

# The complete Spectrum of Signaling Technology



Main catalogue · Edition 13



Indication



Warning



Alarm








# Safety for man, machine and the environment

**Pfannenberg is your reliable and competent partner when it comes to visual and acoustic indication, warning and alarm signals**

Hardly any other company worldwide can comprehensively advise you in this area and supply you from one source the way Pfannenberg can. With the new innovative signaling product series, PATROL, Pfannenberg clearly sets new standards. We are pleased to present this new series to you. Thus, we now cover the complete industrial range. We offer you standard solutions from one source, as well as, if desired, countless customized solutions.

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, Global 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.

### 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

### 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.

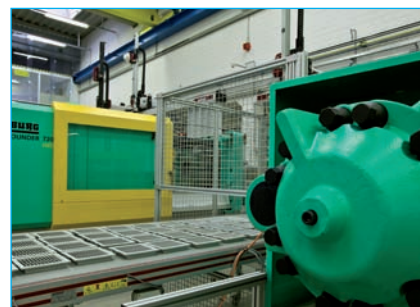
Our own environmental simulation laboratory enables the manufacturing of 'tested' products for the most extreme application conditions, naturally also with VdS and UL approval.



Photo: ©Marit Peters/PIXELO



Photo: ©Juwe/Top/PIXELO

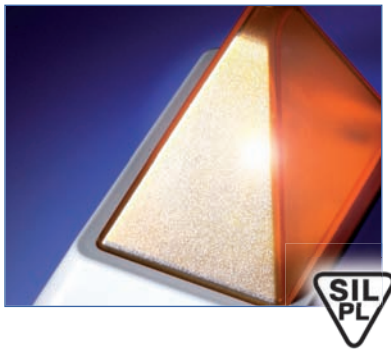


Plastic injection moulding plant,  
Pfannenberg, Hamburg

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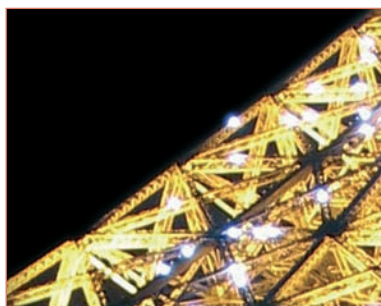




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## New Products



### Sounder series PATROL

PATROL - the new generation of sounders.

Three dimensional innovation.

- **Safe** - an incorrect installation is virtually impossible
- **Easy** - significantly shorter assembly and installation times
- **Economical** - extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

PA1, PA 5.....	136
PA 10, PA 20 .....	138



### PATROL series signaling combinations

The new combi-devices are not only impressive due to the advantages of the PATROL series and the nicely shaped design:

- Pre-wired sounder and light ex works  
- electrical connection only in sounder part
- Matched flash intensity - for combination flashing sounders, higher dB rated sounders are complemented with higher energy flashing lights

PA X 1-05, PA X 5-05, PA X 5-10.....	168
PA X 10-10, PA X 10-15, PA X 20-10, PA X 20-15.....	170



### Flashing light series PY X-S-05

The compact flashing light is not only adaptable to many applications, but it is also impressive due to its safe and easy mounting.

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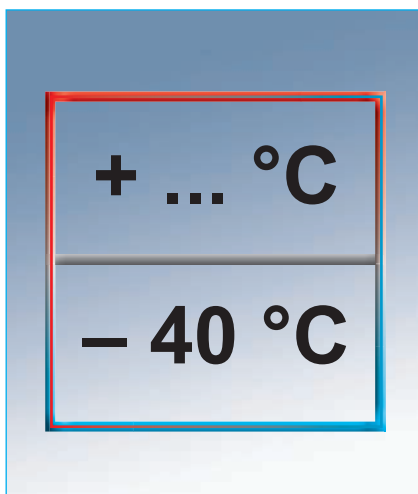


### LED multi-function light Quadro-LED-HI

Designed for tough requirements under industrial conditions.

- innovative LED light with large signaling effect
- suitable for indoor and outdoor use
- extremely insensitive to shock and vibration
- internally and externally selectable operating mode as standard
- 3 different signal options can be selected:
  - continuous light
  - blinking light
  - flashing light

Quadro-LED-HI..... 74



### Expansion of the operating temperature range

Expansion of the operating temperature range to - 40°C for a variety of products for global utilization.



### Obstruction light series POL

The new generation of obstructions lights for flight safety.

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POL 170, POL 2.000 .....	108
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# 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 inrush  
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 moni-  
tored 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.



Acoustic penetration.  
Excellent acoustic penetration of acoustic  
obstacles such as walls and doors.



# Approvals and test symbols



## Germanischer Lloyd

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.



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 'Physikalisch-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.

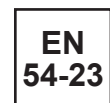


## Schweizerische Eidgenossenschaft

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.



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



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



Pfannenbergl supplies the entire range of signaling technology from one source, regardless for which application and area of use you want to implement the device. Furthermore, we offer appropriate solutions that are customized to the relevant requirements of the various areas of signaling technology:

- Indication
- Warning
- Alarm



**E. g. operation display of a machine informs the operator by means of a signaling device. These types of devices inform personnel who are nearby. These devices are not used for the indication of dangerous situations.**

The signaling can, e.g. contain the following information:

- status of a machine, process, test procedure
- lack of ingoing material / material supply is in danger
- quality defect, good / defective information
- process has ended, standby position
- notification and display of errors
- display of room occupancy



**E. g. as a start-up signal for a machine.**

**These types of devices warn about situations that could occur.**

The warning can, e.g. be executed for the following events:

- caution: Critical status, proceed with caution
- ready for handling
- attention is necessary
- dangerous situations can occur when no measures are in place
- corrective action is necessary within a suitable amount of time
- warning of economic and health damages
- process is outside the normal operating limit but within an acceptable error limit
- a status change is being executed

Reaction of the user: Monitor and / or take corrective action



**E. g. the evacuation alarm in case of a fire. Devices of this nature generate an alarm for emergency situations and have the highest priority.**

The alarm can, e.g. be executed for the following events:

- a dangerous situation has already occurred
- danger of life and limb
- acute health risk
- risk for the environment
- abnormal process status
- exceeds maximum tolerance limits

Reaction of the user: Immediate reaction is necessary



# 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.

1 <sup>st</sup> digit	Protection against foreign particles	2 <sup>nd</sup> 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 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 Pfannenberger 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.








### Safety Instrumented System SIS (Safety Loop)



### 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.

-  Human behavior
-  Organisational reasons
-  Technical reasons
-  Workplace
-  Psychological causes

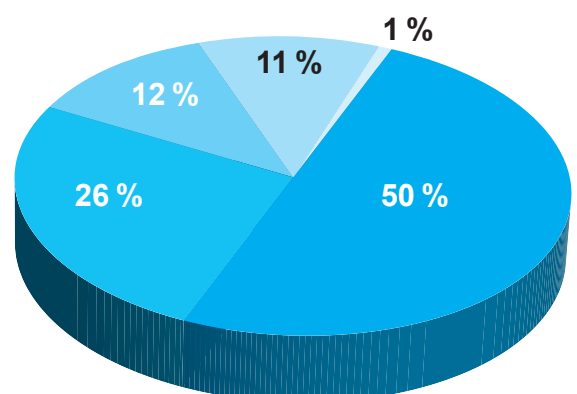


Diagram from safety-network.de

Further information can be found in the download area under „Academy“ at [www.pfannenber.com!](http://www.pfannenber.com!)

## 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 Pfannenber.

## 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 <sub>0</sub>	Performance Level DIN EN ISO 13849-1	Safety Integrity Level DIN EN 62061
10 <sup>-4</sup>	PL a	---
10 <sup>-5</sup>	PL b	SIL 1
3·10 <sup>-5</sup>	PL c	
10 <sup>-6</sup>	PL d	SIL 2
10 <sup>-7</sup>	PL e	SIL 3
10 <sup>-8</sup>	---	SIL 4
10 <sup>-9</sup>	---	

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

**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 Pfannenber can be found on pages 114, 116 and 144.

## 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
- obstacle lights



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:

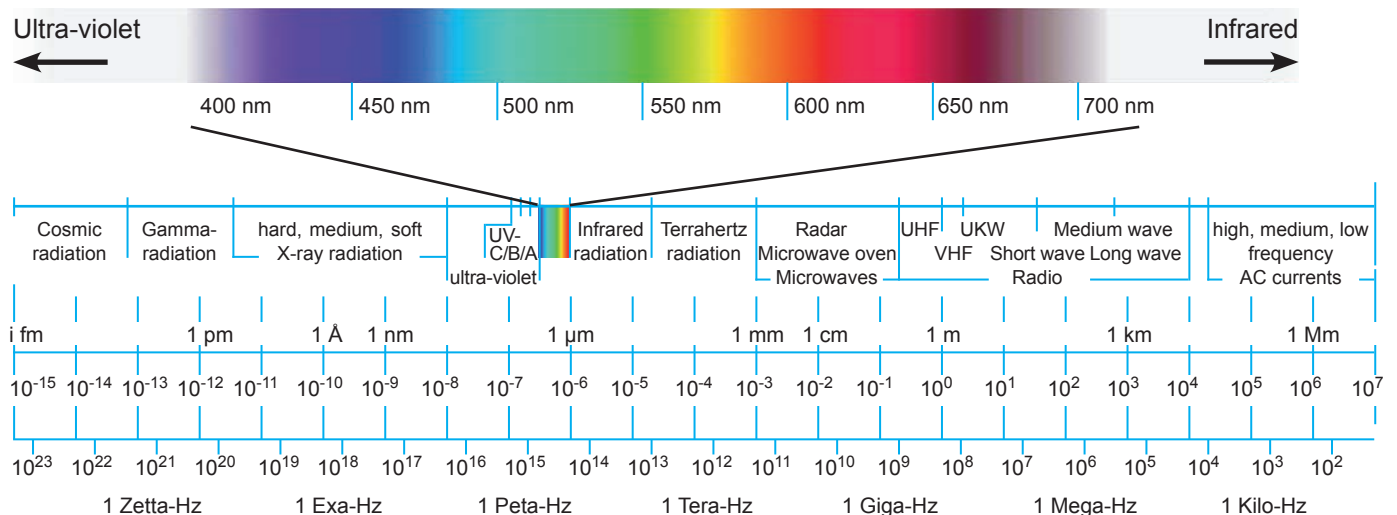
- synchronisation of several lights
- redundant structure
- integrated function monitoring
- limitation of initial current

## 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:

$$\text{Power (P)} = \text{Voltage (U)} \cdot \text{Current (I)}$$

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.



