone 2) 3D (Zone 22)	
Testing body	Pfannenberg	
Sound pressure level	105 dB (A) ± 3 dB (A)	110 dB (A) ± 3 dB (A)
Temperature class	T4 / T3 @ - 25 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Protection system according to EN 60529	IP 66, IP 67	
Duty cycle	100%	
Material	die-cast aluminium GD-Al Si12 Cu	
Surface coating	epoxy resin paint RAL 3000, flame red	
Cable entry	2 x M20 x 1.5 (1 x plastic cable gland, 1 x plug)	
Clamping range of the cable fitting	6 – 13 mm	
Connecting terminals	min. 0.08 mm² ... max. 2.5 mm² AWG 28 - 12 (AWG12 THHN, THWN)	
Weight	AC: 2.15 kg / DC: 1.95 kg	

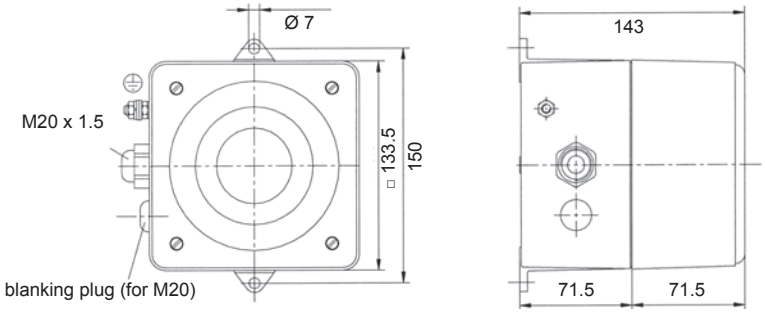
Options / accessories

External tone selection control / 4-stage external tone selection
TAV: control by means of external voltage input (12 V and 24 V DC only)
TAS: control by means of control voltage

GOST

GL 30457-83-HH

Dimensions



Alarm tone table

tone	Code switch 1	2	3	4	5	6	Description - Basic tone (preset: tone no. 1)		Stage 2	Stage 3	Stage 4
0							no tone		1	5	4
1					•		emergency signal DIN 33 404, part 3	1s 1200Hz 500Hz	3	2	4
2				•			emergency evacuation signal as per ISO 8201	1,5s 1s 950Hz	1	4	3
3				•	•		alternating tone	1025Hz 825Hz 0,5s	1	2	4
4			•				continuous tone	950Hz	1	3	5
5			•		•		interrupted tone	2s 950Hz	1	4	3
6			•	•			siren	1200Hz 500Hz 3s 3s	1	4	9
7			•	•	•		fire alarm France – NFS21-001	0,4s 0,1s 554Hz 440Hz	3	10	4
8		•					emergency signal Sweden – SS 031711	0,125s 0,125s 700Hz 60s	2	3	4
9		•			•		horn	800Hz 8ms 4ms	1	3	4
10		•		•			continuous tone	500Hz	27	9	26
11		•		•	•		continuous tone - Bayer	725Hz	1	17	9
12		•	•				continuous tone	825Hz	27	9	26
13		•	•		•		continuous tone	1200Hz	1	5	3
14		•	•	•			continuous tone	1500Hz	1	4	10
15		•	•	•	•		interrupted tone	0,5s 0,5s 500Hz	1	24	12
16	•						interrupted tone	0,5s 0,5s 825Hz	1	24	15
17	•				•		interrupted tone - Bayer	0,7s 0,3s 725Hz	1	11	9

tone	Code switch 1	2	3	4	5	6	Description - Basic tone (preset: tone no. 1)		Stage 2	Stage 3	Stage 4
18	•			•			interrupted tone	0,25s 1s 800Hz	19	7	4
19	•			•	•		alternating tone	1000Hz 800Hz 0,25s 0,25s	27	13	23
20	•		•				interrupted tone IMO SOLAS III/50 + SOLAS III/6.4	2,5s 825Hz 2,5s 7s	9	21	26
21	•		•		•		interrupted tone – leave ship	1s 1s 950Hz 3s	20	9	26
22	•		•	•			sweep up sawtooth with gap	3s 1200Hz 500Hz 0,5s	19	14	2
23	•		•	•	•		siren	3s 500Hz 2400Hz	27	12	2
24	•	•					alternating tone	1075Hz 825Hz 0,5s 0,5s	1	16	12
25	•	•			•		alternating tone	900Hz 500Hz 0,25s 0,25s	1	14	5
26	•	•		•			alternating tone	1400Hz 1200Hz 20ms 20ms	4	9	27
27	•	•		•	•		siren	3s 300Hz 1200Hz	13	23	19
28	•	•	•				siren	3s 1500Hz 700Hz	7	10	4
29	•	•	•		•		siren – Hoechst	40s 10s 10s 1000Hz 150Hz	1	30	9
30	•	•	•	•			interrupted tone	0,875s 0,875s 680Hz	1	4	26
31	•	•	•	•	•		siren – NF C 48-265	0,5s 1s 1600Hz 1400Hz	3	14	4
32	•	•	•	•	•	•	selection of available tone combinations in stages 2, 3 and 4				

Ordering details

Article numbers		DS 10 3G/3D			DS 5 3G/3D		
Ausführung	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Standard		231 11 10 0 007	231 11 15 0 007	231 11 80 0 007	231 06 10 0 007	231 06 15 0 007	231 06 80 0 007
TAS		231 11 10 0 155	231 11 15 0 155	231 11 80 0 155	231 06 10 0 155	231 06 15 0 155	231 06 80 0 155

Article numbers for other voltages and versions on request

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **DS 10 3G/3D, DS 5 3G/3D**
fullfils the requirements of the EN 60079-0, EN 60079-15, EN 61241-0 and EN 61241-1 standards in their latest editions.
This declaration is based on compliance with the following regulations and standards:

DIN EN 60079-0	Electrical equipment for areas at risk of gas explosions - General requirements
DIN EN 60079-15	Electrical equipment for areas at risk of gas explosions - Type of protection "n"
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust - General requirements
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust brennbarem Staub - part 1: protection by enclosure 'tD'
DIN EN 61000-6-2	Generic standard, interference immunity for industrial areas
DIN EN 61000-6-3	Generic standard, interference emission for residential areas
DIN EN 50130-4	Electromagnetic compatibility; product family standard: requirements for the interference immunity of system components for fire and burglar alarms and well as social alarm systems
DIN EN ISO7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms
UVV-BGV A3 (VBG4)	Electrical plants and equipment
DIN EN 54-3	Fire alarm systems – Part 3: fire alarm devices; Acoustic alarms
DIN EN 981	Machine safety - System of acoustic and visual alarm signals and information signals
DIN EN 50262	Metric cable glands for electrical installations
DIN IEC 60038	IEC standard voltages
DIN 33404/3	Alarm signals for workplaces; acoustic alarm signals; uniform emergency signal; technical safety requirements, tests
DIN EN 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN 60950-1	Safety of information technology equipment
DIN EN 60529	Types of protection by enclosure (IP code)
9. GPSG	Appliance and product safety act
Guideline 94/9/EG (ATEX 100a)	
DIN EN 60079-0 / DIN EN 60079-15 / DIN EN 61241-0 / DIN EN 61241-1	

The DS 10 3G/3D, DS 5 3G/3D sounders are approved for use in potentially explosive areas in Zones 2 and 22 as per 94/9/EU.

Sounder 110 dB (A) / 117 dB (A) E2xS 112 / E2xS 121

- 45 different tones, including tones conforming to UKOOA/PFEER
- 2 externally controllable tones
- highly resistant to corrosion and suitable for the toughest environments
- adjustable volume
- besides ATEX, also suitable for operational area class 1, division 2 (optional)
- stainless steel mounting bracket for 360° positioning
- automatic synchronisation in system mode

E2xS 112

max. signal reception range

E2xS 121

max. signal reception range

Protection system

Operating temperature

Electrical data	E2xS 112			
Rated voltage	230 V AC	120 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10 %	± 10 %	38 V – 58 V	10 V – 30 V
Nominal current consumption	54 mA	104 mA	146 mA	284 mA

Electrical data	E2xS 121			
Rated voltage	230 V AC	120 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10 %	± 10 %	38 V – 58 V	10 V – 30 V
Nominal current consumption	76 mA	142 mA	215 mA	280 mA

Mechanical data	E2xS 112	E2xS 121
Explosion protection	II 3G Ex na nL IIC T4	
Category (area of use)	3G (Zone 2)	
Certificate of conformity	DEMKO 06 ATEX 0421554	
Testing body	DEMKO	
Sound pressure level distance 1 m	110 dB (A) ± 3 dB	117 dB (A) ± 3 dB
Tones	45 different tones (conforming to UKOOA/PFEER) selectable by DIP switch, of which 2 selected tones can be selected externally	
Temperature class T	IIC T4 @ - 20 °C ... + 55 °C Ta	
Storage temperature	- 50 °C … + 70 °C	
Relative humidity	90%	
Protection system according to EN 60529	IP 66, IP 67	
Duty cycle	100%	
Material housing	UL94VO PPS & ABS	
Connecting terminals	0.5 ... 2.5 mm²	
Cable entry	2 x M20 (with 1 blanking plug), optionally for UL 1 x 1/2“ NPT	
Weight	AC: 3.0 kg / DC: 2.5 kg	

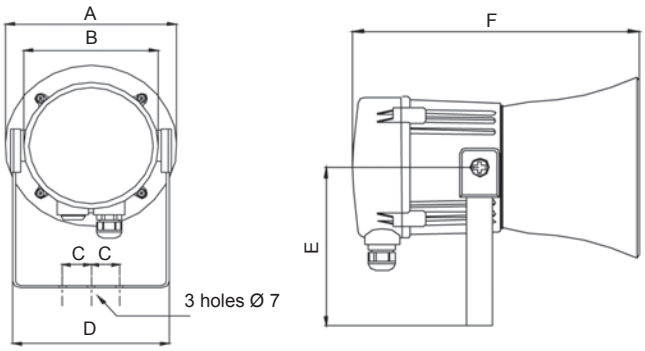
Ordering details

Article numbers	E2xS 112			E2xS 121		
Rated voltage	230 V AC	120 V AC	24 V DC	230 V AC	120 V AC	24 V DC
	320 56 10 0 000	320 56 15 0 000	320 56 80 0 000	320 57 10 0 000	320 57 15 0 000	320 57 80 0 000

Article numbers for other voltages on request

Options / accessories

Dimensions



	E2xS 112	E2xS 121
A	Ø 181	Ø 220
B	Ø 142	
C	30	
D	166	
E	160	
F	270.6	321

Alarm tone table

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 Hz / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 Hz / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 Hz / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	sweeping 500 Hz / 1200 Hz / 500 Hz, switching frequency 0.3 Hz		tone 2	tone 5
tone 9	1200 Hz / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.		tone 15	tone 2
tone 10	alternating tone 2400 Hz / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 Hz / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 Hz / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 Hz / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 Hz / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 Hz / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	continuous tone 300 Hz		tone 2	tone 5
tone 31	siren 660 Hz / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	2-tone bell sound		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s – Singapore		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 0.375 s, 0.25 s gap		tone 35	tone 5
tone 37	continuous tone 1000 Hz – PFEER toxic gas		tone 9	tone 45
tone 38	continuous tone 2000 Hz		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz		tone 2	tone 5
tone 43	continuous tone 1200 Hz		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz		tone 2	tone 5
tone 45	1000 Hz, 1 s signal, 1 s gap – PFEER general alarm		tone 38	tone 34

Sounder 110 dB (A) / 117 dB (A)
BExS 110/120 d/e, BExDS 110/120 d/e

- 32 different tones can be set; UKOOA/PFEER conformant
- 110/117 dB (A) ± 3 dB (A) sound pressure
- 3 externally selectable tones – positive and negative control possible in the case of DC devices
- quartz-stabilised tone synchronisation
- adjustable volume (except 12 V DC)
- ATEX and optionally IECEx approval
- housing made of die-cast aluminium LM6, horn made of ABS
- stainless steel mounting bracket for 360° positioning
- categories 2G and 3G (Zones 1 and 2)
- also available as categories 2D & 3D (Zones 21 & 22) for dust zones
- amendment 2; extended approval/temperature range + 70 °C

BExS 110
r = 56 m
max. signal reception range

BExS 120
r = 126 m
max. signal reception range

IP 66
IP 67
Protection system

+ 70 °C
- 50 °C
Operating temperature

EN 54-3
Standard
'd' version 24 V DC

VdS G209081
Standard
'd' version 24 V DC

Electrical data	BExS 110 d/e / BExDS 110 d/e				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	± 25 %	± 25 %	± 25 %
Nominal current consumption	56 mA	110 mA	130 mA	250 mA	195 mA
Electrical data	**BExS 120 d/e / BExDS 120 d/e**				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	± 25 %	± 25 %	± 25 %
Nominal current consumption	90 mA	180 mA	420 mA	800 mA	850 mA

Mechanical data		BExS 110 d/e	BExS 120 d/e	BExDS 110 d/e	BExDS 120 d/e
Protection system		'd'= IP 67; or 'e'= IP 66			
Explosion protection		II 2G Ex d IIC T4 / II 2G Ex de IIC T4 II 2G Ex d IIB T4 / II 2G Ex de IIB T4		II 2G/D Ex d IIC T4 100°C / II 2G/D Ex de IIC T4 100°C II 2G/D Ex d IIB T4 115°C / II 2G/D Ex de IIB T4 115°C	
Category (area of use)		2G (Zone 1) 3G (Zone 2)		2G (Zone 1) / 2D (Zone 21) 3G (Zone 2) / 3D (Zone 22)	
Certificate of conformity		KEMA 99 ATEX 7906		KEMA 99 ATEX 6312	
Testing body		KEMA		KEMA	
Sound pressure level	microphone distance 1 m	110 dB (A) ± 3 dB (A)	117 dB (A) ± 3 dB (A)	110 dB (A) ± 3 dB (A)	117 dB (A) ± 3 dB (A)
Temperature class T		IIC: T4 @ - 50 °C ... + 55 °C Ta IIB: T4 @ - 50 °C ... + 70 °C Ta		T4 @ - 50 °C ... + 55 °C Ta	
Storage temperature		- 50 °C … + 70 °C			
Relative humidity		90%			
Duty cycle		100%			
Material	housing	die-cast aluminium LM6, similar RAL 3000 (flame red)			
	horn	ABS self-extinguishing, similar to UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black			
Connecting terminals	Exd	1 x 4 mm² or 2 x 2.5 mm²			
	Exde	2 x 2.5 mm²			
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2" NPT			
Weight	Exd	AC version: 3.42 kg DC version: 3.16 kg	AC version: 3.88 kg DC version: 3.42 kg	AC version: 3.42 kg DC version: 3.16 kg	AC version: 3.88 kg DC version: 3.42 kg
	Exde	AC version: 3.68 kg DC version: 3.42 kg	AC version: 4.14 kg DC version: 3.38 kg	AC version: 3.68 kg DC version: 3.42 kg	AC version: 4.14 kg DC version: 3.38 kg

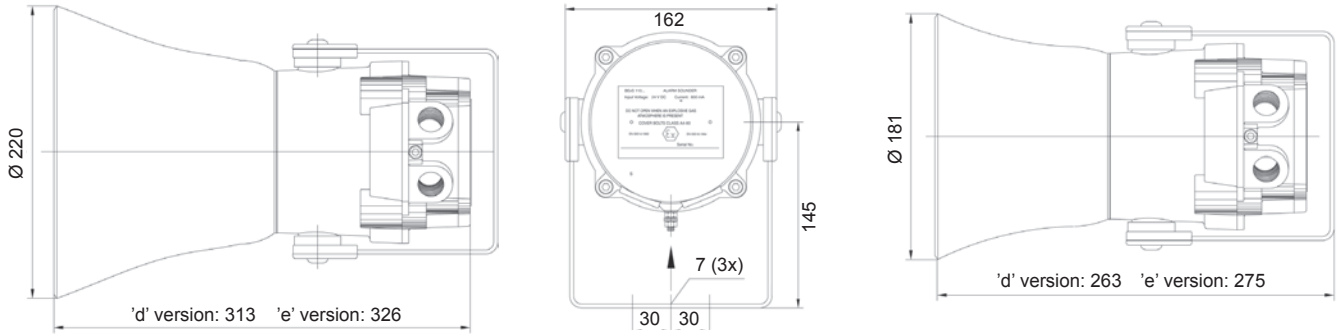
Options / accessories

GOST

IECEx Nr. SIM 04.0001
'd' version BExDS

Dimensions

BEx(D)S 120D/E | **BEx(D)S 110D/E**



Alarm tone table

Basic tone no.	Tones	Stage 2 T2	Stage 3 T3	DIP switch settings 1	2	3	4	5
1	continuous tone 1000 Hz, toxic gas alarm	31	11	0	0	0	0	0
2	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s	17	5	1	0	0	0	0
3	slow whoop 500-1200 Hz, duration 3 s, gap 0.5 s	2	5	0	1	0	0	0
4	sweeping 800 Hz / 1000 Hz, switching frequency 1 Hz	6	5	1	1	0	0	0
5	continuous tone 2400 Hz	3	27	0	0	1	0	0
6	sweeping 2400 Hz / 2900 Hz, switching frequency 7 Hz	7	5	1	0	1	0	0
7	sweeping 2400 Hz / 2900 Hz, switching frequency 1 Hz	10	5	0	1	1	0	0
8	siren 500 / 1200 / 500 Hz, duration 3 s	2	5	1	1	1	0	0
9	sawtooth 1200 Hz / 500 Hz within 1 Hz – DIN-TON, PFEER DIN 33909	15	2	0	0	0	1	0
10	alternating tone 2400 Hz / 2900 Hz, switching frequency 2 Hz	7	5	1	0	0	1	0
11	interrupted tone 1000 Hz, switching frequency 1 Hz, general alarm	31	1	0	1	0	1	0
12	alternating tone 800 Hz / 1000 Hz, switching frequency 0.875 Hz	4	5	1	1	0	1	0
13	interrupted tone 2400 Hz, switching frequency 1 Hz	15	5	0	0	1	1	0
14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap	4	5	1	0	1	1	0
15	continuous tone 800 Hz	2	5	0	1	1	1	0
16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap	18	5	1	1	1	1	0
17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001	2	27	0	0	0	0	1
18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap	2	5	1	0	0	0	1
19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265	2	5	0	1	0	0	1
20	continuous tone 660 Hz	2	5	1	1	0	0	1
21	alternating tone 554 Hz / 440 Hz, switching frequency 1 Hz	2	5	0	0	1	0	1
22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap	2	5	1	0	1	0	1
23	interrupted tone 800 Hz, switching frequency 2 Hz	6	5	0	1	1	0	1
24	sweeping 800 Hz / 1000 Hz, switching frequency 50 Hz	29	5	1	1	1	0	1
25	sweeping 2400 Hz / 2900 Hz, switching frequency 50 Hz	29	5	0	0	0	1	1
26	simulated bell	2	1	1	0	0	1	1
27	continuous tone 554 Hz	26	5	0	1	0	1	1
28	continuous tone 440 Hz	2	5	1	1	0	1	1
29	sweeping 800 Hz / 1000 Hz, switching frequency 7 Hz	7	5	0	0	1	1	1
30	interrupted tone 420 Hz, 0.625 s signal, 0.625 s gap, Australian alert	32	5	1	0	1	1	1
31	sweeping 1200 Hz / 500 Hz, switching frequency 1 Hz, 'prepare to leave platform'	11	1	0	1	1	1	1
32	sweeping 500 Hz / 1200 Hz, 0.375 s signal, 0.375 s gap, switching frequency 15 Hz, Australian evacuation alarm	26	1	1	1	1	1	1

The sounder can be set externally to the respective tones of stage 2 & 3. Tone 2 is preset.

Ordering details

Article numbers	BExS 110D		BExS 110E		BExDS 110D	BExDS 110E
Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	230 V AC
	320 80 10 0 000	320 80 80 0 000	320 82 10 0 000	320 82 80 0 000	320 75 10 0 000	320 85 10 0 000
Article numbers	**BExS 120D**		**BExS 120E**		**BExDS 120D**	**BExDS 120E**
Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC	230 V AC	230 V AC
	320 76 10 0 000	320 76 80 0 000	320 78 10 0 000	320 78 80 0 000	320 89 10 0 000	320 81 10 0 000

Article numbers for other voltages on request

Sounder with speech reproduction 110 dB (A) BExA110 d/e

- text individually programmable without programming device (integrated microphone)
- max. 16 seconds speech reproduction
- 9 different tones (DIN tone), UKOOA/PFEER conformant
- volume control up to 20 dB (A) via potentiometer
- combination of tone/spoken message
- also available as categories 2D & 3D (Zones 21 & 22) for dust zones
- precise definition of alarms and warnings
- low power consumption, hence long alarm using emergency power
- suitable for UPS systems due to 24 V rated voltage
- no PA system required for speech reproduction
- stainless steel mounting bracket for 360° positioning
- protected against pole-reversal
- surface coating has good resistance to most acids, alkalis and oils

r = 56 m
max. signal reception range

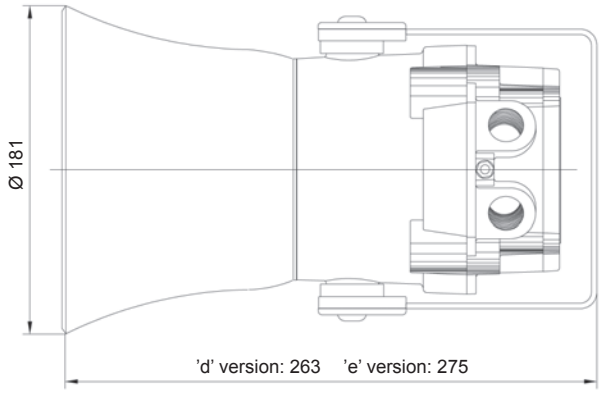
IP 66
IP 67
Protection system

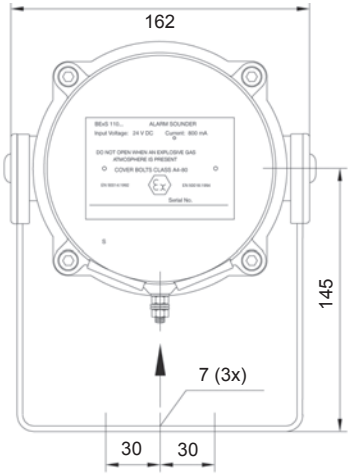
+ 70 °C
- 50 °C
Operating temperature

Electrical data	BExA110 d/e		
Rated voltage	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	± 10 %	± 10 %	± 25 %
Power consumption at maximum volume	45 mA	90 mA	480 mA

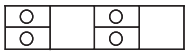
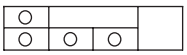
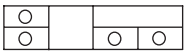
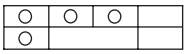
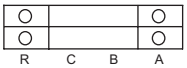
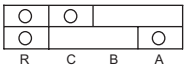
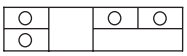
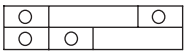
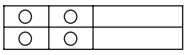
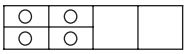
Mechanical data		BExA110 d	BExA110 de
Protection system		IP 67	IP 66
Explosion protection		II 2G Ex d IIC T4 / II 2G EEx de IIC T4 II 2G Ex d IIB T4 / II 2G EEx de IIB T4	
Category (area of use)		2G (Zone 1) 3G (Zone 2)	
Certificate of conformity		KEMA 99 ATEX 7906	
Testing body		KEMA	
Sound pressure level	distance 1 m	110 dB (A) ± 3 dB (A) – speech reproduction 5 dB (A) lower	
Temperature class T		IIC: T4 @ - 50 °C ... + 55 °C Ta IIB: T4 @ - 50 °C ... + 70 °C Ta	
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Duty cycle		100%	
Material	housing	die-cast aluminium LM6, similar RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar to UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black	
Connecting terminals	AC	2 x 1.5 mm²	
	DC	1 x 4 mm² or 2 x 2.5 mm²	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2“ NPT	
Weight	AC	3.4 kg	3.7 kg
	DC	3.2 kg	3.4 kg

Dimensions





Alarm tone table

Stage	Tone & frequency description	Bridge setting for tone selection	Tone length
1	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		4 cycles
2	slow whoop 500-1200 Hz, duration 3 s, gap 0.5 s		2 cycles
3	sawtooth 1200 Hz / 500 Hz within 1 s PAPA		4 cycles
4	alternating tone 544 Hz for 100 ms, 550 Hz for 400 ms		4 cycles
5	continuous tone 1000 Hz, toxic gas alarm		2 seconds
6	simulated bell		2 seconds
7	interrupted tone 1000 Hz, signal 0.5 s, gap 0.5 s, general alarm		3 cycles
8	Australian alert 420 Hz with 0.625 s gap		4 cycles
9	Australian evacuation alarm 500 Hz / 1200 Hz, duration 3.75 s, gap 0.25 s		2 cycles
10	no tone – 0.5 s gap between messages or 2 s pause if 2nd message option is selected		

Ordering details

Article numbers	BExA110 d		BExA110 e	
Rated voltage	230 V AC	24 V DC	230 V AC	24 V DC
	320 86 10 0 000	320 86 80 0 000	320 88 10 0 000	320 88 80 0 000

Options / accessories

GOST

Sounder 105 dB (A) IS-A105N

r = 32 m
max. signal reception range

IP 66
Protection system

+ 60 °C
- 40 °C
Operating temperature

These sounders are used in workplaces where dangerous, explosive atmospheres are to be expected

- free selection of 49 different tones UKOOA/PFEER conformant
- high sound pressure level of 105 dB (A), can be reduced by up to 15 dB (A) via a potentiometer
- up to 2 tones can be selected externally in order to signal different alarms
- works on DC voltages between 10 and 28 Volt DC, rated voltage 24 V DC
- an input protector prevents damage due to incorrect connection without a Zener barrier or galvanic isolation
- can also be used outdoors thanks to housing made of self-extinguishing ABS and IP 66 protection system
- categories 1G, 2G and 3G (Zones 0, 1 and 2)

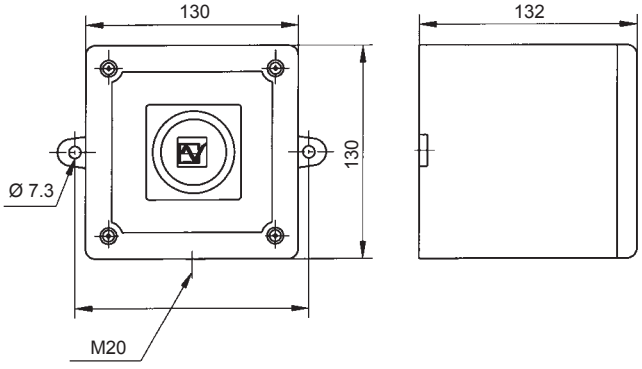
See pages 250 and 251 for suitable zener barriers

Electrical data	IS-A105N
Rated voltage	24 V DC
Operating range	10 V DC – 28 V DC
Nominal current consumption	25 mA (typical for connection to 24 V DC via 28 V / 300 Ω zener barrier)

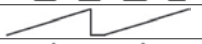
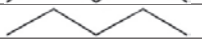
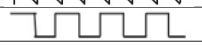
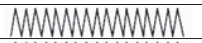
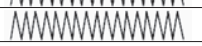
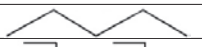
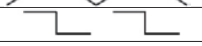
Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 251)

Mechanical data	IS-A105N
Type of protection	'ia' inherently safe
Explosion protection	II 1G Ex ia IIC T4 - 40 °C ... + 60 °C Ta
Category (area of use)	1G (Zone 0) / 2G (Zone 1) / 3G (Zone 2)
Certificate of conformity	SIRA 04 ATEX 2301X
Testing body	SIRA
Sound pressure level microphone distance 1 m	up to 105 dB (A) ± 3 dB (A) can be reduced by up to 15 dB (A) via an internal potentiometer
Tones	49 different tones can be set via DIP switch, of which 2 tones are externally selectable
Storage temperature	- 40 °C … + 70 °C
Relative humidity	90% @ + 50 °C
Duty cycle	100%
Material	ABS self-extinguishing, similar to UL 94 VO
Colour	similar RAL 3000 (flame red), optionally in grey RAL 7038 or white RAL 9010
Connecting terminals	0.5 – 2.5 mm²
Cable entry	20 mm
Weight	0.75 kg

Dimensions



Alarm tone table

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 Hz / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 Hz / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 Hz / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	siren 500 Hz / 1200 Hz / 500 Hz, duration 3 s		tone 2	tone 5
tone 9	sawtooth 1200 Hz / 500 Hz within 1 s		tone 15	tone 2
tone 10	alternating tone 2400 Hz / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 Hz / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 Hz / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 Hz / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 Hz / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 Hz / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	continuous tone 300 Hz		tone 2	tone 5
tone 31	siren 660 Hz / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	2-tone bell sound		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 1 s – Australian evacuation alarm		tone 35	tone 5
tone 37	continuous tone 1000 Hz		tone 9	tone 45
tone 38	continuous tone 2000 Hz		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz		tone 2	tone 5
tone 43	continuous tone 1200 Hz		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz		tone 2	tone 5
tone 45	interrupted tone 1000 Hz, 1 s signal, 1 s gap – general alarm		tone 38	tone 34
tone 46	sawtooth 1200 Hz / 500 Hz within 1 s		tone 47	tone 37
tone 47	interrupted tone 1000 Hz, 1 s signal, 1 s gap – general alarm		tone 46	tone 37
tone 48	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 49	tone 5
tone 49	slow whoop 500-1200 Hz within 1s – Australian evacuation alarm		tone 26	tone 37

Ordering details

Article number	IS-A105N
Rated voltage	24 V DC
	320 33 80 0 000

Manufacturer's declaration

Developed and manufactured in accordance with EN 50014 (general requirements), EN 50020 (intrinsically safety), EMC Directive 89/336/EEC.