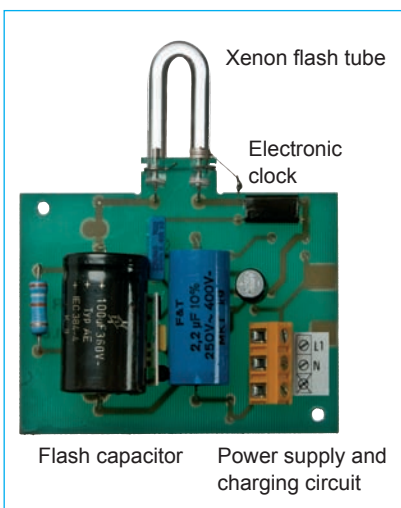
### Halogen lamp

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.

## Xenon technology versus LED technology:

Currently, the LED technology is the buzz in the area of generating light. In signaling technology, LED is being used increasingly. Thereby, LED is connected with positive characteristics such as energy efficiency, life span and insensitivity to mechanical influences, which cancel out the negative side, the price.

Visual signaling technology must cover various application in three areas:

- Indication
- Warning
- Alarm

in which there are different requirements, e.g. special visual appearance, for the products.

While the positive characteristics of LED technology come to use almost to 100% in the area of "Informing", in the areas "Warning" and "Alarm", the advantages of the LED technology are scarcely considered. When taking the area "Alarm" into consideration, the perceptibility is in the foreground in order to convey the signal and therewith, the urgency of the alarm to the observer. Here, devices based on Xenon technology exhibit distinct advantages, e.g. the differential luminance, which can be ascribed to the formation of the light impulse.

A Xenon flashing light creates a very short (approx. 250 ms), yet very intense impulse with a peak value of well over 100 000 cd, which cannot be produced by means of LED technology. Typical curve progressions are depicted in figures 1 and 2. It is clearly visible that the light intensity of the LEDs only has a flat progression, in contrast to the Xenon flash tubes. Both lights have almost the same effective luminous intensity.

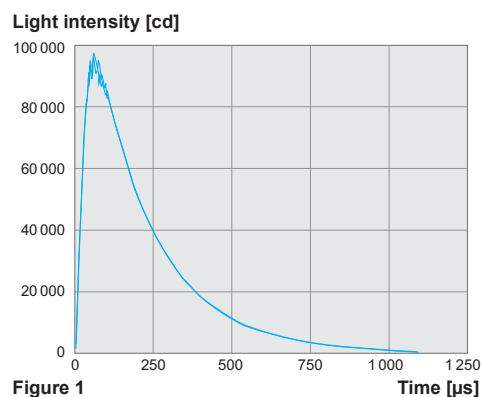
When comparing the bottom line of the expense of energy for both technologies, the LED is also, in this aspect, not advantageous. The effective power consumption of a Xenon flashing light is lower when compared to a LED flashing light that has almost the same effective luminous intensity as the Xenon light. Furthermore, LED lights with the same effective luminous intensity as compared to Xenon lights are significantly more expensive. I.e. not only are the operating costs, but also the acquisition costs in favor of the Xenon technology.

Another advantage of Xenon lights are the emission characteristics. Whilst in LED technology, these only produce an approximate omni-directional characteristic through the arrangement of the LEDs in the casing, the Xenon technology has a radiating point of light that provides for this from the get go. The emission characteristics are identical in all directions and thus, no „optical gaps“ are created in all directions of light.

The duty cycle is a positive LED characteristic that offers an advantage over Xenon technology. Yet when you take into consideration that special alarm devices are only needed and activated in dangerous situations, the life span of the lights is not crucial criteria. Pfannenberger Xenon flashing lights have a life span of a minimum 8 million flashes; this is adequate to warn of dangerous situations, in most cases, for a period of at least 20 years. All Xenon flashing light tubes are secured by means of an additional steel rod in Pfannenberger products so that the mechanical influences (shock/vibration) are reduced to a minimum.

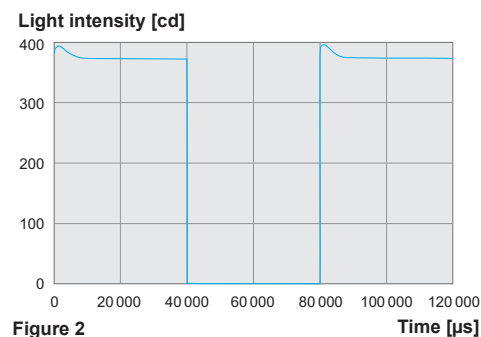
In applications where the signaling devices are not just used frequently but also function as a permanent beacon, the advantage of LED-based devices is obvious: The duty cycle and low power consumption cannot be surpassed.

**Luminous intensity / course of time of a Xenon flashing light**



**Figure 1**

**Luminous intensity / course of time of a LED flashing light**



**Figure 2**

## 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.

$$\text{light intensity [cd]} = \text{luminous flux [lm]} / \text{dihedral angle [sr]}$$

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

**Luminous flux  $\Phi$**  is expressed in Lumen [lm].

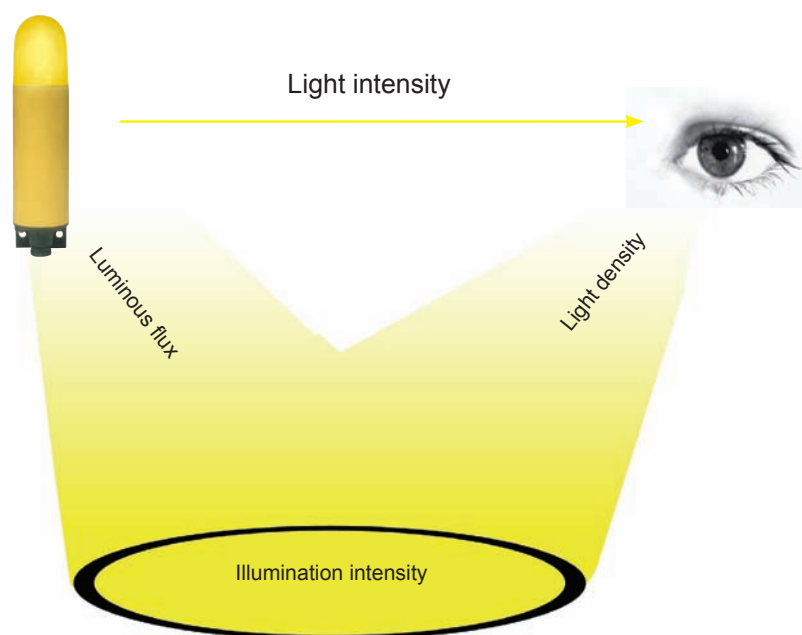
The luminous flux is a measure of the entire visible radiation that is radiated in all directions from a source of light and, as opposed to light intensity, is not directionally dependent.

**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.

$$\text{illumination intensity [lx]} = \text{luminous flux [lm]} / \text{area A (m}^2\text{)}$$

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 (as per IEC 73)	Meaning / message category	Purpose	User reaction (as per DIN VDE 0199)	Example application
red	emergency	limit value exceeded	<ul style="list-style-type: none"> <li>• danger</li> <li>• abnormal status</li> <li>• act immediately</li> <li>• urgent rescue or protection measure</li> </ul>	<ul style="list-style-type: none"> <li>• emergency</li> <li>• alarm</li> <li>• stop</li> <li>• prohibited</li> <li>• failure</li> </ul>	immediate reaction	<ul style="list-style-type: none"> <li>• stop sign</li> <li>• prohibiting sign</li> <li>• emergency stop devices</li> </ul>
yellow / amber	abnormal	warning limit reached	<ul style="list-style-type: none"> <li>• caution</li> <li>• be prepared</li> <li>• act if necessary</li> </ul>	<ul style="list-style-type: none"> <li>• attention required</li> <li>• change of status</li> <li>• intervention</li> </ul>	monitor and/or intervene	indication of dangers, such as: fire, explosion, radiation, chemical influences, obst- ructions etc.
green	normal	within normal range	<ul style="list-style-type: none"> <li>• everything ok</li> <li>• normal status</li> <li>• safe</li> <li>• no danger</li> <li>• danger is past</li> <li>• first aid</li> </ul>	<ul style="list-style-type: none"> <li>• return to normal process</li> <li>• continue</li> </ul>	no action required	<ul style="list-style-type: none"> <li>• identification of escape routes and emergency exits</li> <li>• first aid and rescue stations</li> </ul>
blue	specified meaning	specified meaning	<ul style="list-style-type: none"> <li>• display of necessity for specified action</li> <li>• command sign</li> <li>• notice</li> <li>• machine-specific</li> </ul>	<ul style="list-style-type: none"> <li>• action</li> <li>• protection</li> <li>• extraordinary attention</li> <li>• safety-relevant regulation or precaution with priority</li> </ul>	specified action	<ul style="list-style-type: none"> <li>• obligation to wear personal protective equipment</li> <li>• location of a telephone</li> <li>• etc.</li> </ul>
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:

$$d = \sqrt{I_{\text{eff}} / E}$$

*d* is the distance between the observer and the alarm device in metres [m]

*I<sub>eff</sub>* 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.