IS-Mini series Sounders 100 dB (A)
IS-mA1

- very economical acoustic alarm
- certified for use in Ex-Zones 0, 1 and 2!
- compact design with a diameter of just 88 mm
- sounder operated via certified zener barriers or galvanic isolators
- 49 loud tones at 100 dB (A)
- very well suited for fire alarm systems and direct control due to low power consumption
- self-synchronising sounder for clear tone perception
- 2 different externally controllable tones
- volume control
- also available as mining-certified device (IM1 EEx ia)

See pages 250 and 251 for suitable zener barriers

max. signal reception range

Protection system

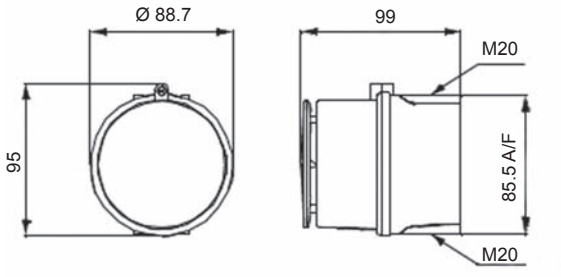
Operating temperature

Electrical data	IS-mA1
Rated voltage	24 V DC
Operating range	16 V – 28 V
Nominal current consumption	25 mA [1]

[1] typical for connection to 24 V DC via 28 V / 300 Ω zener barrier. Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 251)

Mechanical data	IS-mA1
Type of protection	'ia' inherently safe
Explosion protection	II 1G EEx ia IIC T4 - 40 °C ... + 60 °C Ta
Category (area of use)	1G (Zone 0) / 2G (Zone 1) / 3G (Zone 2)
Certificate	SIRA 05 ATEX2084X
Testing body	SIRA
Sound pressure level	100 dB (A)
Sound level reduction	by - 20 dB
Storage temperature	- 40 °C … + 70 °C
Relative humidity	90%
Protection system according to EN 60529	IP 65
Duty cycle	100%
Material	ABS, self-extinguishing UL94VO & 5VA, similar RAL 3000 (flame red)
Connecting terminals	0.5 – 2.5 mm²
Cable entry	2 x M20 (disruption prepared)
Weight	230 g

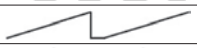
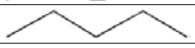
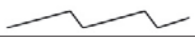
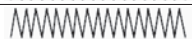
Dimensions



Ordering details

Article numbers	IS-mA1
Rated voltage	24 V DC
	320 34 80 0 000

Alarm tone table

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 Hz / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 Hz / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 Hz / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	siren 500 Hz / 1200 Hz / 500 Hz, duration 3 s		tone 2	tone 5
tone 9	sawtooth 1200 Hz / 500 Hz within 1 s		tone 15	tone 2
tone 10	alternating tone 2400 Hz / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 Hz / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 Hz / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 Hz / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 Hz / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 Hz / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	continuous tone 300 Hz		tone 2	tone 5
tone 31	siren 660 Hz / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	2-tone bell sound		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 1s – Australian evacuation alarm		tone 35	tone 5
tone 37	continuous tone 1000 Hz		tone 9	tone 45
tone 38	continuous tone 2000 Hz		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz		tone 2	tone 5
tone 43	continuous tone 1200 Hz		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz		tone 2	tone 5
tone 45	interrupted tone 1000 Hz, 1 s signal, 1 s gap – general alarm		tone 38	tone 34
tone 46	sawtooth 1200 Hz / 500 Hz within 1 s		tone 47	tone 37
tone 47	interrupted tone 1000 Hz, 1 s signal, 1 s gap – general alarm		tone 46	tone 37
tone 48	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 49	tone 5
tone 49	slow whoop 500-1200 Hz within 1s – Australian evacuation alarm		tone 26	tone 37

Loudspeaker 118 dB (A) E2xL 15

- extremely sturdy and impact-proof
- stainless steel mounting bracket for 360° positioning
- besides ATEX, UL approval for operational areas of class 1, division 2 is also optionally available
- maximum output power 15 Watt

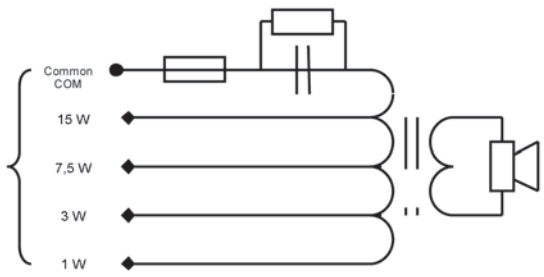
r = 141 m
max. signal reception range

IP 66
IP 67
Protection system

+ 55 °C
- 20 °C
Operating temperature

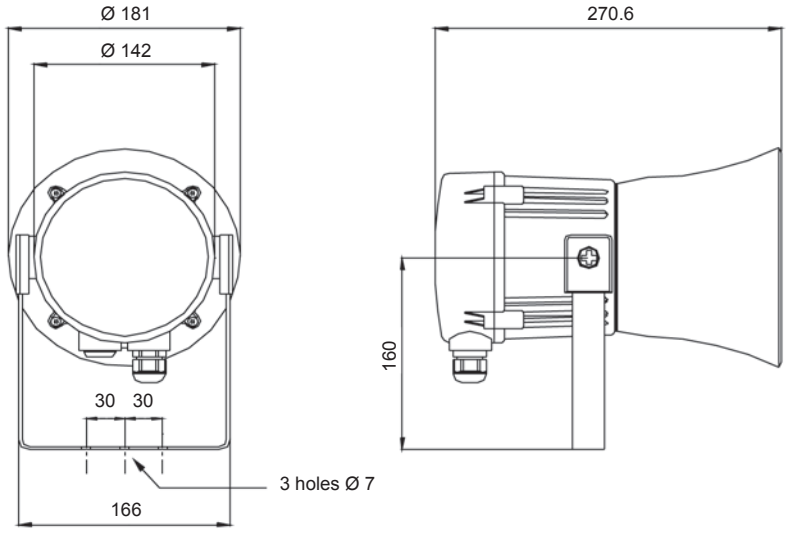
Mechanical data		E2xL 15
Protection system		IP 66, IP 67
Explosion protection		II 3G Ex nA IIC T4
Category (area of use)		3G (Zone 2)
Certificate of conformity		DEMKO 06 ATEX 0421554
Testing body		DEMKO
Sound pressure level	distance 1 m	118 dB (A) ± 3 dB (A) @ 15 W full power
Rated power	RMS	15 W
Transformer	type	70 V power: 15 W / 7.5 W / 3 W / 1 W taps (Z = 336.67 Ω / 653.33 Ω / 1.6 kΩ / 4.9 kΩ) 100 V power: 15 W / 7.5 W / 3 W / 1 W taps (Z = 666.87 Ω / 1.34 kΩ / 3.34 kΩ / 10 kΩ)
Impedance	type	8 Ω or 16 Ω
Dispersion		120° @ 1 kHz / 32° @ 4 kHz
Frequency range		400 Hz – 8,000 Hz
Temperature class T		IIC T4 @ - 20 °C ... + 55 °C Ta
Storage temperature		- 50 °C … + 70 °C
Relative humidity		90%
Material	housing	UL94VO PPS & ABS
Connecting terminals		0.5 ... 2.5 mm²
Cable entry		2 x M20 (with 1 blanking plug), optionally PG13.5 or 1/2“ NPT
Weight	transformer	2.6 kg
	impedance	2.2 kg

Power setting



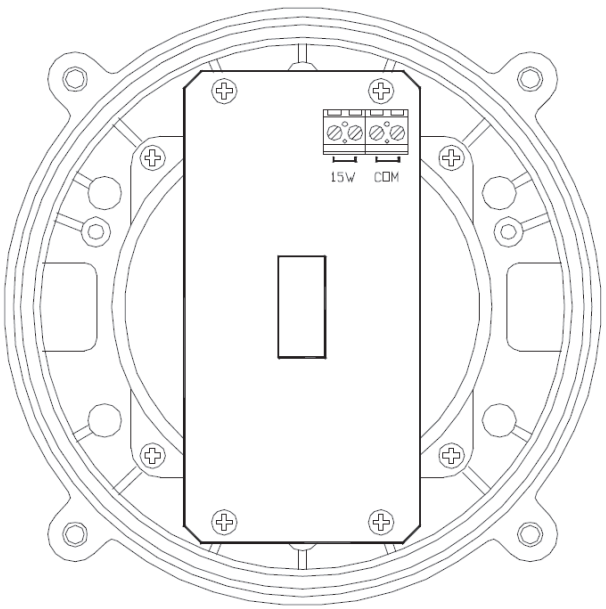
Impedance	E2xL 15 15 W
8 Ω	10.95 V
16 Ω	15.49 V

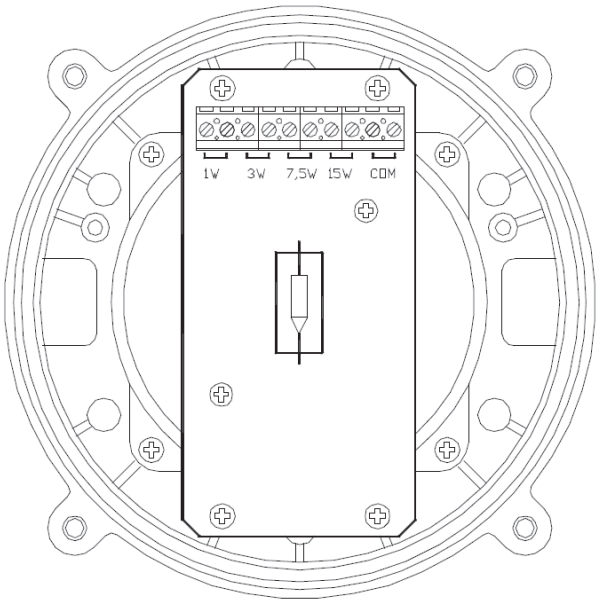
Dimensions



Connection diagrams

8 Ω and 16 Ω version	70 V and 100 V version





Ordering details

Article numbers	E2xL 15
8 Ω	320 92 00 0 910
16 Ω	320 92 00 0 911
100 V transformer	320 92 00 0 912

Options / accessories

c UL us

Loudspeaker 117 dB (A) / 113 dB (A) BExL 25 d/e / BExL 15 d/e

- EEx d IIC T4 / EEx de IIC T4
- KEMA certified
- ATEX approval, optionally IEC and GOST approvals
- housing made of die-cast aluminium LM6, horn ABS
- categories 2G and 3G (Zones 1 and 2)
- also available as category 2D/3D for dust zones 21 and 22
- chromated polyester powder coating, resistant to moisture and salt spray, good resistance to most acids, alkalis and oils

BExL 15

max. signal reception range

BExL 25

max. signal reception range

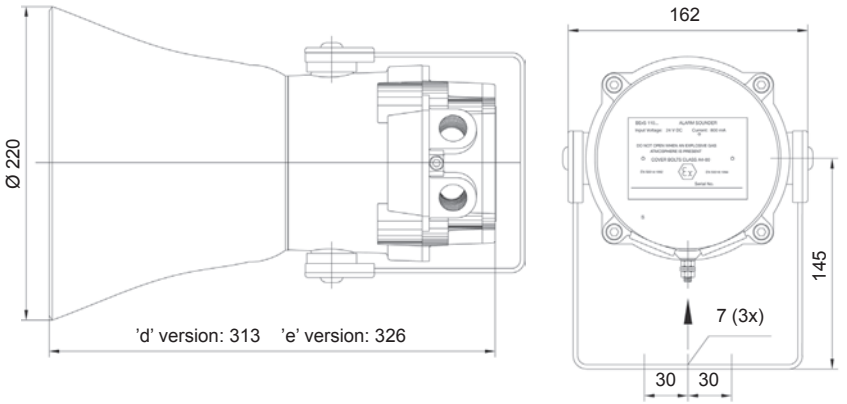
Protection system

Operating temperature

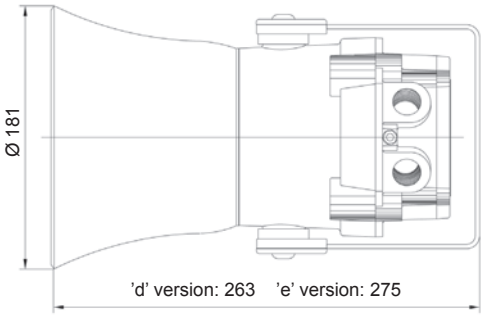
Mechanical data		BExL 25 d/e	BExL 15 d/e
Protection system		'd'= IP 67; or 'e'= IP 66	
Explosion protection		II 2G Ex d IIC T4 / II 2G EEx de IIC T4 II 2G Ex d IIB T4 / II 2G EEx de IIB T4	
Category (area of use)		2G (Zone 1) 3G (Zone 2)	
Certificate of conformity		KEMA 99 ATEX 7906	
Testing body		KEMA	
Sound pressure level	distance 1 m	117 dB (A) ± 3 dB (A) @ 25 W	113 dB (A) ± 3 dB (A) @ 15 W
Rated power	sine wave	25 W	15 W
Transformer	type	100 V power – 25 W / 12.5 W / 6 W / 2 W taps (Z = 400 Ω / 800 Ω / 1.67 kΩ / 5 kΩ)	100 V power – 15 W / 7.5 W / 3 W / 1 W taps (Z = 666.87 Ω / 1.34 kΩ / 3.34 kΩ / 10 kΩ)
Impedance	type	8 Ω or 16 Ω	
Dispersion		130° @ 1 kHz / 32° @ 4 kHz	120° @ 1 kHz / 32°@ 4 kHz
Frequency range		300 Hz – 8,000 Hz	400 Hz – 8,000 Hz
Temperature class T		IIC T4 @ - 50 °C ... + 55 °C Ta IIB T4 @ - 50 °C ... + 70 °C Ta	
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Duty cycle		100%	
Material	housing	die-cast aluminium LM6, similar RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar to UL 94 VO & 5VA FR ABS, Ex II 2GD anti-static ABS, black	
Connecting terminals		1 x 4 mm^2 or 2 x 2.5 mm^2	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2" NPT	
Weight	transformer	'd': 3.95 kg / 'e': 4.21 kg	'd': 3.45 kg / 'e': 3.10 kg
	impedance	'd': 3.56 kg / 'e': 3.82 kg	'd': 3.71 kg / 'e': 3.36 kg

Dimensions

BExL 25 d/e

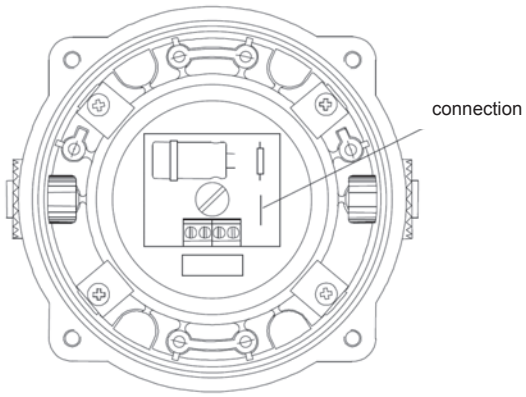


BExL 15 d/e

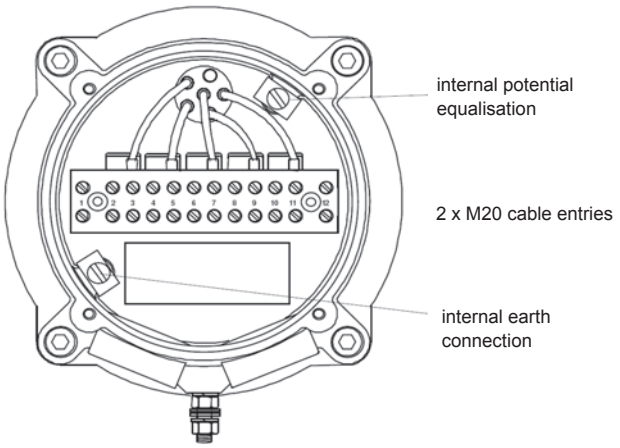


Connection diagrams

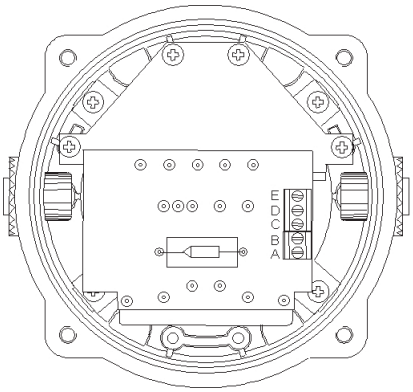
EEx d version 8 Ω and 16 Ω



EEx e Version 8 Ω and 16 Ω



100V version



Connections	BExL 25 d (25 W)	BExL 15 d (15 W)
A–B	25 W	15 W
A–C	12.5 W	7.5 W
A–D	6 W	3 W
A–E	2 W	1 W

Ordering details

Article numbers	BExL 25 d	BExL 25 e	BExL 15 d	BExL 15 e
8 Ω	320 93 00 0 910	320 95 00 0 910	320 97 00 0 910	320 99 00 0 910
16 Ω	320 93 00 0 911	320 95 00 0 911	320 97 00 0 911	320 99 00 0 911
100 V transformer	320 93 00 0 912	320 95 00 0 912	320 97 00 0 912	320 99 00 0 912

Options / accessories

GOST

Sounder/flashing light combination E2xCS 112-05

- combination device for visual and acoustic alarms
- besides ATEX, UL approval for operational areas of class 1, division 2 is also optionally available
- automatic synchronisation or alternating mode of the flashing light
- extremely intensive light reflection due to 5 Joule xenon flash
- 45 different tones, UKOOA/PFEER conformant
- 2 externally controllable tones
- highly resistant to corrosion and suitable for the toughest environments
- adjustable volume
- extremely resistant to shocks and impacts
- stainless steel protective cage and stainless steel mounting bracket for 360° positioning
- can be operated via common or separate voltage supplies

r = 56 m
max. signal reception range

IP 66
IP 67
Protection system

+ 55 °C
- 20 °C
Operating temperature

Electrical data	E2xCS 112-05 sounder			
Rated voltage	230 V AC	120 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10 %	± 10 %	38 V – 58 V	10 V – 30 V
Nominal current consumption	54 mA	104 mA	146 mA	284 mA
Electrical data	**E2xCS 112-05 flashing light**			
Rated voltage	230 V AC	120 V AC	48 V DC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	± 10 %	± 10 %	42 V – 58 V	20 V – 28 V
Nominal current consumption	30 mA	80 mA	145 mA	275 mA