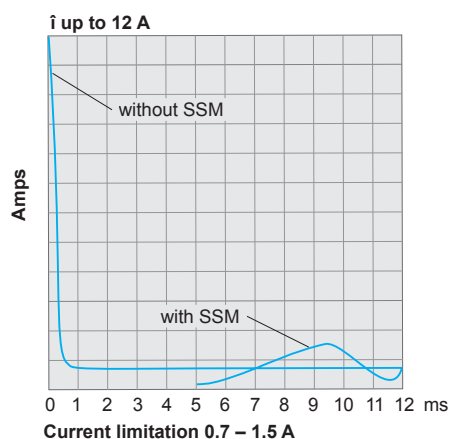
As soon as the operating voltage is applied, the evaluation relay closes the error contact. If the operating voltage fails, the relay opens immediately. This method of operation represents the fail-safe normally-closed circuit function and guarantees an alarm even if the operating voltage fails. On the 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





# 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



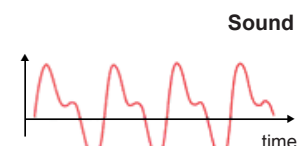
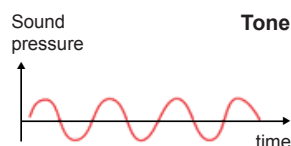
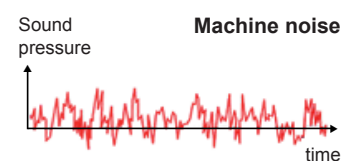
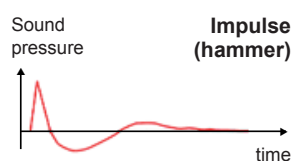
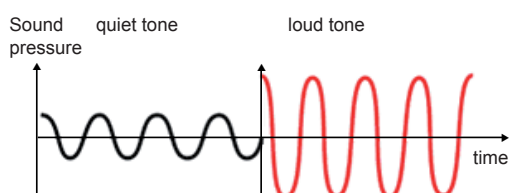
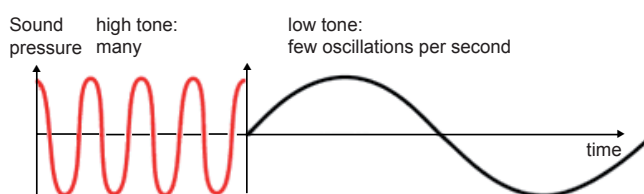
## Basic principles of acoustics

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 ( $\mu\text{bar}$ ). 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

## Frequency range and sound pressure level

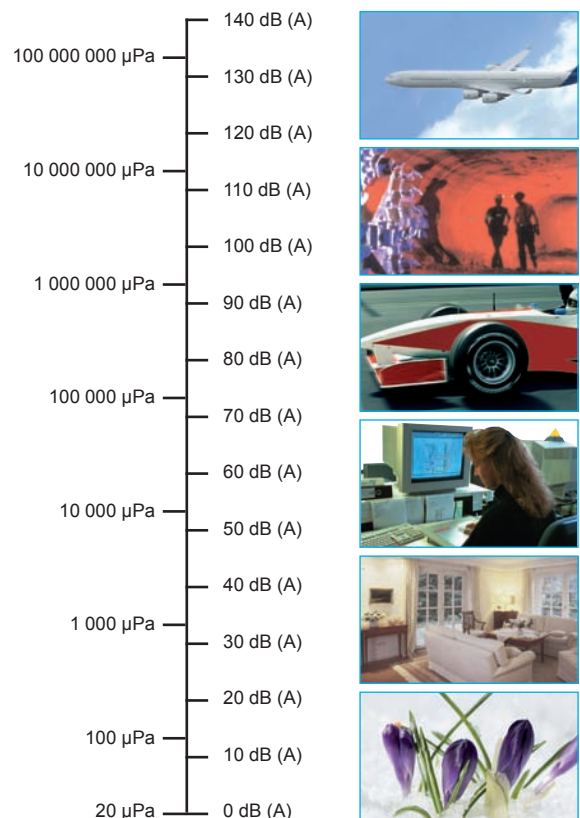
The range of human hearing is from 20 to 20,000 Hz. Deeper sounds (infrasound) and higher sounds (ultrasound) cannot be heard. The human ear is most sensitive to sound between 500 Hz and 3 kHz. With regard to volume, a sound pressure of  $2/10,000 = 0.0002 \mu\text{bar}$  is just barely audible.

This limit value is called 'hearing threshold pressure'.  
A sound pressure of 200  $\mu\text{bar}$  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:

$$L_p = 20 \times \log \frac{\text{measured sound pressure in } \mu\text{bar}}{\text{hearing threshold pressure in } \mu\text{bar}} \text{ dB}$$



## Basic principles of acoustic audibility

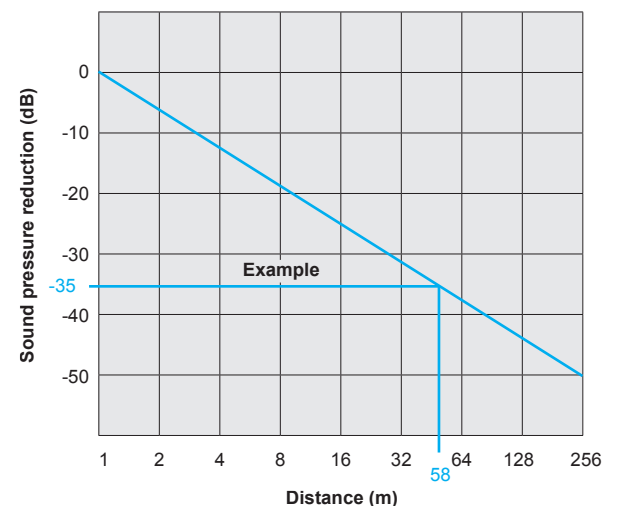
The loudness of a sounder is expressed in dB (A) and measured at a distance of 1 metre (USA 10 feet). The smallest increase in the sound level that the human ear can detect is 3 dB. An increase of 6 dB is equivalent to a doubling of the sound pressure. An increase of around 10 dB is perceived as being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

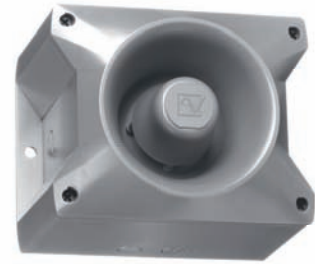


A large number of audio samples of different tones are available at [www.pfannenbergl.com/support](http://www.pfannenbergl.com/support).

## 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.

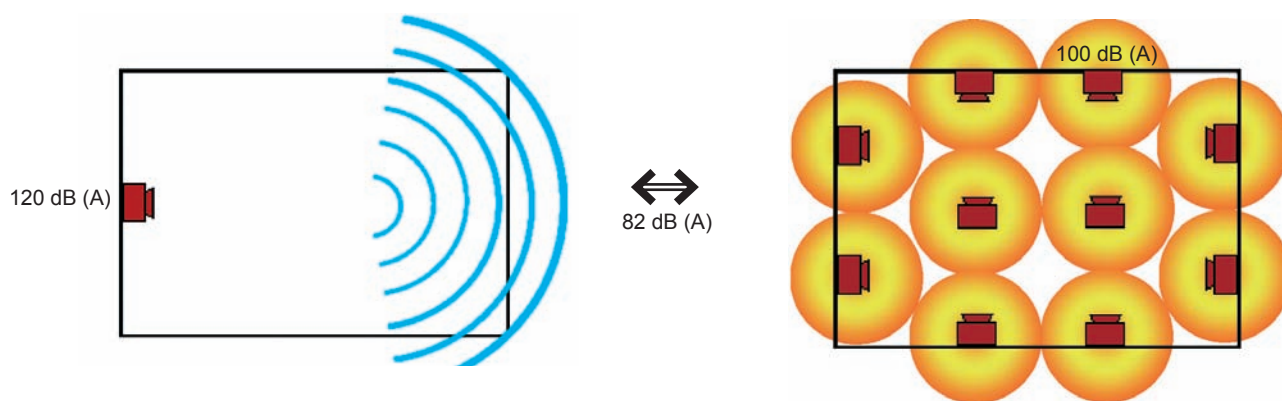
### Example calculation

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<sup>2</sup>

Sound transmission area of a 120 dB (A) sounder in order to achieve 82 dB (A) = 20,000 m<sup>2</sup>

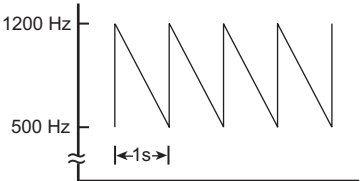
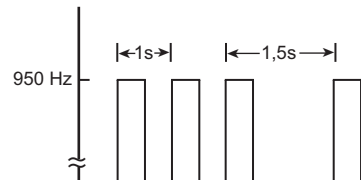
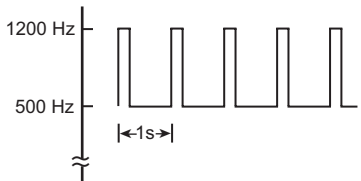



The type of signaling (number of sounders) used is essentially determined by the geometric properties of the room, the shape of any obstructions and the maximum permissible sound pressure level of the sounder. When using a sounder with, for example, 120 dB (A), it must be ensured that people cannot be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



## The meaning of different tones

Pfannenberg sounders can generate up to 45 different tones. All tones can be 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		
<b>DIN 33404</b>	Acoustic alarm signal for workplaces in cases of fire, gas, explosion or radiation danger	
<b>ISO 8201</b>	Emergency evacuation signal	
<b>NFS 32-001</b>	Fire alarm in France	
<b>SS 031711</b>	Emergency signal in Sweden	



A large number of audio samples of different tones are available at [www.pfannenberg.com/support](http://www.pfannenberg.com/support).

## 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.





# 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) <sup>1</sup>					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 J	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				36
	PMF 2020						7 J			●	●			●	38
	PMF 2015						7 J				●				
	ABL / ABS						15 J	IP 54	ohne Winkel 242 x Ø 80	●	●			●	40
	P 400 STR						15 J	IP 65	220 x Ø 140		○				42
	P 400 STS						15 J				○				
	Quadro F12						13 J	IP 66 IP 67 IK 08	130 x 130 x 130		●				44
	Quadro S						13 J				●				
	PB 2010						10 J	IP 55	128 x 166.2 x 111.2	●	●			●	46
	PMB 2010						5 J			●	●			●	48
	PB 2005						5 J			●	●			●	50
	WBL / WBS						5 J	IP 54	200 x Ø 54	●	●			●	52
	WBL-PX						5 J	IP 54	200 x Ø 54						
	WBLR						5 J	IP 65	144 x 120 x 85	●	●		○ <sup>1</sup>	●	54
	WBSR									●	●		●	●	
	P 300 STR						5 J	IP 65	150 x Ø 100		○				56
	P 300 STS						5 J				○				
	P 300 STF						5 J				○				
	PY X-S-05						5 J	IP 66	85 x 109.5 x 80.6	● <sup>1</sup>	○	○	●		58
	DWBL / DWBS						2.5 J	IP 54	200 x Ø 54	●	●			●	60
	P 100 STR						1 J	IP 65	65.5 x Ø 60		○				62
	P 200 STR						1 J	IP 65	80 x Ø 60		○				62