Mechanical data	E2xCS 112-05
Explosion protection	II 3G Ex na nL IIC T2 - 20 °C ... + 55 °C Ta II 3G Ex na nL IIC T3 - 20 °C ... + 40 °C Ta
Category (area of use)	3G (Zone 2)
Certificate of conformity	DEMKO 06 ATEX 0421554
Testing body	DEMKO
Sound pressure level distance 1 m	110 dB (A) ± 3 dB
Flash energy	5 Joules
Flash rate	1 Hz
Lens colours	clear, yellow, amber, red, green, blue
Storage temperature	- 50 °C … + 70 °C
Relative humidity	90%
Protection system according to EN 60529	IP 66, IP 67
Duty cycle	100%
Service life of the flash tube	light emission still 70% after 8,000,000 flashes
Material – lens	borosilicate glass
Material – housing	UL94VO PPS
Material – protective cage and bracket	stainless steel
Connecting terminals	0.5 ... 2.5 mm²
Cable entry	2 x M20 (with 1 blanking plug), optionally PG13.5 or 1/2“ NPT
Weight	AC: 3.5 kg / DC: 3.0 kg

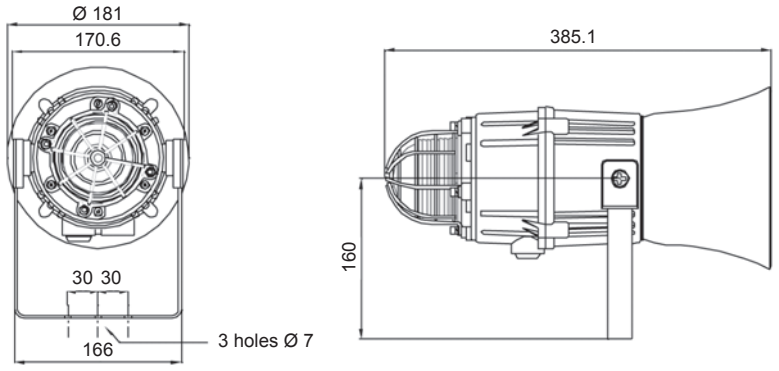
Ordering details

Options / accessories

Article numbers		E2xCS 112-05 ATEX		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
red		320 61 10 5 000	320 61 15 5 000	320 61 80 5 000

Article numbers for other colours on request

Dimensions



Alarm tone table

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 Hz / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 Hz / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 Hz / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	sweeping 500 Hz / 1200 Hz / 500 Hz, switching frequency 0.3 Hz		tone 2	tone 5
tone 9	1200 Hz / 500 Hz, 1 Hz – DIN / PFEER P.T.A.P.		tone 15	tone 2
tone 10	alternating tone 2400 Hz / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 Hz / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 Hz / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 Hz / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 Hz / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 Hz / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	continuous tone 300 Hz		tone 2	tone 5
tone 31	siren 660 Hz / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	2-tone bell sound		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s – Singapore		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 0.375 s, 0.25 s gap		tone 35	tone 5
tone 37	continuous tone 1000 Hz – PFEER toxic gas		tone 9	tone 45
tone 38	continuous tone 2000 Hz		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz		tone 2	tone 5
tone 43	continuous tone 1200 Hz		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz		tone 2	tone 5
tone 45	1000 Hz, 1 s signal, 1 s gap – PFEER general alarm		tone 38	tone 34

Sounder/flashing light combinations BExCS 110-05D, BExDCS 110-05D

- combination devices for visual and acoustic alarms
- stainless steel protective cage and stainless steel mounting bracket for 360° positioning
- extremely intensive light reflection due to 5 Joule xenon flash
- 32 different tones incl. DIN tone, UKOOA/PFEER conformant, 2 externally controllable tones (via plus or minus in DC version) (see page 231 for tone table)
- flashing light and sounder can be controlled separately
- synchronised flash frequency (1 Hz) or alternating flash mode in system operation
- highly resistant to corrosion and suitable for the toughest environments
- adjustable volume (except 12 V DC version)
- flashing light is insensitive to vibration, impact and shock

r = 56 m
max. signal reception range

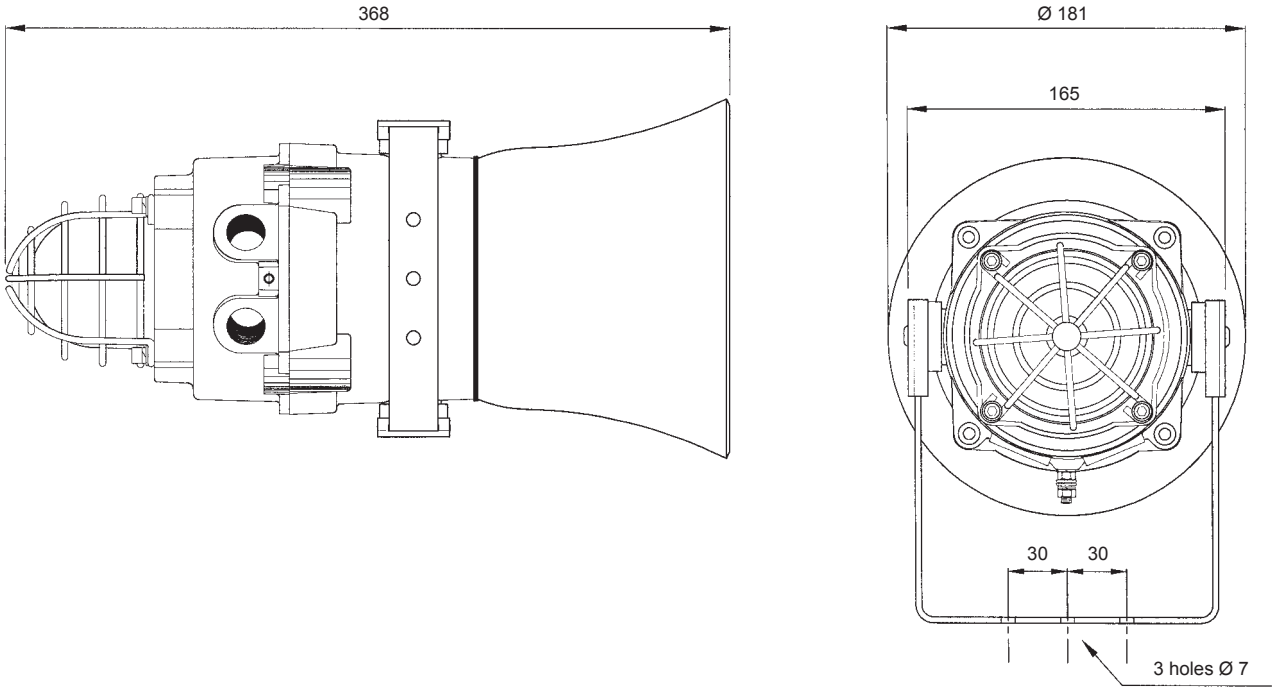
IP 67
Protection system

+ 55 °C
- 50 °C
Operating temperature

Electrical data	BEx(D)CS 110-05D sounder				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	± 25 %	± 25 %	± 25 %
Nominal current consumption	56 mA	110 mA	130 mA	250 mA	195 mA
Electrical data	**BEx(D)CS 110-05D flashing light**				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	42 V – 54 V	20 V – 28 V	10 V – 14 V
Nominal current consumption	55 mA	140 mA	180 mA	270 mA	750 mA

Mechanical data		BExCS 110-05D	BExDCS 110-05D
Explosion protection		II 2G Ex d IIB T4 - 50 °C ... + 55 °C Ta	II 2GD Ex d IIB T4 T100°C
Category (area of use)		2G (Zone 1) 3G (Zone 2)	2G (Zone 1) / 2D (Zone 21) 3G (Zone 2) / 3D (Zone 22)
Certificate of conformity		KEMA 03 ATEX 2545	KEMA 01 ATEX 2223
Testing body		KEMA	KEMA
Sound pressure level		110 dB (A)	
Volume control		- 9 dB	
Flash energy		5 Joules	
Flash rate		approx. 1 Hz = 60 flashes/min.	
Lens colours		clear, yellow, amber, red, green, blue	
Storage temperature		- 50 °C … + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 67	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Material	lens	Glas	
	housing	die-cast aluminium LM6, similar RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar to UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black	
Connecting terminals		0.5 ... 4.0 mm²	
Cable entry		2 / 1 x verschlossen, 1 x offen (M20), optionally PG13.5 or 1/2“ NPT	
Weight	AC version	5.0 kg	
	DC version	4.8 kg	

Dimensions



Ordering details

Article numbers		BExCS 110-05D		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC
red		320 74 10 5 000	320 74 15 5 000	320 74 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected flashing light with the type designation
BExCS 110-05 D, BExDCS 110-05D
has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust

Loudspeaker/flash light combination BExCL 15-05D
Voice sounder/flashing light combination BExCA 110-05D

- combination device for visual and acoustic alarms
- extremely intensive light reflection due to 5 Joule xenon flash
- synchronised flash frequency or alternating flash mode in system operation
- acoustic and visual signal can be controlled separately
- highly resistant to corrosion and suitable for the toughest environments
- adjustable volume
- stainless steel protective cage and stainless steel mounting bracket for 360° positioning

additionally for BExCA 110-05D (see page 232 for technical description)

- 9 different tones
- protected against pole-reversal
- simple recording and saving of messages via built-in microphone (duration 16 seconds)

BExCA: r = 56 m — max. signal reception range

BExCL: r = 79 m — max. signal reception range

IP 67 — Protection system

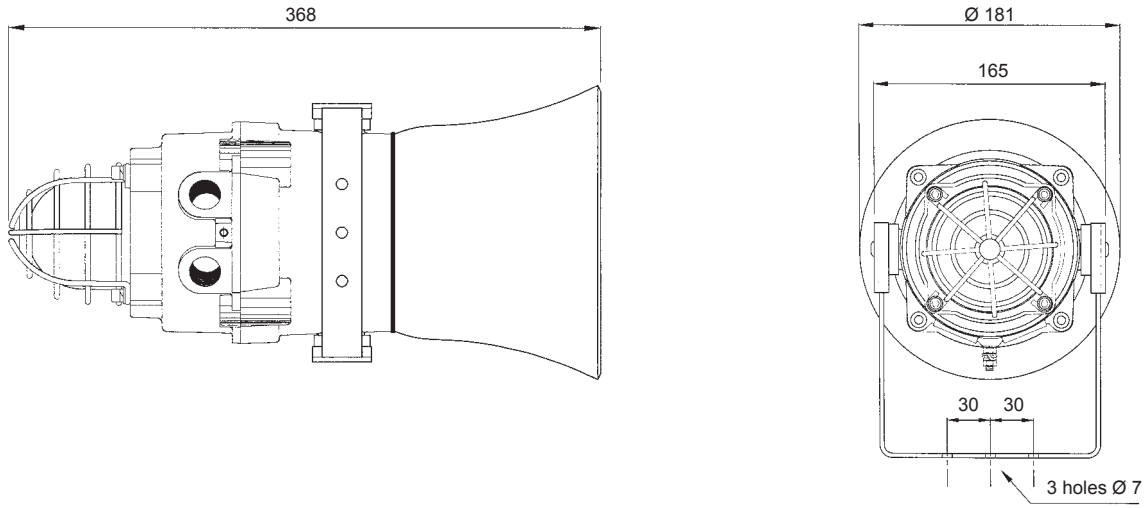
+ 55 °C / - 50 °C — Operating temperature

Electrical data	BExCL 15-05D / BExCA 119-05D flashing light				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz			
Operating range	± 10 %	± 10 %	42 V – 54 V	20 V – 28 V	10 V – 14 V
Nominal current consumption	55 mA	140 mA	180 mA	270 mA	750 mA

Electrical data	BExCA 110-05D voice sounder		
Rated voltage	230 V AC	115 V AC	24 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	
Operating range	± 10 %	± 10 %	± 25 %
Nominal current consumption	45 mA	90 mA	480 mA

Mechanical data		BExCL 15-05D	BExCA 110-05D
Explosion protection		II 2G Ex d IIB T4 / II 2G EEx de IIB T4	II 2G Ex d IIB T4
Category (area of use)		2G (Zone 1) / 3G (Zone 2)	
Certificate of conformity		KEMA 03 ATEX 2545	
Testing body		KEMA	KEMA
Sound pressure level	distance 1 m	113 dB (A) ± 3 dB (A) @ 15 W	110 dB (A) ± 3 dB (A)
Alarm tones			10 tones
Rated power	sine wave	15 W	
Transformer	type	1100 V power – 15 W / 7.5 W / 3 W / 1 W taps (Z = 666.87 Ω / 1.34 kΩ / 3.34 kΩ / 10 kΩ)	
Impedance	type	8 Ω or 16 Ω	
Dispersion		120° @ 1 kHz / 32° @ 4 kHz	
Frequency range		400 Hz – 8,000 Hz	
Flash energy		5 Joules	
Flash rate		approx. 1 Hz	
Lens colours		clear, yellow, amber, red, green, blue	
Temperature class T		IIB: T4 @ - 50 °C ... + 70 °C Ta	
Storage temperature		- 50 °C … + 70 °C	
Protection system according to EN 60529		IP 67	
Duty cycle		100%	
Service life of the flash tube		light emission still 70% after 8,000,000 flashes	
Material	lens	glass	
	housing	die-cast aluminium LM6, RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar to UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS	
Connecting terminals		0.5 ... 4.0 mm²	
Cable entry		2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2“ NPT	
Weight		5 kg	AC: 5.0 kg / DC: 4.8 kg

Dimensions



Alarm tone table BExCA 110-05D

Stage	Tone & frequency description		Tone length
1	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		4 cycles
2	slow whoop 500-1200 Hz, duration 3 s, gap 0.5 s		2 cycles
3	sawtooth 1200 Hz / 500 Hz @ 1Hz –DIN / PFEER P.T.A.P.		4 cycles
4	alternating tone 544 Hz for 100 ms, 440 Hz for 400 ms – NF S 32.001		4 cycles
5	continuous tone 1000 Hz, toxic gas alarm		2 cycles
6	simulated bell		2 cycles
7	interrupted tone 1000 Hz, signal 1 s, gap 1 s, general alarm		3 cycles
8	Australian alert 420 Hz with 0.625 s gap		4 cycles
9	Australian evacuation alarm 500 Hz / 1200 Hz, duration 3.75 s, gap 0.25 s		2 cycles
10	no tone – 0.5 s gap		

Ordering details

Article numbers		BExCL 15-05D	
Lens colour	**Type**	230 V AC	24 V DC
red	**8 Ω**	320 91 10 5 910	320 91 80 5 910
red	**16 Ω**	320 91 10 5 911	320 91 80 5 911
red	**100 V transformer**	320 91 10 5 912	320 91 80 5 912

Article numbers		BExCA 110-05D		
Lens colour	**Rated voltage**	230 V AC	115 V AC	24 V DC
red		320 71 10 5 000	320 71 15 5 000	320 71 80 5 000

Article numbers for other colours and voltages on request

Options / accessories

GOST

Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation
BExCL 150-05 D, BExCA 110-05D
has been developed and manufactured in accordance with section 5.1.2 of EN 50014.