<sup>1</sup> with a clear lens

● available  
○ in preparation  
<sup>1</sup> Option



Type	Maximum signal reception range as per EN 54-23 in metres (m) <sup>1</sup>					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		○				64
P 400 FLH						35 / 40 W				○				
P 300 FLF						25 W	IP 65	150 x Ø 100		○				66
P 300 FLH						20 / 25 W				○				
P 200 FLF						5 W	IP 65	80 x Ø 60		○				68
P 100 FLF						5 W	IP 65	65.5 x Ø 60		○				68
LED Lights														
PMF-LED Flex						30 cd	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				70
P 400 LDA						30 cd	IP 65	220 x Ø 140		○				72
P 300 LDA						20 cd	IP 65	150 x Ø 100		○				72
Quadro-LED-HI						100 cd	IP 66/67 IK 08	130 x 130 x 130		●				74
PD 2100-LED						5 cd	IP 55	128 x 166.2 x 111.2		●				76
P 200 LDA						5 cd	IP 65	80 x Ø 60		○				78
P 100 LDA						5 cd	IP 65	65.5 x Ø 60		○				78
Quadro-LED-TL						80 cd	IP 66 IK 08	130 x 130 x 396						80

<sup>1</sup> 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) <sup>1</sup>					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		○				82
	P 350 TLA						45 cd	IP 65	140 x Ø 100		○				82
	P 22 D						–	IP 65	52 x Ø 29						84
	P 22 DFS						–	IP 65	52 x Ø 29						84
Continuous Lights															
	P 400 SLF						40 W	IP 65	220 x Ø140		○				86
	P 400 SLH						35 / 40 W				○				
	P 300 SLF						15 W	IP 65	150 x Ø 100		○				88
	P 300 SLH						20 / 25 W				○				
	PD 2100						15 W	IP 55	128 x 166.2 x 111.2		●				90
	P 200 SLF						5 W	IP 65	80 x Ø 60		○				92
	P 100 SLF						5 W	IP 65	65.5 x Ø 60		○				92
	P 450 TSB						25 W	IP 65	177 x Ø 140		○				94
	P 450 TDB						2 x 15 W				○				
	P 350 TSB						15 W	IP 65	140 x Ø 100		○				94
Rotating Mirror Lights															
	P 400 RTH						35 / 40 W	IP 65	220 x Ø 140		○				96
	P 300 RTH						20 / 25 W	IP 65	150 x Ø 100		○				96

<sup>1</sup> with a clear lens● available  
○ in preparation

Type	Maximum signal reception range as per EN 54-23 in metres (m) <sup>1</sup>					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 J	IP 66 IP 67 IK 08	130 x 130 x 130		●				98
WBL-M / WBS-M						5 J	IP 54	242 x Ø 80	●	●			●	100
PMF 2015-M						7 J	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				102
PD 2100-M-AS-i (LED)						5 cd	IP 55	128 x 166.2 x 111.2		●				104
PD 2100-LED-M						5 cd	IP 55	128 x 166.2 x 111.2		●				104
Obstacle Lights														
POL 32-M						32 cd	IP 68	240 x Ø 114						106
POL 10-M						10 cd								
POL 10-M-R						10 cd								
POL 10-M-RA						10 cd								
POL 170W-R						170 cd	IP 68	100 x Ø 258						108
POL 170W-R-ES						170 cd		183 x Ø 352						
POL 2.000R						2 000 cd		183 x Ø 352						
POL 20.000 / 2.000R						20 000 cd	IP 68	183 x Ø 352						110
POL 20.000 / 170W-R						170 cd								
POL 20.000 / 2.000W						2 000 cd								
Safety-related Lights														
Quadro F12-SIL						10 J	IP 66 IP 67 IK 08	130 x 130 x 130		●				114
PMF 2015-SIL						10 J	IP 55	direct mounting 185 x Ø 177 bracket mounting 170.5 x Ø 130		●				116

<sup>1</sup> with a clear lens

● available  
○ in preparation



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

# All-Round Flashing Light 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 / 60 Hz			
Operating range		195 – 253 V			
Nominal current consumption	@ 30 J	1 Hz: 450 mA	0.75 Hz: 380 mA	0.5 Hz: 310 mA	0.1 Hz: 150 mA
	@ 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 J, switchable to 20 J			
Light intensity (DIN 5037) <sup>1</sup>		1500 cd			
Lens colours		clear, amber, red, green, blue			
Lens type		lens with fresnel characteristic			
Beam angle	vertical	approx. 16°			
	horizontal	360°			
Operating temperature		- 40 °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		bracket mounting: M20 x 1.5			
Connecting terminals		single wire 0.5 – 2.5 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , with cable end sleeves DIN 46228/1			
Weight	bracket mounting	1.25 kg			
	direct mounting	0.75 kg			

<sup>1</sup> with a clear lens

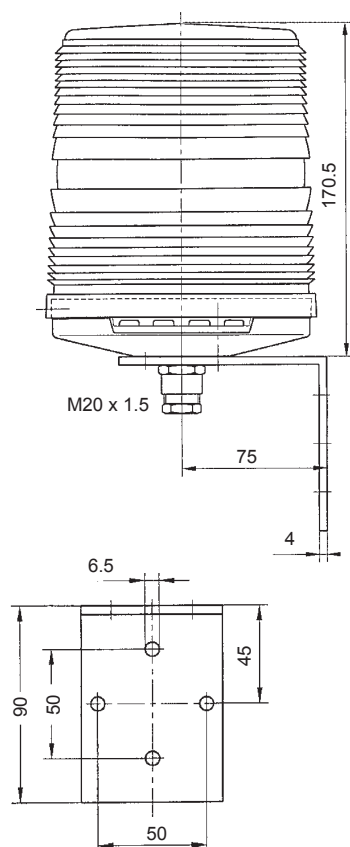
### Flash frequencies

S1				Flash energy	Flash rate	S1				Flash energy	Flash rate
1	2	3	4			1	2	3	4		
OFF	OFF	OFF	OFF	30 J	1 Hz	OFF	OFF	ON	OFF	20 J	1 Hz
ON	OFF	OFF	OFF		0.75 Hz	ON	OFF	ON	OFF		0.75 Hz
OFF	ON	OFF	OFF		0.5 Hz	OFF	ON	ON	OFF		0.5 Hz
ON	ON	OFF	OFF		0.1 Hz	ON	ON	ON	OFF		0.1 Hz

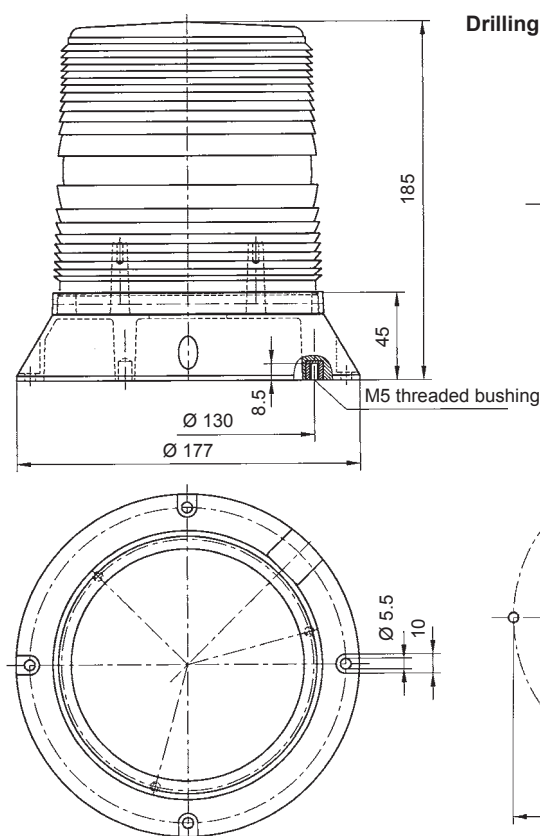


## Dimensions

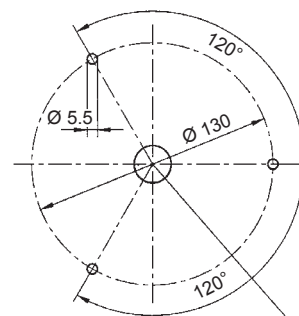
### Bracket mounting



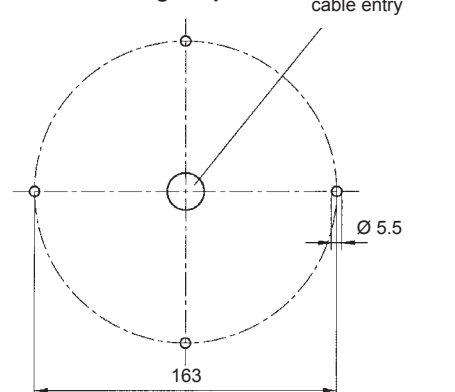
### Direct mounting



### 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



See page 118 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 fensel 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 / 60 Hz	50 / 60 Hz			50 / 60 Hz	50 / 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 A	1.35 A				

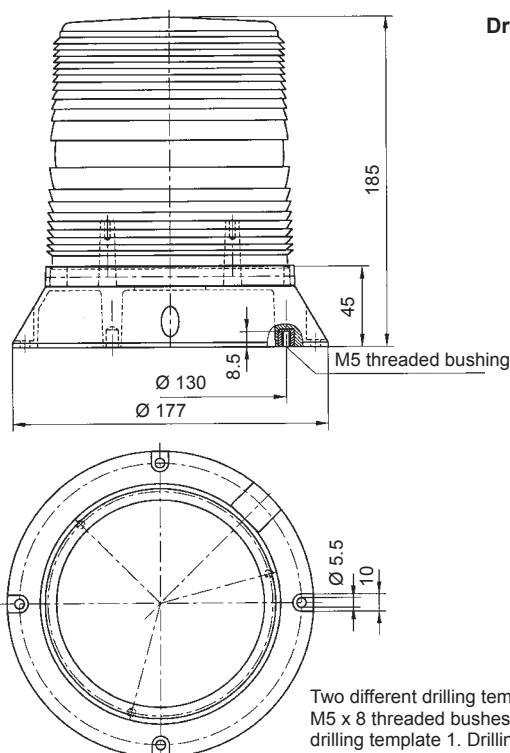
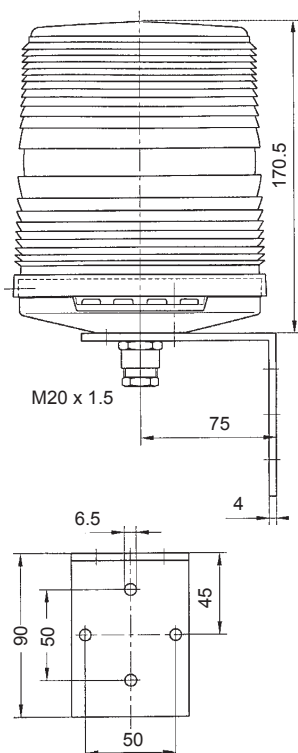
Mechanical data		PMF 2020		PMF 2015	
Operating mode		quad, double, single flash		quad, double flash	
Flash energy of the main flash		7 J (12 V: 5 J)		7 J	
Light intensity (DIN 5037) <sup>1</sup>		200 cd			
Lens colours		clear, amber, red, green, blue			
Lens type		lens with fresnel characteristic			
Beam angle	vertical	approx. 16 °			
	horizontal	360 °			
Operating temperature		- 40 °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	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 mm², fine wire 0.5 – 1.5 mm², 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			

<sup>1</sup> with a clear lens

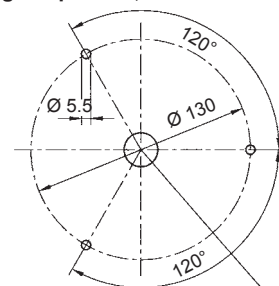
## Dimensions

### Bracket mounting

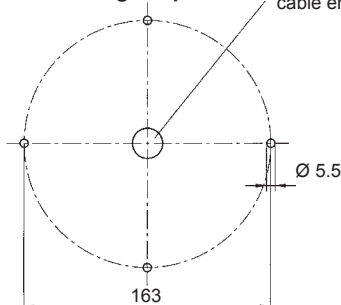
### Direct mounting



### Drilling template 1 (for M5 threaded bushing)



### Drilling template 2



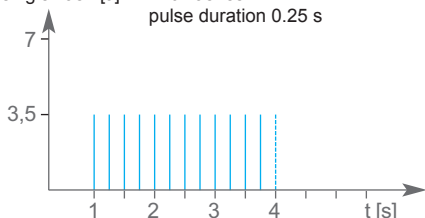
Two different drilling templates are available for fixing the light (direct mounting). M5 x 8 threaded bushes are set into the base of the light for fixing according to drilling template 1. Drilling template 2 allows the light to be fixed using 4 through bolts or similar from above.

## Flash rate

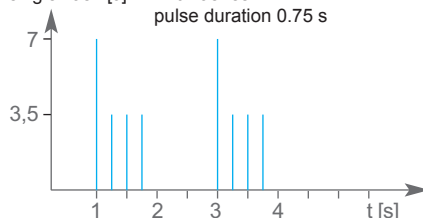
### PMF 2020

### PMF 2020 / PMF 2015

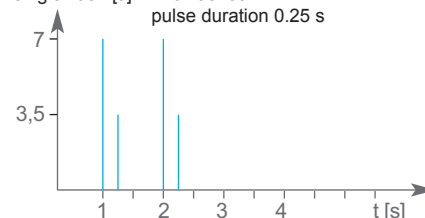
Energy single flash [J]  
single flash  
240 flashes/min.  
pulse duration 0.25 s



Energy single flash [J]  
4 flashes  
120 flashes/min.  
pulse duration 0.75 s



Energy single flash [J]  
2 flashes  
120 flashes/min.  
pulse duration 0.25 s



## 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



See page 118 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

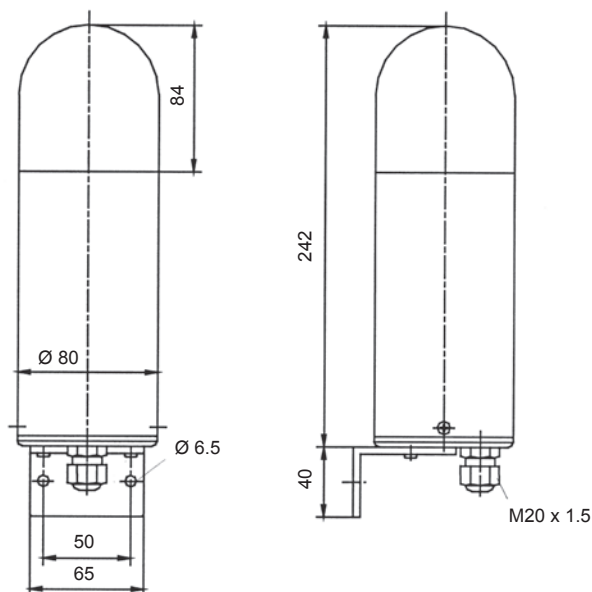
Electrical data	AC	ABL					
Rated voltage		230 V AC	127 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range		185 – 255 V	108 – 140 V	95 – 127 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption		0.18 A	0.25 A	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 – 72 V	40 – 60 V	29 – 43 V	18 – 30 V	10 – 15 V	
Nominal current consumption		0.26 A	0.35 A	0.55 A	0.7 A	1.5 A	

Mechanical data	ABL		ABS	
Flash rate	1 Hz = 60 flashes/min.			
Flash energy	15 J			
Light intensity (DIN 5037) <sup>1</sup>	214 cd			
Lens colours	clear, white, yellow, amber, red, green, blue			
Operating temperature	- 40 °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 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , with cable end sleeves DIN 46228/1			
Weight	AC	650 g		
	DC	800 g		

<sup>1</sup> with a clear lens



## 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



See pages 118/119 for further information

Article number:  
287 10 50 0 042

## 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 15 Joules

## P 400 STR / P 400 STS (Ø 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



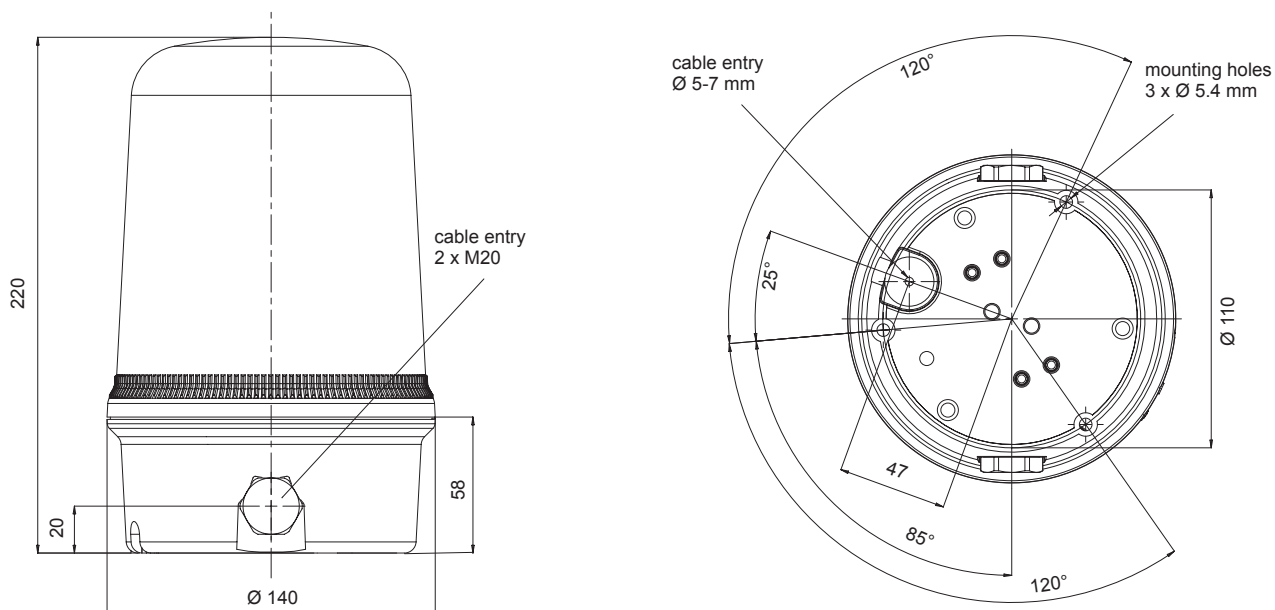
Operating temperature

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 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC
Operating range	207 – 253 V	100 – 130 V	20 – 28 V	207 – 253 V	100 – 130 V	20 – 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	flashing light	synchronised flashing light	
Light source		xenon flash tube			
Flash energy	mode 1	double flash 15 J + 10 J @ 0.75 Hz	15 J @ 1 Hz	15 J @ 1 Hz	
	mode 2	single flash 15 J @ 1 Hz			
	mode 3	triple flash 15 J + 10 J + 10 J @ 0.5 Hz			
Light intensity (DIN 5037) <sup>1</sup>		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	632 g			
	DC	696 g			

<sup>1</sup> with a clear lens

## 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



Article number:  
213 94 00 0 000



Article number:  
213 95 00 0 000



Article number:  
282 50 20 0 000

only in  
combination  
with tubular  
stand

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 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



Sync



Electrical data	Quadro F12			Quadro S
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz
Operating range	195 – 253 V	95 – 127 V	18 – 30 V	195 – 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

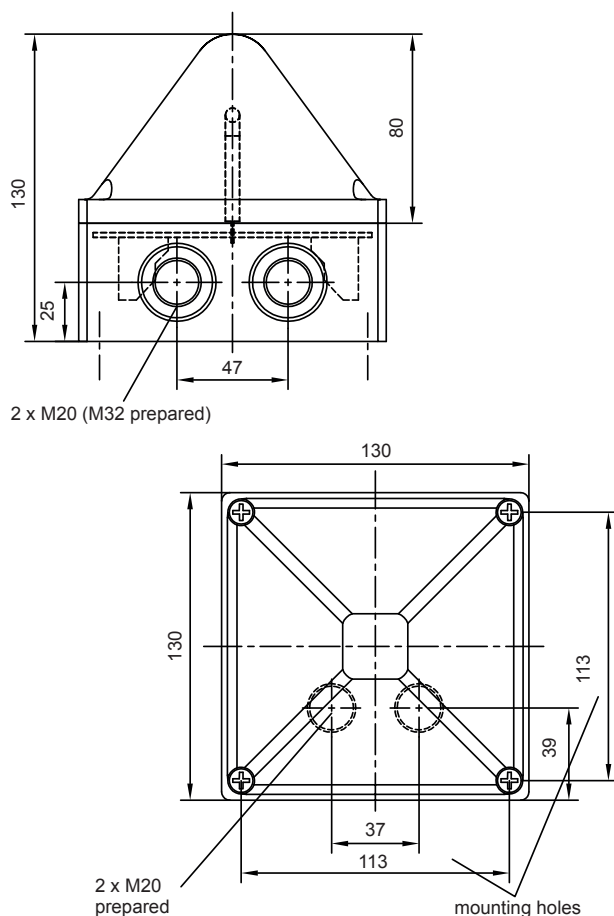
Mechanical data	Quadro F12	Quadro S
Flash rate	1 Hz = 60 flashes/min.	
Flash energy	13 J	
Light intensity (DIN 5037) <sup>1</sup>	140 cd	
Lens colours	clear, white, yellow, amber, red, green, blue	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	100%	
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 mm <sup>2</sup>	
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	