This declaration is based on compliance with the following regulations and standards:

94/9/EG	CE conformity
EN 50014	Electrical equipment for areas at risk of explosions – General requirements
EN 50018	Pressure-resistant encapsulation 'd'
EN 50281-1-1	Electrical equipment for use in areas with combustible dust

LED blinking light/sounder combination IS-Mini series IS-mC1

- very economical visual and acoustic alarm
- certified for use in Ex-Zones 0, 1 and 2!
- compact design with a diameter of just 88 mm
- alarm operated via certified zener barriers or galvanic isolators
- 49 loud tones at 100 dB (A); super-bright LEDs in red, green, blue and yellow/amber for all applications
- volume control
- can be operated as combination unit or separately
- very well suited for fire alarm systems and direct control due to low power consumption
- self-synchronising sounder for clear tone perception
- 2 different externally controllable tones

See pages 250 and 251 for suitable zener barriers

r = 18 m
max. signal reception range

IP 65
Protection system

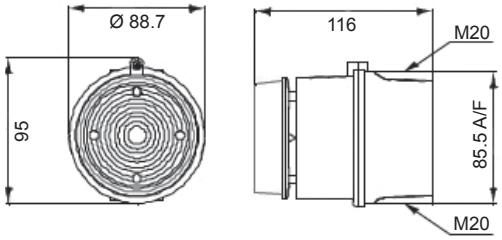
+ 60 °C
- 40 °C
Operating temperature

Electrical data	IS-mC1
Rated voltage	24 V DC
Operating range	16 V – 28 V
Nominal current consumption	48 mA [1]

[1] typical for connection to 24 V DC via 28 V / 300 Ω zener barrier. Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 251)

Mechanical data		IS-mC1
Type of protection		'ia' inherently safe
Explosion protection		II 1G Ex ia IIC T4 - 40 °C ... + 60 °C Ta
Category (area of use)		1G (Zone 0) / 2G (Zone 1) / 3G (Zone 2)
Certificate / testing body		SIRA 05 ATEX2084X / SIRA
Sound pressure level		100 dB (A)
Sound level reduction		by - 20 dB
Flash rate		can be set to 2 Hz or 1 Hz
Lens colour		clear, with red, yellow/amber, blue or green LEDs
Storage temperature		- 40 °C … + 70 °C
Relative humidity		90%
Protection system according to EN 60529		IP 65
Duty cycle		100%
Material	lens	polycarbonate (PC)
	housing	ABS, self-extinguishing UL94VO & 5VA, similar RAL 3000 (flame red)
Connecting terminals		0.5 – 2.5 mm²
Cable entry		2 x M20 (disruption prepared)
Weight		280 g

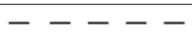
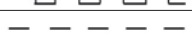
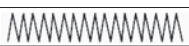
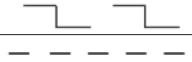
Dimensions



Ordering details

Article numbers		IS-mC1	Article numbers		IS-mC1
Colour LED	Rated voltage	24 V DC	Colour LED	Rated voltage	24 V DC
yellow/amber		320 35 80 4 000	green		320 35 80 6 000
red		320 35 80 5 000	blue		320 35 80 7 000

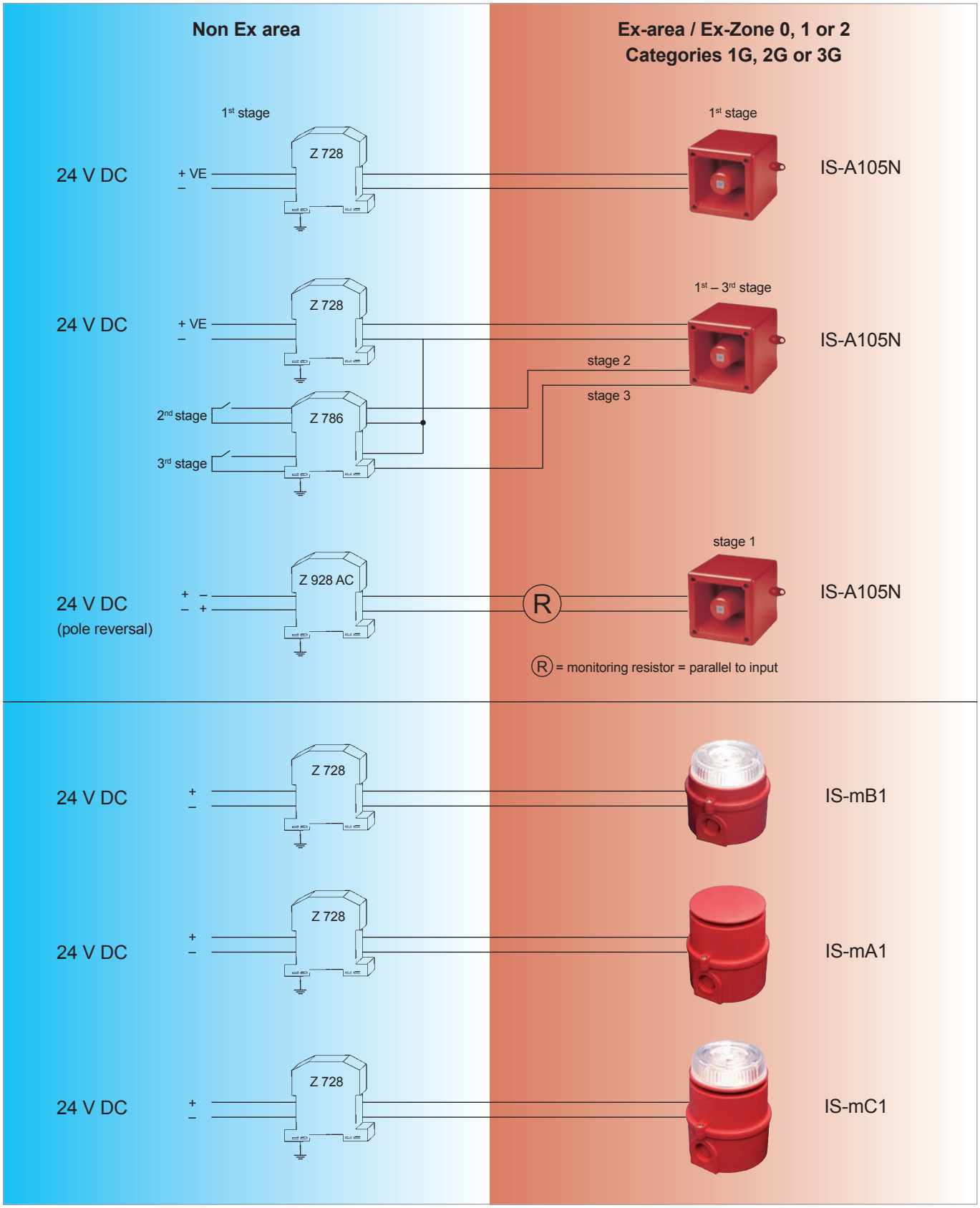
Alarm tone table

Stage 1	Description - Frequency		Stage 2	Stage 3
tone 1	continuous tone 340 Hz		tone 2	tone 5
tone 2	alternating tone 800 Hz / 1000 Hz, alternation every 0.25 s		tone 17	tone 5
tone 3	slow whoop 500-1200 Hz, switching frequency 0.3 Hz, 0.5 s		tone 2	tone 5
tone 4	sweeping 800 Hz / 1000 Hz, switching frequency 1 Hz		tone 6	tone 5
tone 5	continuous tone 2400 Hz		tone 3	tone 20
tone 6	sweeping 2400 Hz / 2900 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 7	sweeping 2400 Hz / 2900 Hz, switching frequency 1 Hz		tone 10	tone 5
tone 8	siren 500 Hz / 1200 Hz / 500 Hz, duration 3 s		tone 2	tone 5
tone 9	sawtooth 1200 Hz / 500 Hz within 1 s		tone 15	tone 2
tone 10	alternating tone 2400 Hz / 2900 Hz, switching frequency 2 Hz		tone 7	tone 5
tone 11	interrupted tone 1000 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 12	alternating tone 800 Hz / 1000 Hz, switching frequency 0.875 Hz		tone 4	tone 5
tone 13	interrupted tone 2400 Hz, switching frequency 1 Hz		tone 15	tone 5
tone 14	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 4	tone 5
tone 15	continuous tone 800 Hz		tone 2	tone 5
tone 16	interrupted tone 660 Hz, 150 ms signal, 150 ms gap		tone 18	tone 5
tone 17	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 2	tone 27
tone 18	interrupted tone 660 Hz, 1.8 s signal, 1.8 s gap		tone 2	tone 5
tone 19	sweeping 1400 Hz –1600 Hz rising 1 s, falling 0.5 s – NF C 48-265		tone 2	tone 5
tone 20	continuous tone 660 Hz		tone 2	tone 5
tone 21	alternating tone 554 Hz / 440 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 22	interrupted tone 544 Hz, 0.875 s signal, 0.875 s gap		tone 2	tone 5
tone 23	interrupted tone 800 Hz, switching frequency 2 Hz		tone 6	tone 5
tone 24	sweeping 800 Hz / 1000 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 25	sweeping 2400 Hz / 2900 Hz, switching frequency 50 Hz		tone 29	tone 5
tone 26	simulated bell		tone 2	tone 15
tone 27	continuous tone 554 Hz		tone 26	tone 5
tone 28	continuous tone 440 Hz		tone 2	tone 5
tone 29	sweeping 800 Hz / 1000 Hz, switching frequency 7 Hz		tone 7	tone 5
tone 30	continuous tone 300 Hz		tone 2	tone 5
tone 31	siren 660 Hz / 1200 Hz, switching frequency 1 Hz		tone 26	tone 5
tone 32	2-tone bell sound		tone 26	tone 15
tone 33	interrupted tone 745 Hz, switching frequency 1 Hz		tone 2	tone 5
tone 34	alternating tone 1000 Hz / 2000 Hz, alternation every 0.5 s		tone 38	tone 45
tone 35	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 36	tone 5
tone 36	slow whoop 500-1200 Hz within 1s – Australian evacuation alarm		tone 35	tone 5
tone 37	continuous tone 1000 Hz		tone 9	tone 45
tone 38	continuous tone 2000 Hz		tone 34	tone 45
tone 39	interrupted tone 800 Hz, 0.25 s signal, 1 s gap		tone 23	tone 17
tone 40	alternating tone 544 Hz (100 ms) / 440 Hz (400 ms) – NF S 32-001		tone 31	tone 27
tone 41	motor siren, slowly rising to 1200 Hz		tone 2	tone 5
tone 42	motor siren, slowly rising to 800 Hz		tone 2	tone 5
tone 43	continuous tone 1200 Hz		tone 2	tone 5
tone 44	motor siren, slowly rising to 2400 Hz		tone 2	tone 5
tone 45	interrupted tone 1000 Hz, 1 s signal, 1 s gap – general alarm		tone 38	tone 34
tone 46	sawtooth 1200 Hz / 500 Hz within 1 s		tone 47	tone 37
tone 47	interrupted tone 1000 Hz, 1 s signal, 1 s gap – general alarm		tone 46	tone 37
tone 48	interrupted tone 420 Hz, every 0.625 s – Australian alert		tone 49	tone 5
tone 49	slow whoop 500-1200 Hz within 1s – Australian evacuation alarm		tone 26	tone 37

Accessories

Zener barriers

Combination possibilities: Zener barrier, IS-A105N sounder and IS-Mini series alarm



Technical data for Zener barriers

Type	Version	Rated data		Ex characteristic values for (Eex ia) IIC							Technichal data			
		V	Ω	U_z (V)	R_{min} (Ω)	I_k (I_0) (mA)	P_{max} (W)	C_{max} (µF)	L_{max} (mH)	L/R Ratio	max. lon-gitudinal resistance (Ω)	U in at 10 µA (V)	U in max. (V)	rated safety current (mA)
Z 728	Zener barrier + Ve BAS 01 ATEX 7005	28	300	28	301	93	0.65	0.083	3.05	56	327	26.5	28.0	50
Z 928	Zener barrier AC BAS 01 ATEX 7005	28	300	28	301	93	0.65	0.083	3.05	56	327	26.0	27.6	50
Z 786	Diode barrier BAS 01 ATEX 7005	28	Diode A1 A2 B	28 28 28	– – –	– – –	– – –	0.083 0.083 0.083	– – –	– – –	36 + 0.9 V 36 + 0.9 V –	26.5 26.5 –	28.0 28.0 –	50 50 –

Note: A1 and A2 - separate channels, B - two channels connected in parallel with ground connection

Mechanical data

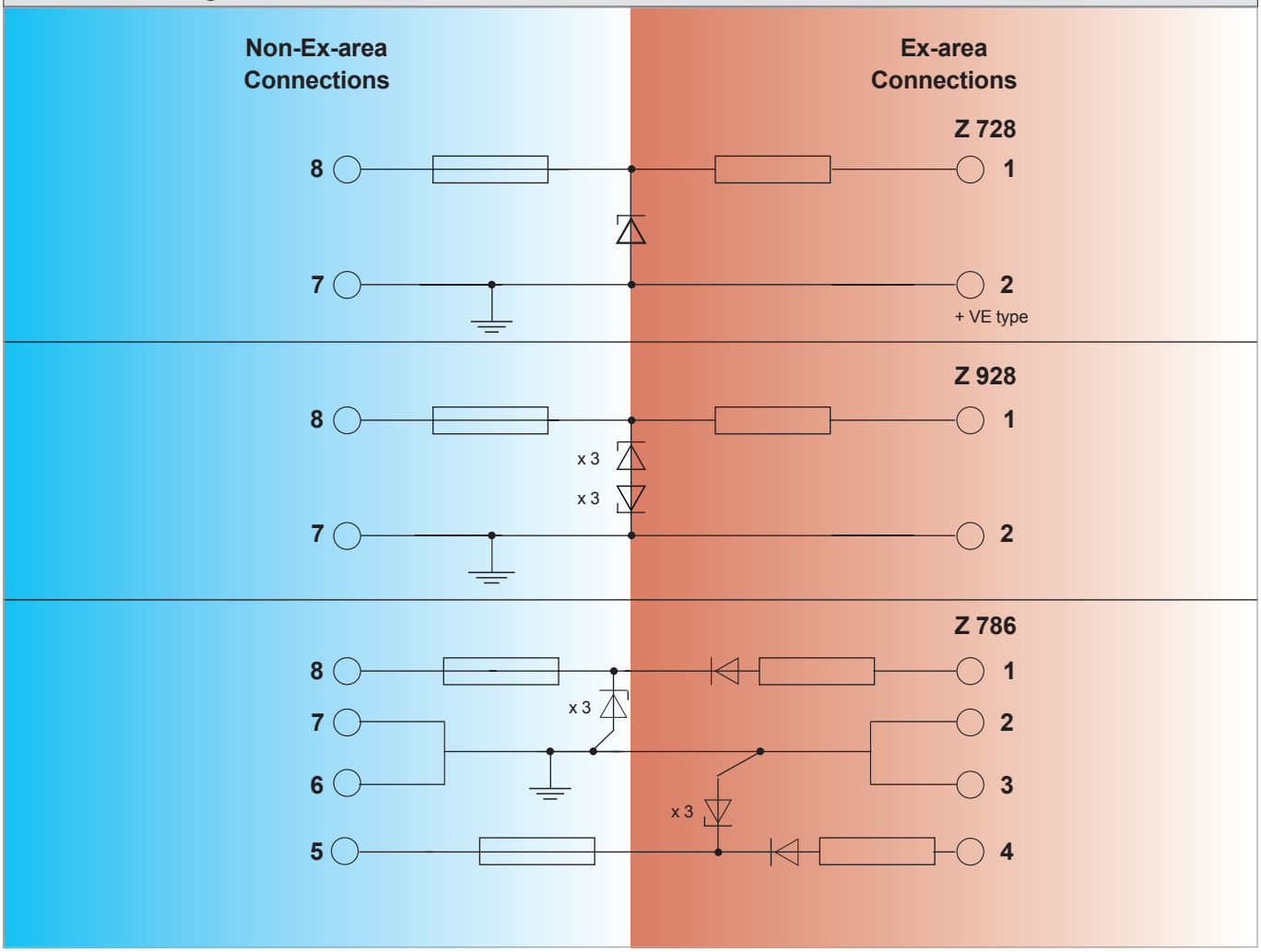
Design		terminal housing made of makrolon, flammability class UL 94 V-0
Height x Width x Depth	mm	110 x 12.5 x 115
Mounting		snap fitting to 35 mm DIN rail conforming to DIN EN 50022
Connection		self-opening apparatus terminals; max. wire cross-section 2 x 2.5mm²
Ambient temperature		- 20 °C … + 60 °C