<sup>1</sup> with a clear lens

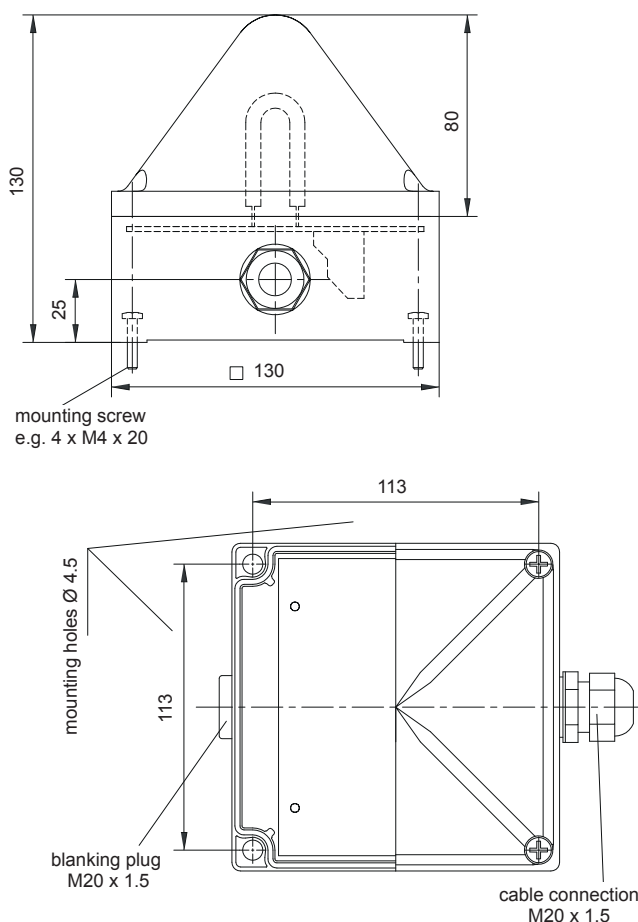


## Dimensions

### 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



## 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 Lights 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



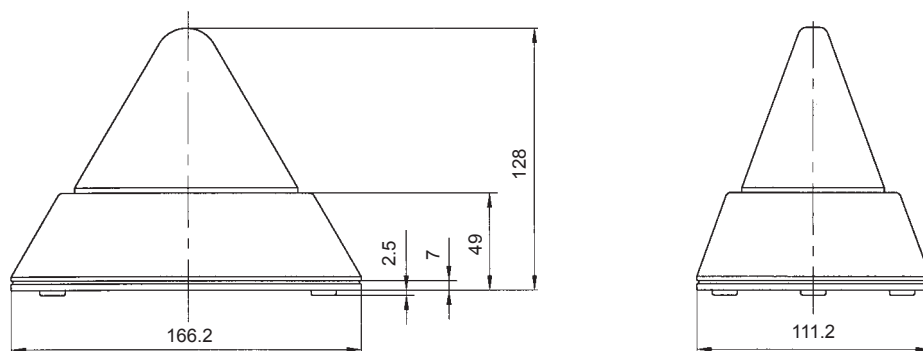
Operating  
temperature

Electrical data	AC	PB 2010					
Rated voltage		230 V AC	110 V AC	42 V AC	24 V AC		
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Operating range		185 – 255 V	90 – 135 V	35 – 50 V	20 – 30 V		
Nominal current consumption		0.14 A	0.23 A	0.72 A	1.5 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 – 96 V	50 – 72 V	40 – 60 V	36 – 45 V	18 – 30 V	10 – 15 V
Nominal current consumption		0.18 A	0.21 A	0.3 A	0.45 A	0.56 A	1.21 A

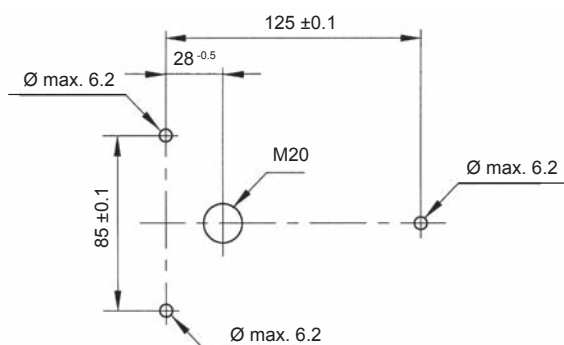
Mechanical data	PB 2010	
Flash rate	1 Hz = 60 flashes/min.	
Flash energy	10 J	
Light intensity (DIN 5037) <sup>1</sup>	118 cd	
Lens colours	clear, white, yellow, amber, red, green, blue	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	90%	
Protection 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 <sup>2</sup>	
Weight	AC	340 g
	DC	400 g

<sup>1</sup> with a clear lens

## 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 118/119 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

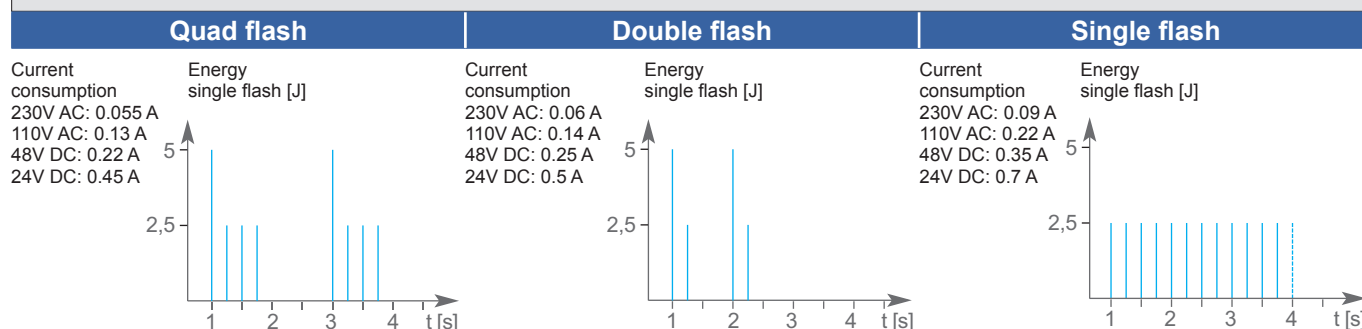


Operating temperature

Electrical data	PMB 2010			
Rated voltage	230 V AC	110 V AC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		
Operating range	195 – 253 V	90 – 135 V	18 – 30 V	40 – 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 J			
Light intensity (DIN 5037) <sup>1</sup>	44 cd			
Lens colours	clear, white, yellow, amber, red, green, blue			
Operating temperature	- 40 °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: 305 g / DC: 360 g			

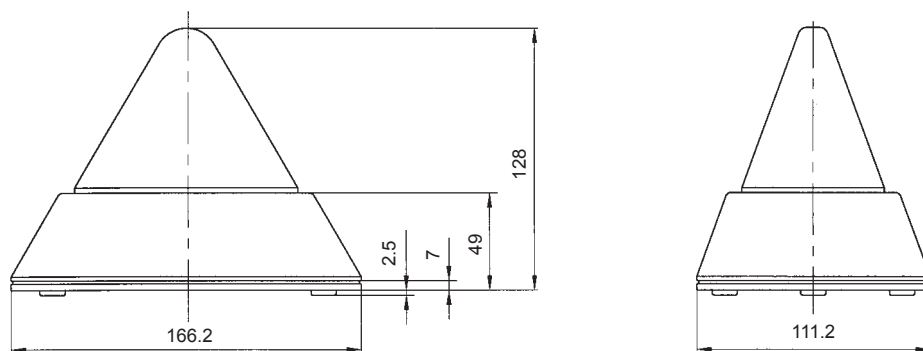
<sup>1</sup> with a clear lens

## Flash rate

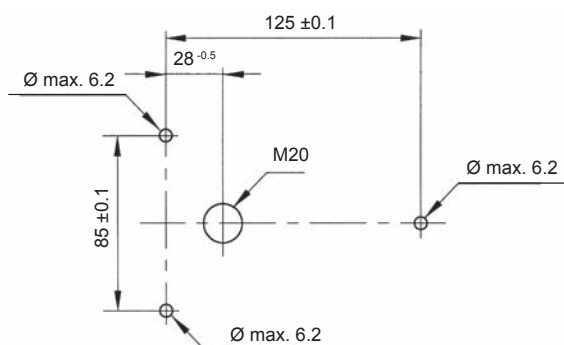




## Dimensions



## 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 118/119 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 Lights 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



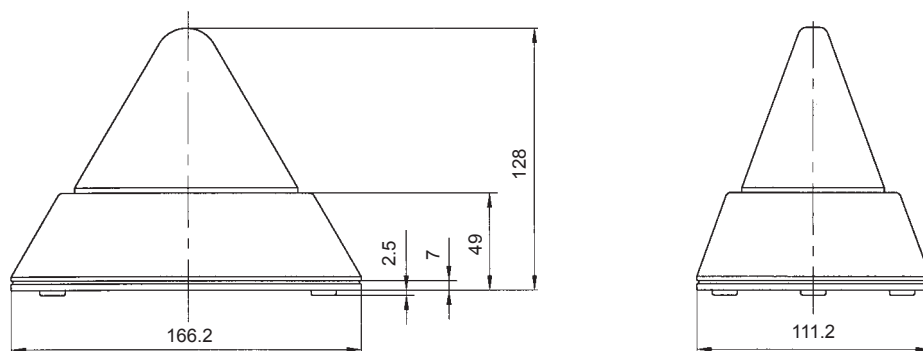
Operating  
temperature

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
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range		185 – 255 V	110 – 148 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption		0.07 A	0.115 A	0.1 A	0.47 A	0.5 A	0.77 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 – 96 V	50 – 72 V	40 – 60 V	18 – 30 V		10 – 15 V
Nominal current consumption		0.11 A	0.13 A	0.18 A	0.25 A		0.6 A

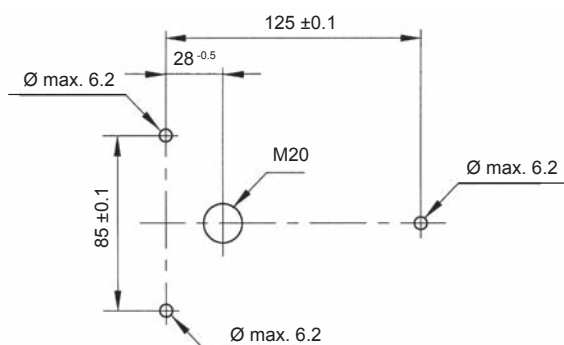
Mechanical data	PB 2005	
Flash rate	1 Hz = 60 flashes/min.	
Flash energy	5 J	
Light intensity (DIN 5037) <sup>1</sup>	44 cd	
Lens colours	clear, white, yellow, amber, red, green, blue	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	90%	
Protection 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 <sup>2</sup>	
Weight	AC	275 g
	DC	310 g

<sup>1</sup> with a clear lens

## 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 118/119 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



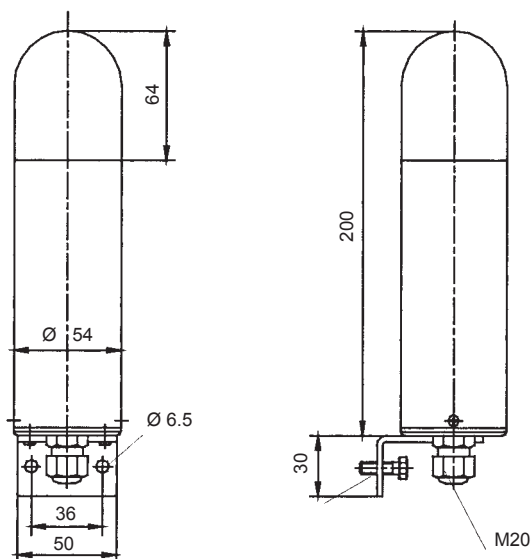
WBL-PX

Electrical data	AC	WBL				
Rated voltage		230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range		185 – 255 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption		0.07 A	0.1 A	0.47 A	0.5 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
Operating range		88 – 132 V	64 – 96 V	50 – 72 V	40 – 60 V	18 – 35 V
Nominal current consumption		0.09 A	0.11 A	0.13 A	0.18 A	0.25 A
					0.25 A	0.6 A
Electrical data		WBL-PX				
Rated voltage		230 V AC				
Rated frequency		50 / 60 Hz				
Operating range		185 – 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 J		
Light intensity (DIN 5037) <sup>1</sup>		44 cd		
Lens colours		clear, white, yellow, amber, red, green, blue		
Operating temperature		- 40 °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 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , with cable end sleeves DIN 46228/1		
Weight	AC	260 g		260 g
	DC		300 g	

<sup>1</sup> with a clear lens

## 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



See pages 118/119 for further information

Article number:  
287 10 50 0 041

## 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



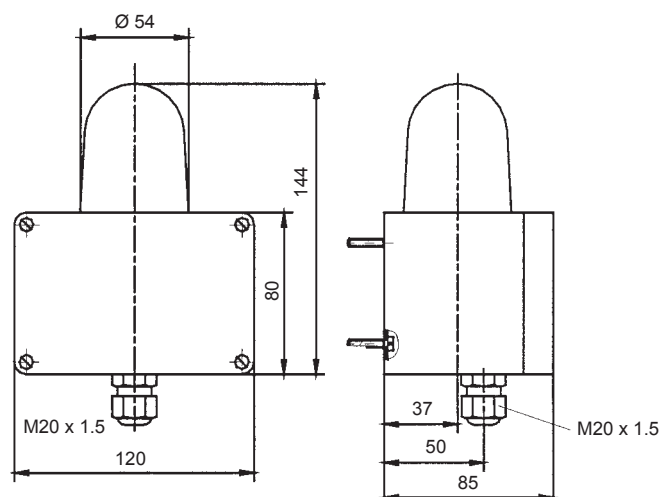
24 V DC, 48 V DC

Electrical data	AC	WBLR				
Rated voltage		230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range		185 – 255 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption		0.07 A	0.1 A	0.47 A	0.5 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
Operating range		88 – 132 V	64 – 96 V	50 – 72 V	40 – 60 V	18 – 35 V
Nominal current consumption		0.09 A	0.11 A	0.13 A	0.18 A	0.25 A

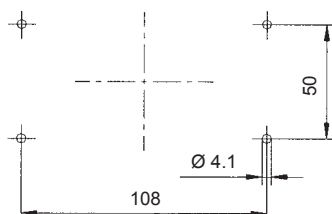
Mechanical data	WBLR	WBSR
Flash rate	1 Hz = 60 flashes/min.	
Flash energy	5 J	
Light intensity (DIN 5037) <sup>1</sup>	44 cd	
Lens colours	clear, white, yellow, amber, red, green, blue	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	90%	
Protection 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 (PC)
	housing	ABS, light grey, similar to RAL 7035
Cable entry	M20 x 1.5	
Connecting terminals	single wire 0.5 – 2.5 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , with cable end sleeves DIN 46228/1	
Weight	AC	290 g
	DC	300 g

<sup>1</sup> with a clear lens

## 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



See pages 118/119 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 (Ø 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



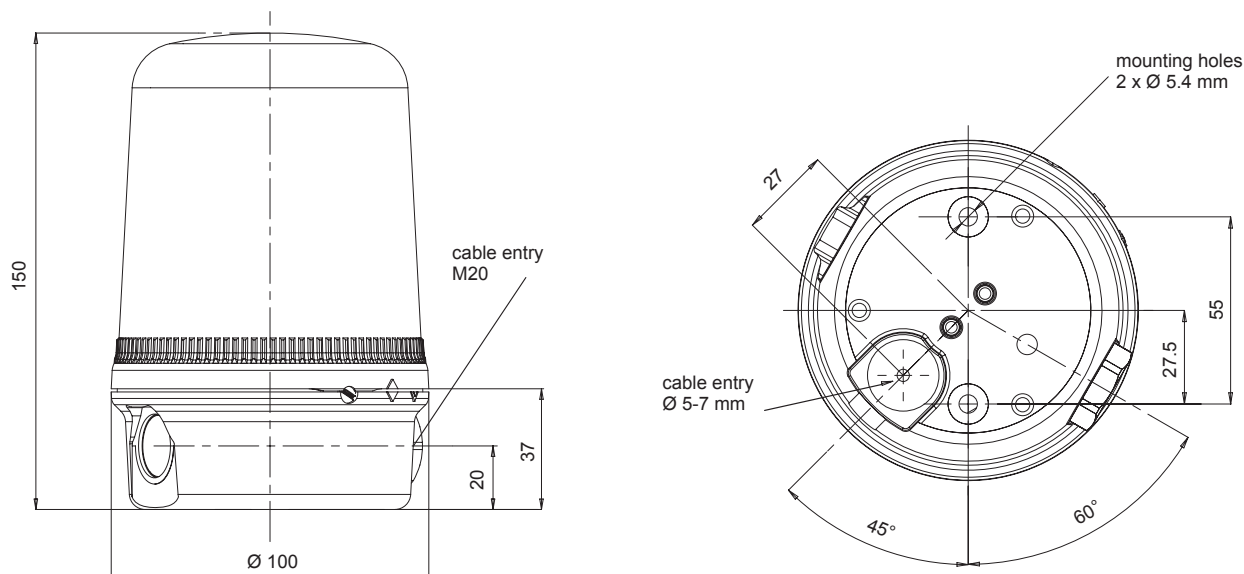
Operating temperature

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 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range		207 – 253 V	100 – 130 V	207 – 253 V	100 – 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 – 28 V	20 – 28 V	10 – 15 V	20 – 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 J @ 1 Hz	5 J @ 1 Hz	5 J @ 1 Hz or 2 Hz
Light intensity (DIN 5037) <sup>1</sup>	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 mm <sup>2</sup>		
Weight	AC	300 g	325 g
	DC	325 g	325 g

<sup>1</sup> with a clear lens

## 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



Article number:  
213 92 00 0 000



Article number:  
213 93 00 0 000



Article number:  
282 50 20 0 000

only in combination with tubular stand

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

# Compact Flashing Light 5 Joules

## PY X-S-05



The compact flashing light is not only adaptable to many applications, but it is also impressive due to its safe and simple mounting

- installation options with external lugs or internal holes
- simple electrical connection on the bottom of the casing
- impact-proof lens
- suitable for panel mounting
- housing colours: red, grey or white
- optional with Soft-Start-Module for reduction of starting current



Range as  
per EN 54



Protection  
system



Operating  
temperature



24 V DC,  
48 V DC



24 V DC,  
48 V DC



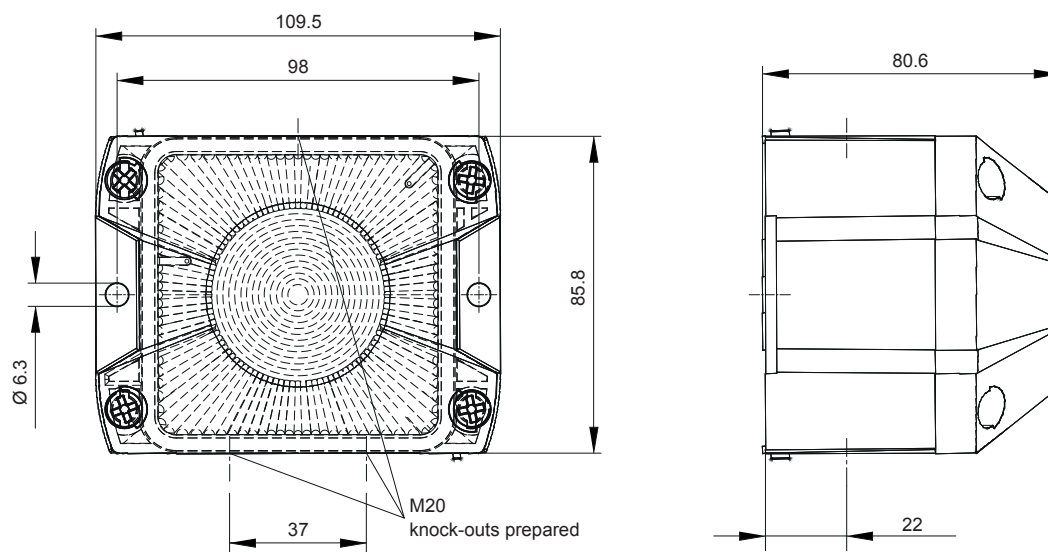
Electrical data	PY X-S-05					
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption	55 mA	100 mA	800 mA	170 mA	300 mA	600 mA