Ordering details

Article numbers

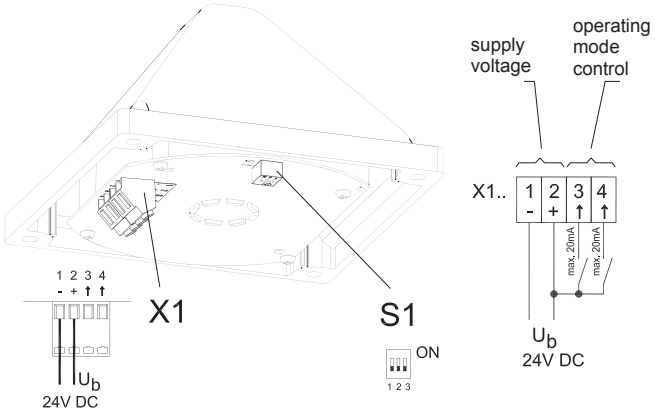
Type	Z 728 + Ve	Z 928 AC	Z 786 Diode
	381 09 80 0 000	381 09 30 0 000	381 09 80 0 001

Block circuit diagrams



Connection diagrams

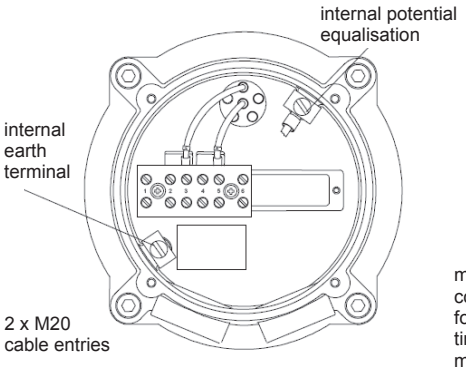
Quadro-LED Flex-3G/3D



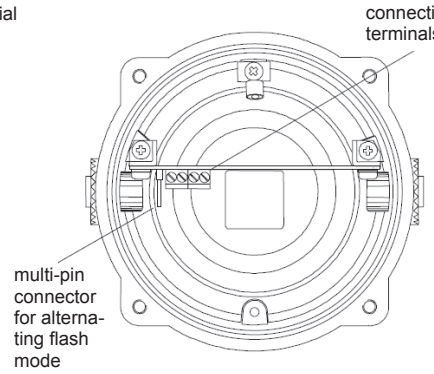
CWB-ATEX

on request!

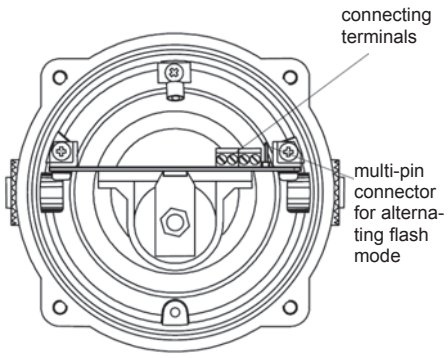
BExBG15 / BExBG 10 / BExBG 05 EEx e version



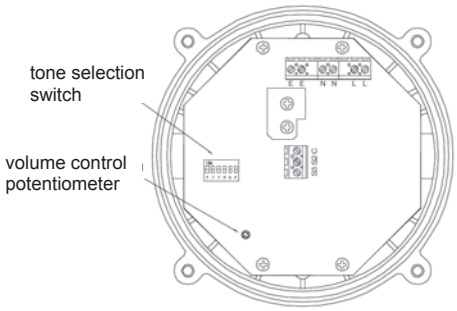
BExBG 05 EEx d version



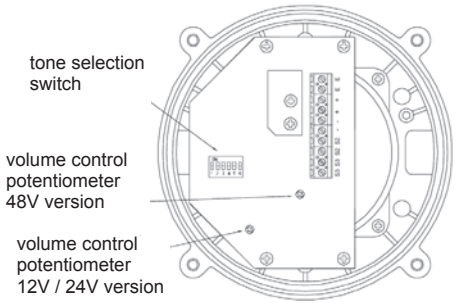
BExBG15 / BExBG 10 EEx d version



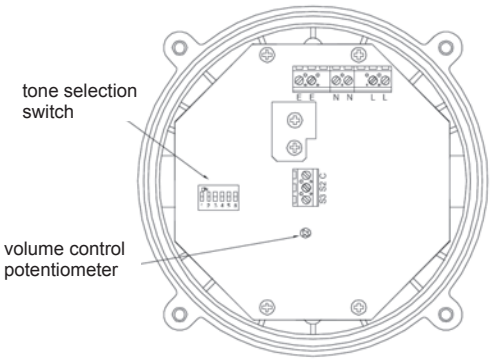
E2xS 112 AC version



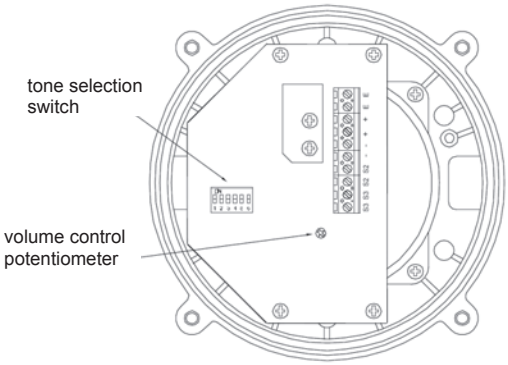
E2xS 112 DC version



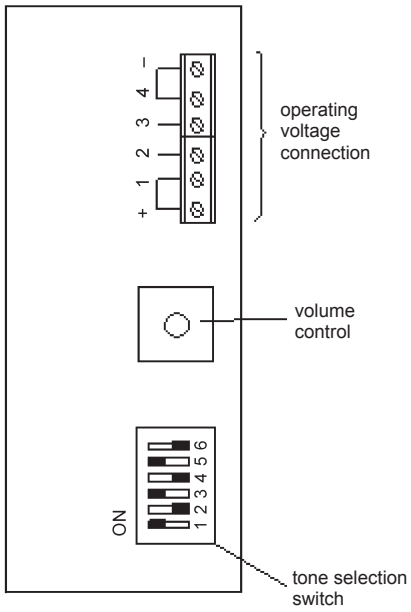
E2xS 121 AC version



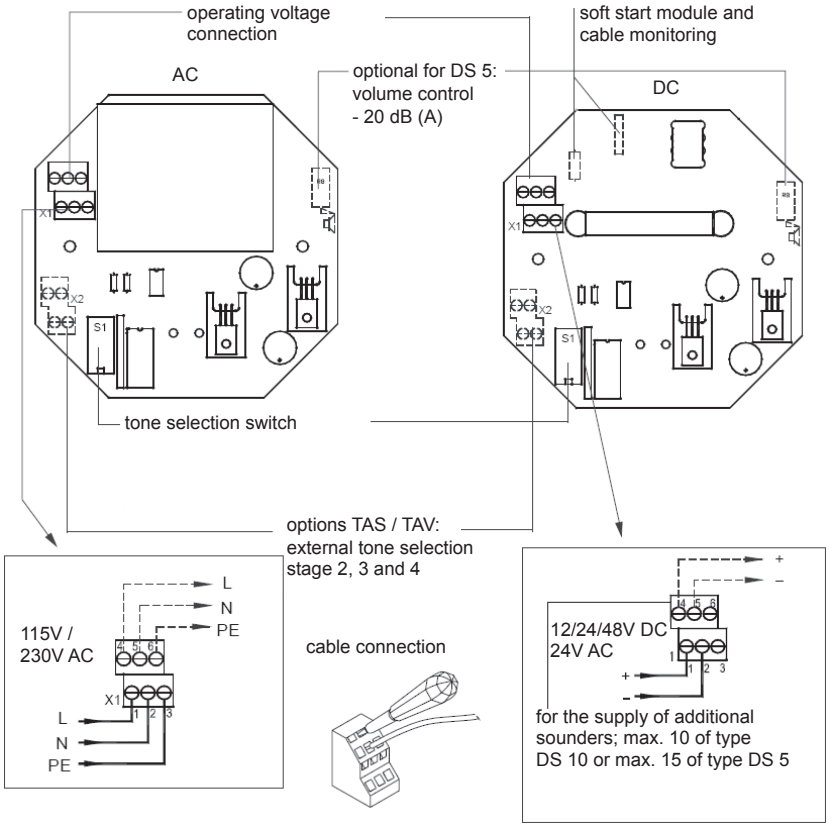
E2xS 121 DC version



IS-A105N

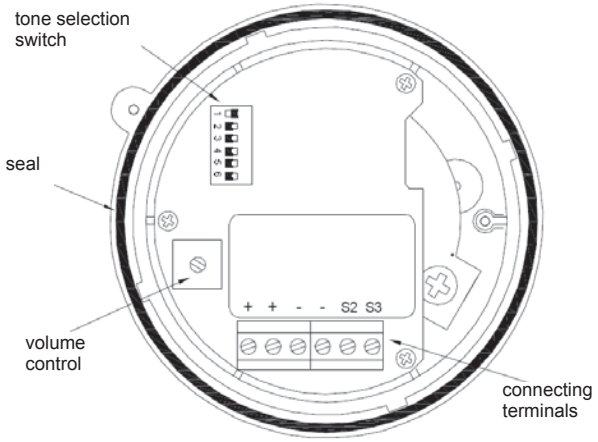


DS 5 3G/3D / DS 10 3G/3D AC version

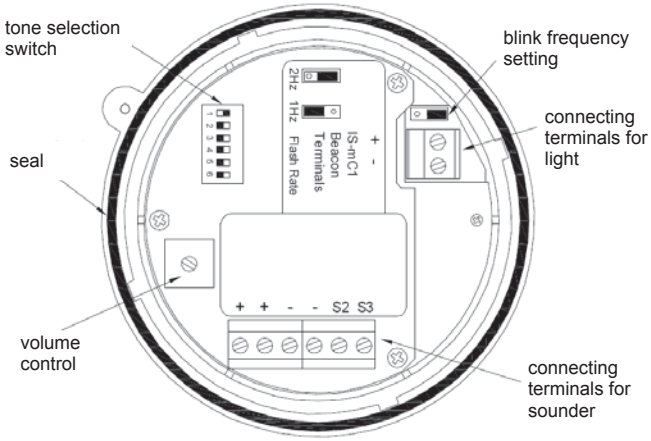


DS 5 3G/3D / DS 10 3G/3D DC version

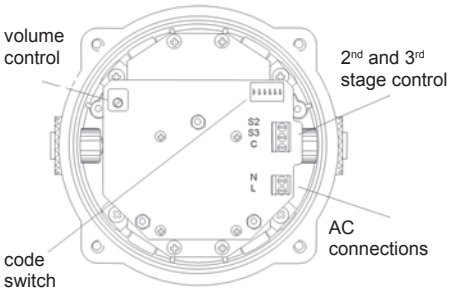
IS-mA1



IS-mC1



BExS 110d AC version



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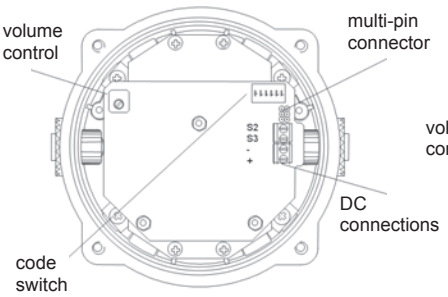

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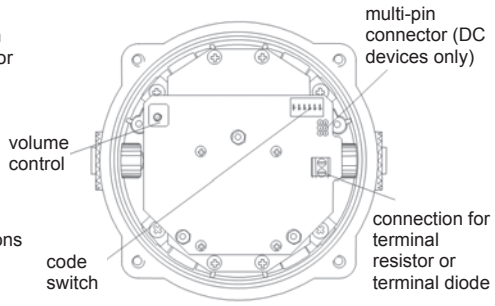

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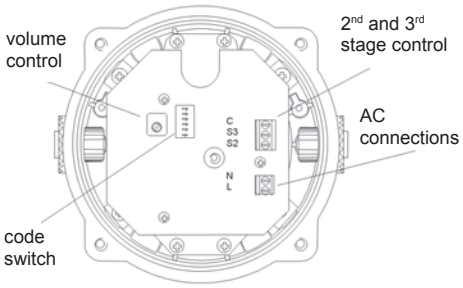

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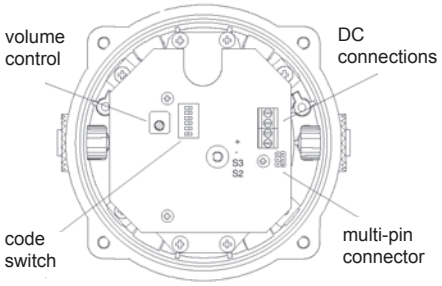

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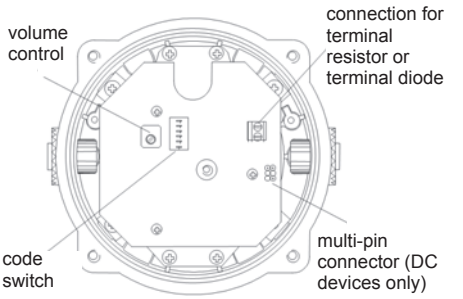
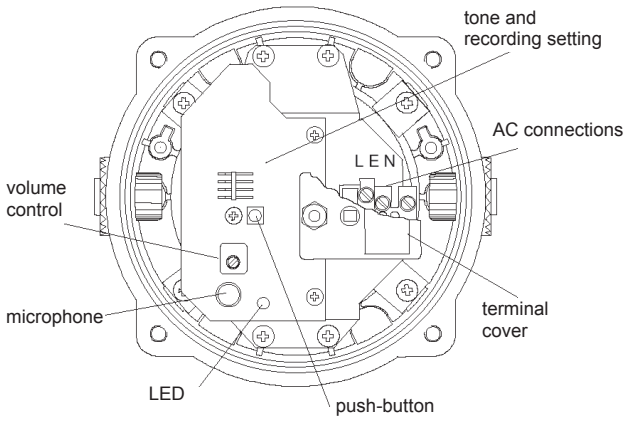


BExA 110 AC version



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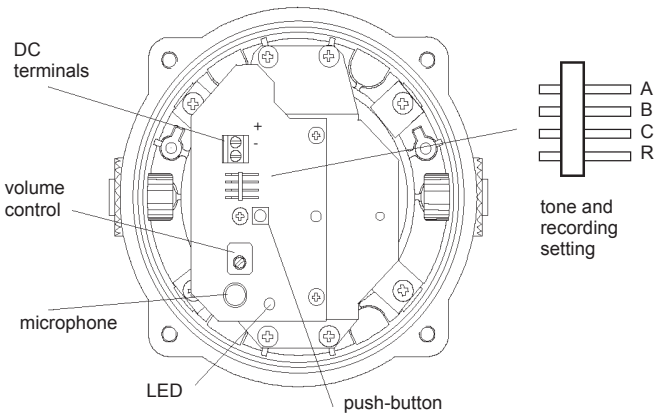
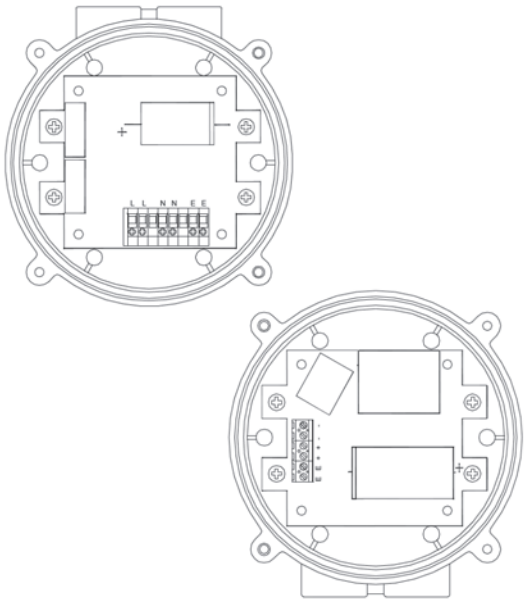
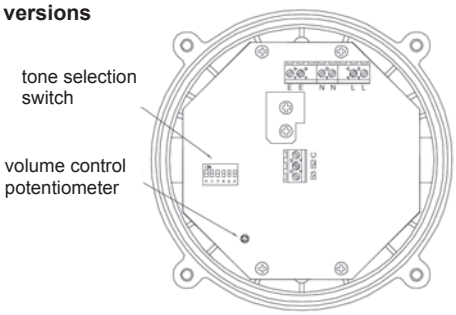


E2xCS 112-05 flashing light

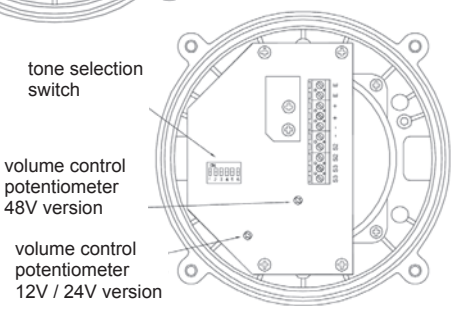


E2xCS 112-05 sounder

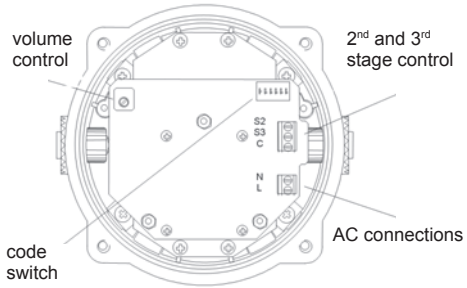
AC versions



DC versions



BExCS 110-05D sounder AC version



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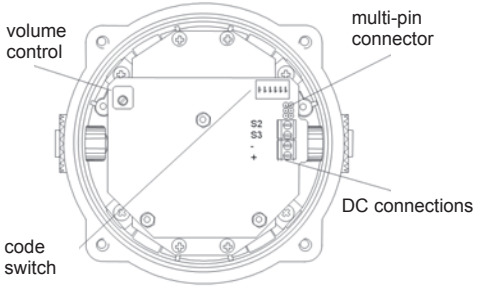
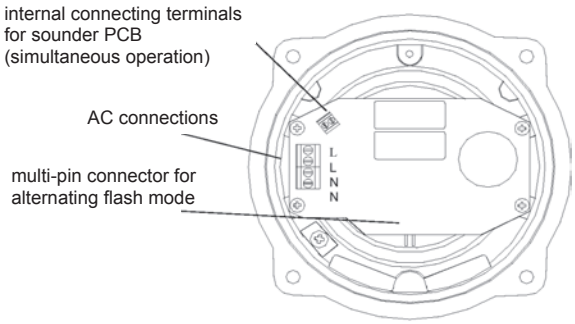
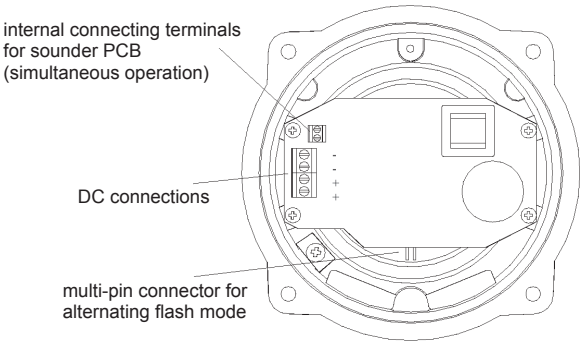


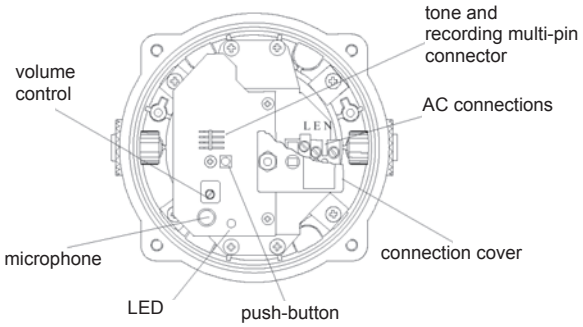
BExCS 110-05D / BExCA 110-05D flashing light



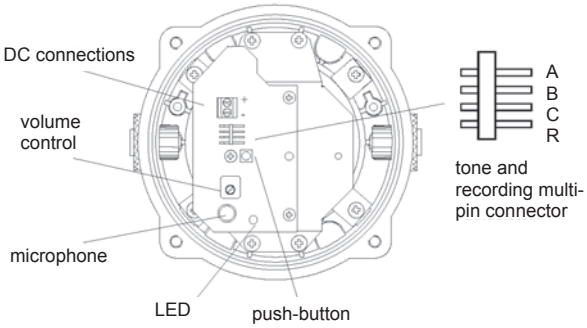


BExCA 110-05D sounder

AC versions

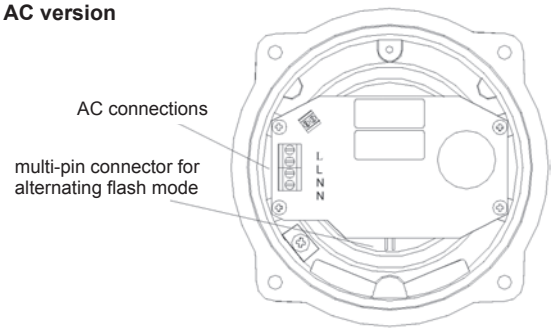


DC versions

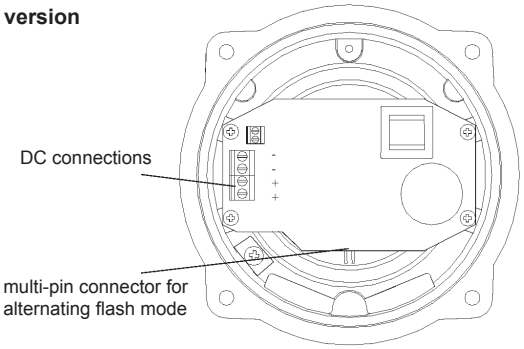


BExCL 15-05D flashing light

AC version

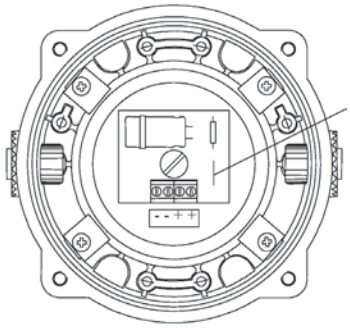


DC version

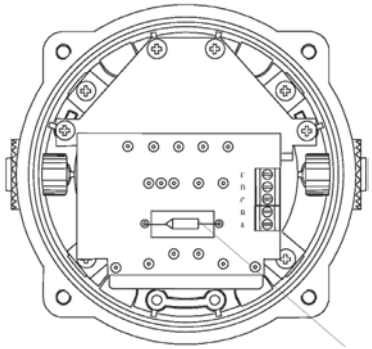


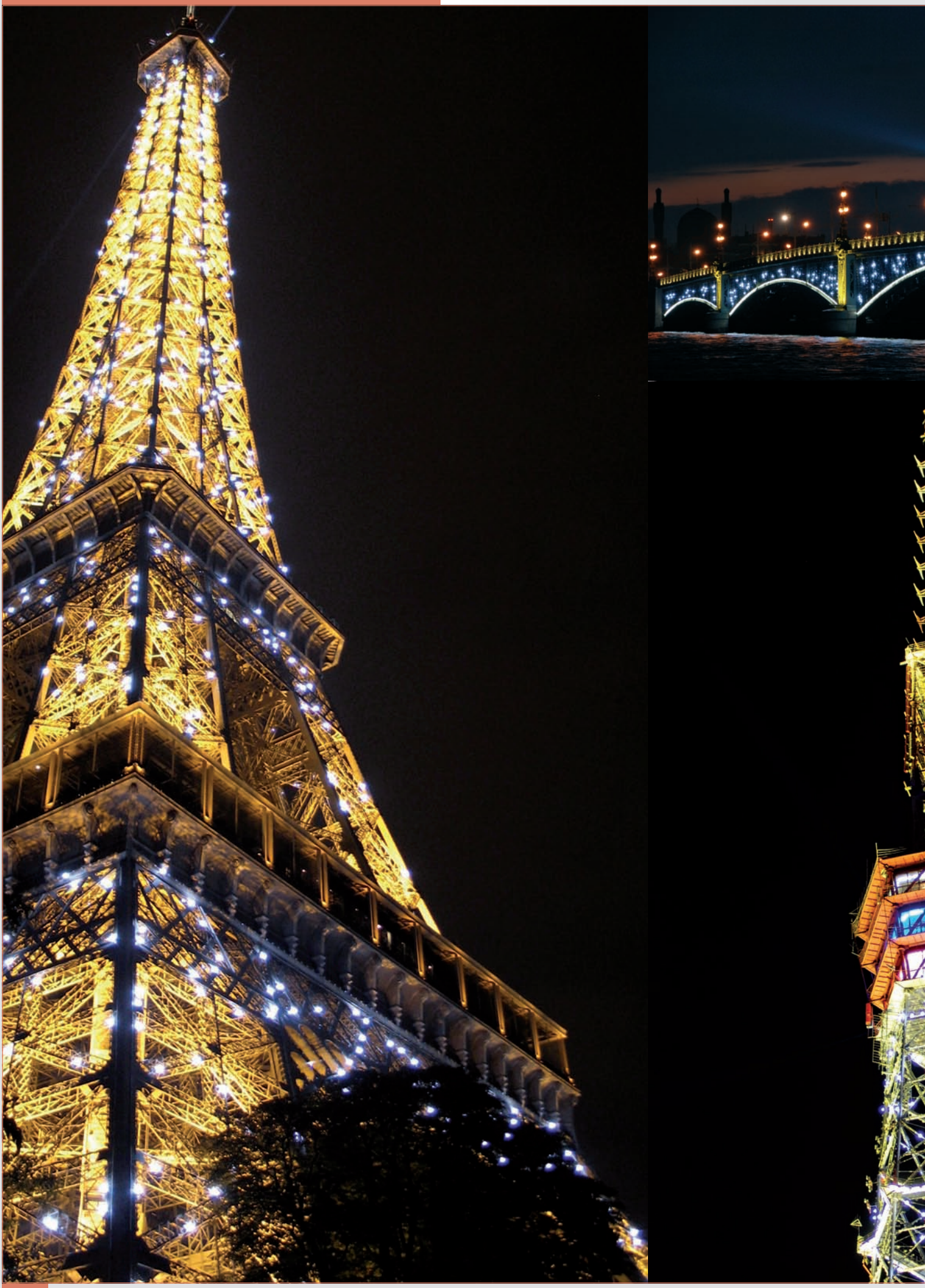
BExCL 15-05D loudspeaker

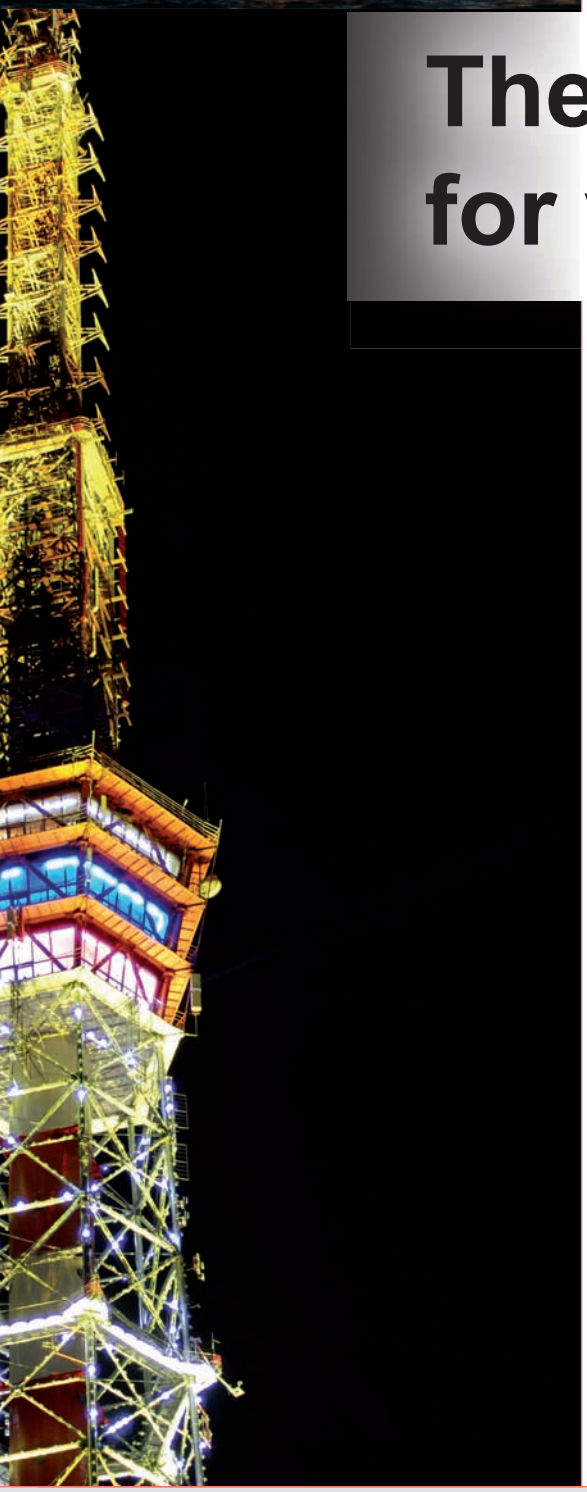
8 Ω / 16 Ω version



100 V version







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Benefit from our know-how in the field of light architecture

Illumination is naturally also technology. In its purest form, however, it is much more. Namely art. Or, to put it better: a real philosophy, because with light, you can take your building into a completely new dimension.

That is what makes perfect illumination an ideal image tool. Present your building or structure in the right light. You can see for yourself how that looks in Paris, for example, where we illuminated a famous tower by a certain Gustave Eiffel, or in St. Petersburg, where the TV Tower and Trinity Bridge (Troitskiy-Most) are lit up by 9,500 Pfannenberg flashing lights.

ART ILLUMINATION

A completely different side of Pfannenberg: art illumination.

The beauty of the application and the durability and sturdiness of Pfannenberg flashing lights are the driving forces here. Let yourself be captivated by a few selected examples of Pfannenberg's artistic side.

Quadro R-ST

In June 2008, St. Petersburg became the scene of a fantastic art illumination installation. The TV Tower and the Trinity Bridge were illuminated as part of the International Economic Forum.

The project, which was based on the unique illumination of the Eiffel Tower in Paris, was carried out by a local company under the auspices of the city authorities. 9,500 Pfannenberg Quadro R-ST flashing lights were used for the project, selected because of their sturdy design that guarantees a long service life under adverse conditions.

St. Petersburg, Russia
TV Tower and Trinity Bridge



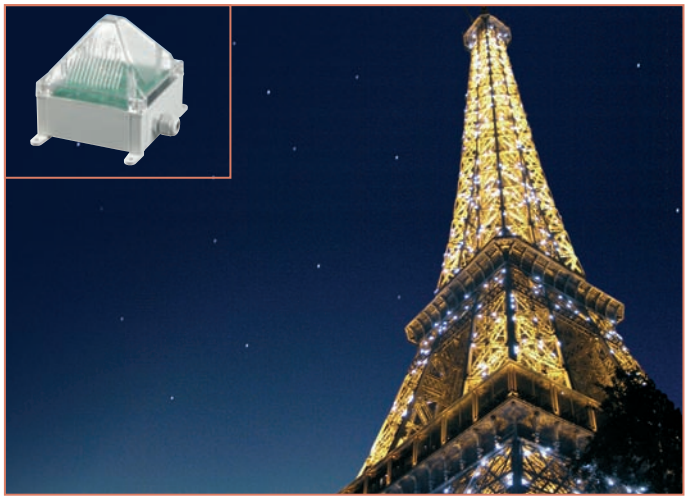


Quadro R

Pfannenberg put the Eiffel Tower back in the spotlight on 21 June 2003. Millions of people all over the world have admired the flashing lights that illuminate one of the most famous landmarks in the world.

20,000 flashing lights, specially manufactured by Pfannenberg GmbH, were installed by experienced mountaineers in order to light up the Eiffel Tower.

Each light has a service life of at least 10 years and can light up over 10 million times during that time. Thanks to their special design, they withstand summer and winter, storm and hail and illuminate the Eiffel Tower daily between 7 pm and midnight every hour on the hour for 10 minutes, as well as on special occasions.



Paris, France
Eiffel Tower

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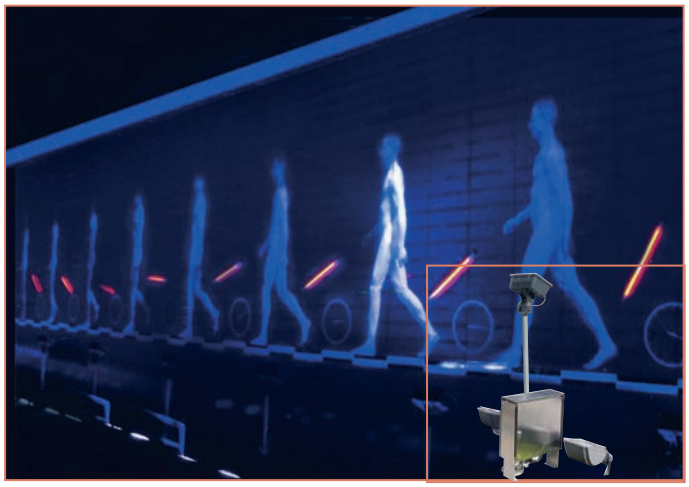
PSL 060

At the Expo 2000, the façade of the French Pavilion was turned into a spectacular eye-catcher. Etienne Jules Meray's photo 'The Walking Man', taken in 1880, was recreated as a large, moving light construction in keeping with the exhibition's slogan: 'Transport, Mobility and Movement'.

The 26 steps of the movement were illuminated in quick succession by Pfannenberg flashing lights. Like in a film, the lights ran along the 100 metre long walkway in 2 seconds and brought the man to life, day and night.



Hanover, Germany
Expo 2000

AB-PN

Pfannenberg's extremely bright and extremely strong flashing lights were used to illuminate the Pont de Normandie.

The frequencies of the flashing lights can be programmed in various stages and the light sequences adjust themselves to the level of traffic on the bridge: a lot of traffic – fast sequences, little traffic – slow sequences.

Due to the varying light sequences, the light installation has become a real attraction that draws in and captivates tourists.

Le Havre - Honfleur, France
Pont de Normandie

Quadro R-ST

In honour of the Sino-European Economic Conference in Hamburg in 2004, the organisers wanted to create a special accent and had the Council House lit up in blue. As the icing on the cake, the tower was lit by Pfannenberg Eiffel Tower flashing lights, thus captivating the observers with the famous Champagne sparkle.

Many citizens and visitors described the project, which could be seen from afar, as innovative and, as the light artist Michael Batz, who arranged the lights, said: "on a par with large cities such as Paris or New York".

Hamburg, Germany
Council House

Flashing lights 10 Joules
Quadro R / Quadro R-ST / Quadro A-DMX

Quadro R
- art illumination inside and outside buildings, even under the toughest of conditions
- with instant sparkling effect

Quadro R-ST (additional)
- equipped with industrial plug connectors for simple mounting
- one plug connector each for input and output, thus the devices can be connected in a row

Quadro A-DMX
- DMX-Controller for the individual controlling of each individual light in the system by means of a DMX-Bus system
- can be directly controlled by means of the standard DMX-Master
- rugged plug connectors for power supply and DMX-Bus (inlet and outlet)

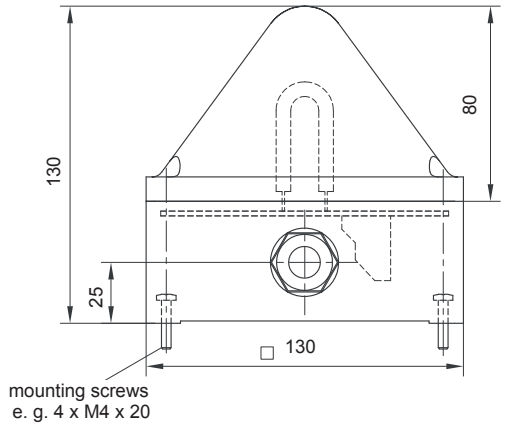
IP 66	IP 67	IK 08	+ 55 °C / - 25 °C	+ 60 °C / - 30 °C	I lim t
Protection system	Protection system	Impact-proof housing	Operating temperature	Operating temperature (Quadro A-DMX)	Quadro A-DMX

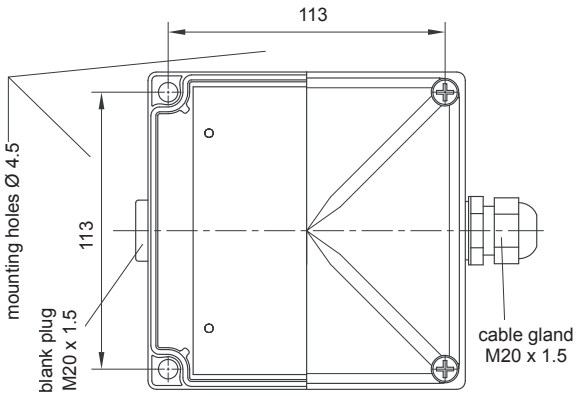
Electrical data	Quadro R	Quadro R-ST	Quadro A-DMX
Rated voltage	230 V AC	230 V AC	230 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	195 V – 253 V	195 V – 253 V	195 V – 253 V
Nominal current consumption	85 mA	85 mA	280 mA @ 1 Hz
Initial current limited to			< 1 A

Mechanical data		Quadro R	Quadro R-ST	Quadro A-DMX
Flash rate		22 – 28 flashes/min.		≤ 2 Hz
Flash energy		10 Joules		
Light intensity (DIN 5037)	clear lens	124 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 25 °C ... + 55 °C		- 30 °C ... + 60 °C
Storage temperature		- 40 °C ... + 70 °C		
Relative humidity		100%		
Protection system according to EN 60529		IP 66, IP 67, mounting arbitrary		
Impact resistance as per EN 50102		IK 08		
Protection class		II		
Duty cycle		100%		
Service life of the flash tube		light emission still 70% after 10,000,000 flashes		
Material	lens	polycarbonate (PC)		
	housing	polycarbonate (PC), RAL 7035		
Type of connection		screw clamps 2.5 mm²	2 x plug connectors (input/output)	2 x plug connectors for operation voltage 2 x plug connectors for Bus-connection
Cable entry		2 x M20		
Mounting	external lugs	113 x 153 mm – M5 or 127.1 x 127.1 mm – M5		
	internal holes	113 x 113 mm		
Weight		600 g		

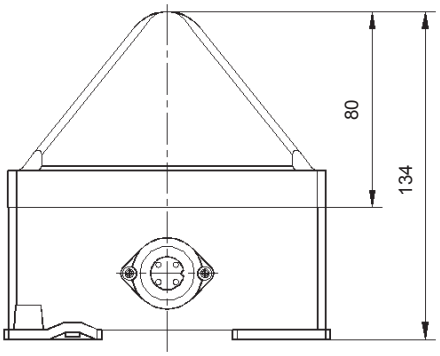
Dimensions

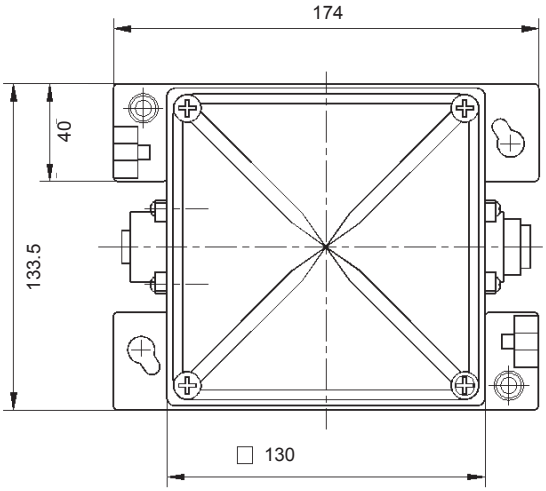
Quadro R



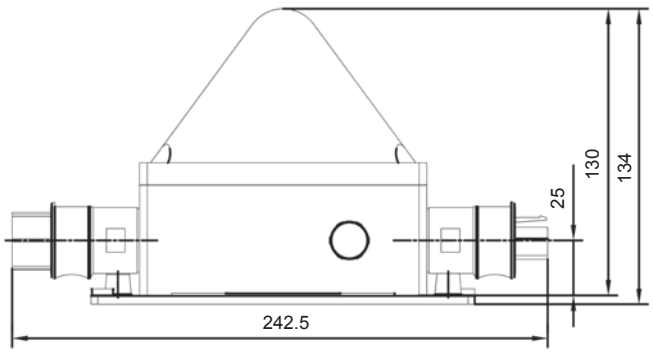


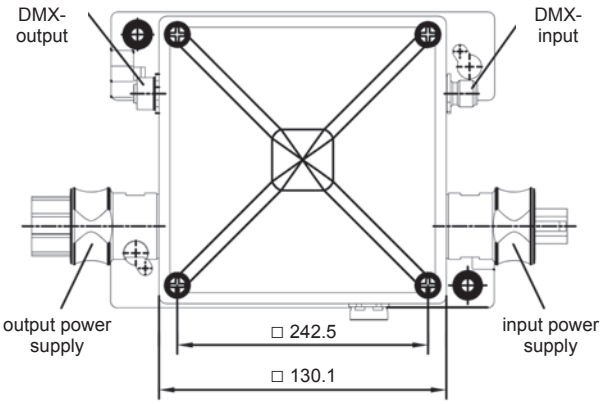
Quadro R-ST





Quadro A-DMX





Ordering details

Article numbers		Quadro R	Quadro R-ST	Quadro A-DMX
Lens colour	**Rated voltage**	230 V AC	230 V AC	230 V AC
clear		291 23 10 1 005	291 24 10 1 000	291 25 10 1 000

Article numbers for other colours on request

Options / accessories

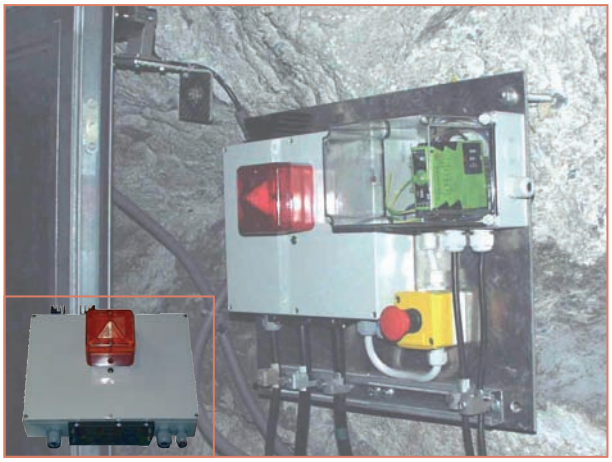
GOST

Custom solutions

Customer-specific solutions are another of Pfannenberg's specialties.

WBQ-SG

Integrated sounder/flashing light combinations is a sturdy aluminium housing to protect against extreme mechanical stress, developed for the German navy.



PL 105 Accu

Fire signal in the safety tunnel alongside the Kitzsteinhorn railway; integrated 60 minute battery buffer.

LWL M-AS-i

Laser function display as per IEC 60825-1 with integrated function monitoring, redundant LED equipment and AS-i control in machine-specific design.

BR 35 Silver

Special high-gloss surface coating in customer-specific machine design.

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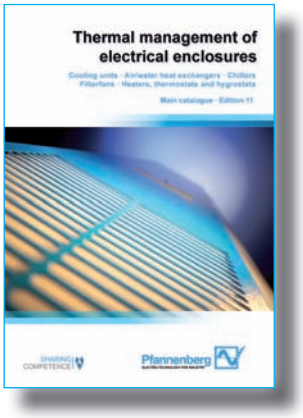

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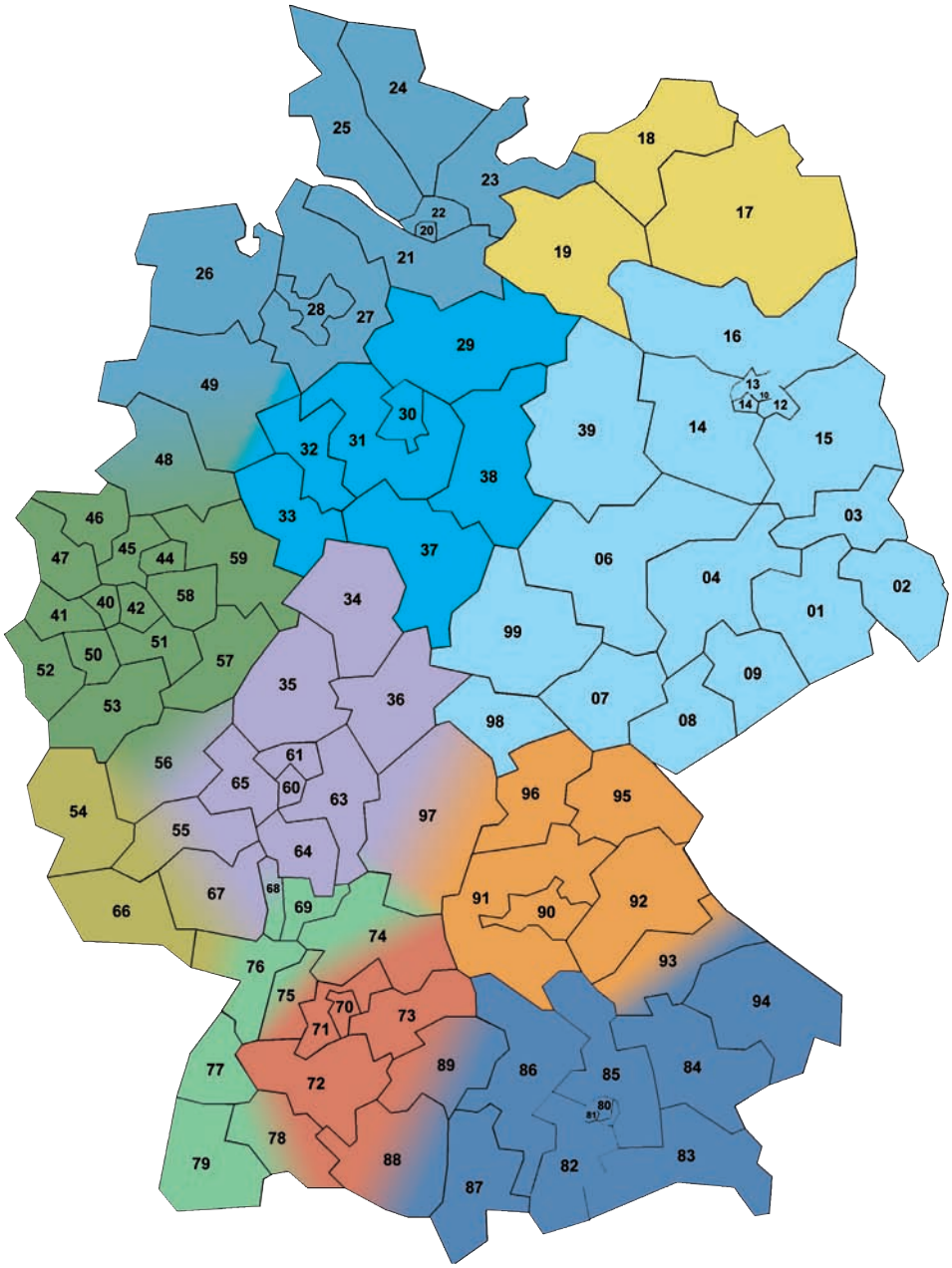

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