Mechanical data	PY X-S-05	
Flash rate	1 Hz = 60 flashes/min.	
Flash energy	5 J	
Light intensity (DIN 5037) <sup>1</sup>	44 cd	
Lens colours	clear, white, yellow, amber, red, green, blue	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	max. 90%	
Protection system according to EN 60529	IP 66	
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	PC / ABS blend
Colour	housing	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)
Cable entry	3 x M20 knock-outs on side, 1 knock-out on back	
Integrated seal with cable entry	6 – 13 mm (feed-through grommet)	
Connecting terminals	2.5 mm <sup>2</sup> fine wire with cable end sleeve, AWG 16	
Weight	AC	165 g
	DC	200 g

<sup>1</sup> with a clear lens



## Dimensions



## Ordering details

Article numbers		PY X-S-05 – housing red		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
yellow		215 10 10 3 000	215 10 15 3 000	215 10 80 3 000
amber		215 10 10 4 000	215 10 15 4 000	215 10 80 4 000
red		215 10 10 5 000	215 10 15 5 000	215 10 80 5 000
Article numbers		PY X-S-05 – housing grey		
Lens colour	Rated voltage	230 V AC	115 V AC	24 V DC
yellow		215 10 10 3 055	215 10 15 3 055	215 10 80 3 055
amber		215 10 10 4 055	215 10 15 4 055	215 10 80 4 055
red		215 10 10 5 055	215 10 15 5 055	215 10 80 5 055

Article numbers for other colours and voltages on request

## Options / Accessories



Enclosure fitting

Surface gasket

Tamper-proof sealing

Panel mounting kit



SSM  
(only for 24 V DC)

See page 119 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



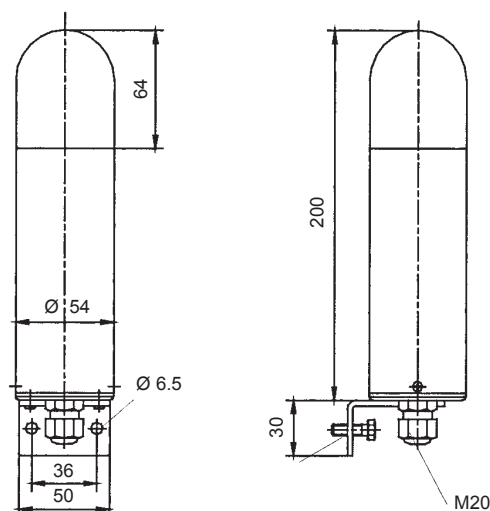
Operating  
temperature

Electrical data	AC	DWBL				
Rated voltage		230 V AC	110 V AC	48 V AC	42 V AC	24 V AC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Operating range		185 – 255 V	90 – 135 V	40 – 54 V	35 – 50 V	20 – 30 V
Nominal current consumption		0.04 A	0.05 A	0.26 A	0.29 A	0.5 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 – 15 V	18 – 30 V	40 – 60 V	50 – 72 V	64 – 96 V
Nominal current consumption		0.27 A	0.15 A	0.1 A	0.07 A	0.067 A

Mechanical data	DWBL		DWBS
Flash rate	1 Hz = 60 flashes/min.		
Flash energy	2.5 J		
Light intensity (DIN 5037) <sup>1</sup>	8 cd		
Lens colours	clear, white, yellow, amber, red, green, blue		
Operating temperature	- 40 °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 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , with cable end sleeves DIN 46228/1		
Weight	AC	270 g	
	DC		300 g

<sup>1</sup> with a clear lens

## 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 118/119 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

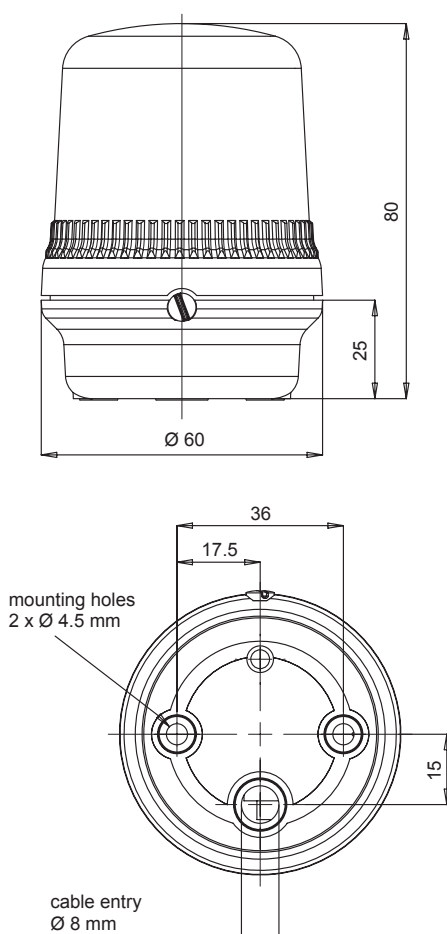
Electrical data	P 200 STR			P 100 STR		
Rated voltage	230 V AC	115 V AC	12 / 24 V AC/DC	230 V AC	115 V AC	12 / 24 V AC/DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz / DC
Operating range	207 – 253 V	100 – 130 V	10 – 30 V	207 – 253 V	100 – 130 V	10 – 30 V
Nominal 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 J @ 0.75 Hz	
Light intensity (DIN 5037) <sup>1</sup>	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 mm <sup>2</sup>	screw terminals 1.5 mm <sup>2</sup> pluggable
Weight	AC	89 g
	DC	84 g
		105 g
		100 g

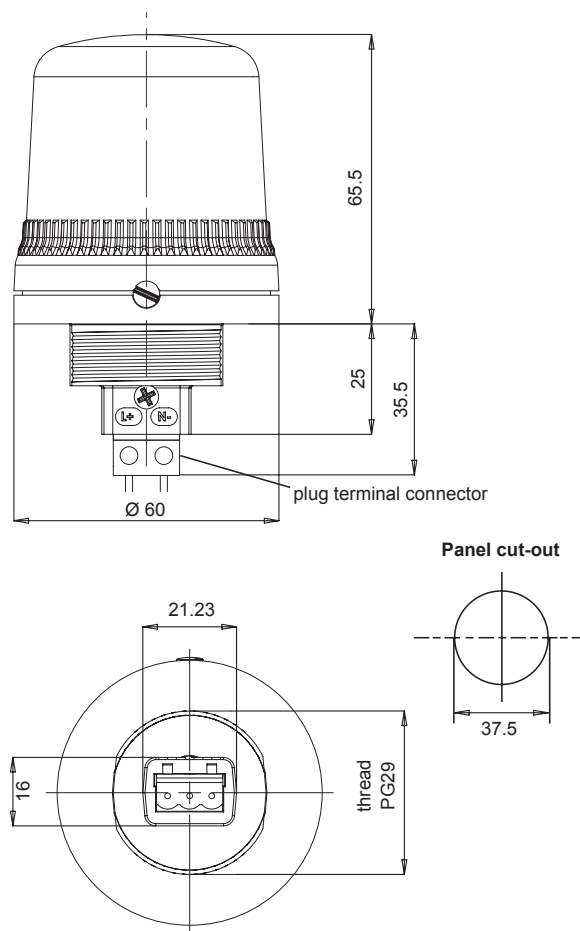
<sup>1</sup> with a clear lens

## Dimensions

### P 200 STR



### P 100 STR



## 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



only for  
P 200 STR

Article number:  
213 90 00 0 000



only for  
P 200 STR

Article number:  
213 91 00 0 000



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. 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 (Ø 140 mm)



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

P 400 FLF

P 400 FLH



Range as per EN 54



Range as per EN 54



Protection system

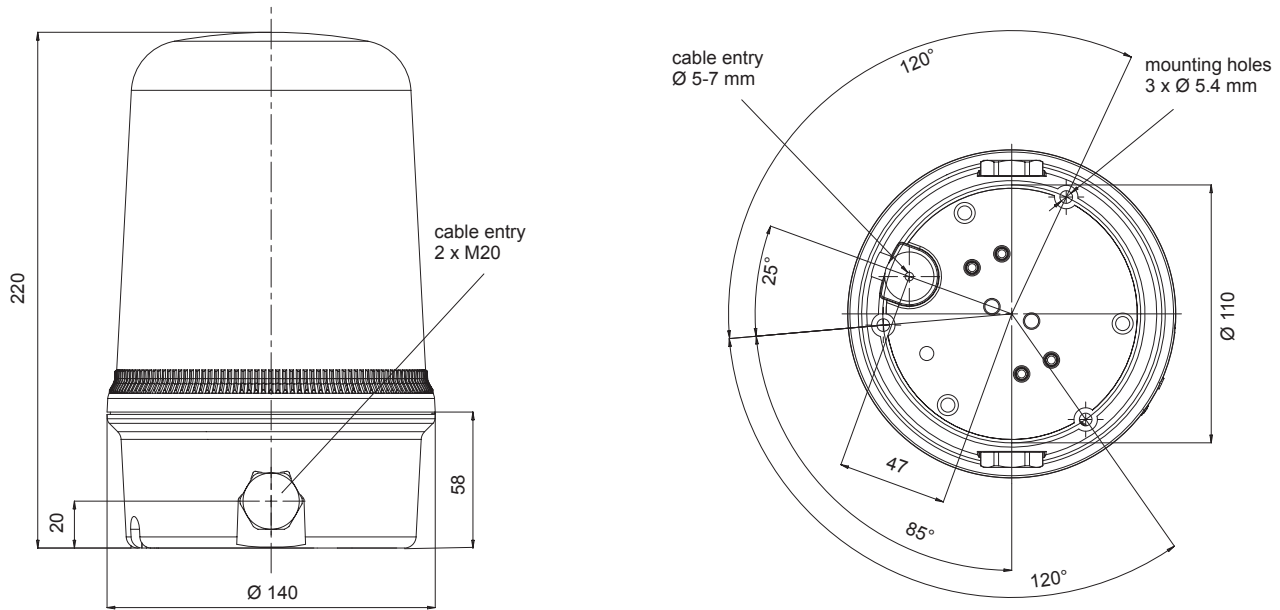


Operating temperature

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 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	207 – 253 V	100 – 130 V	20 – 28 V	207 – 253 V	100 – 130 V	20 – 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 3 blink frequencies – adjustable during installation	35 W / 40 W @ 0.5 Hz / 1 Hz / 2 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)	
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 <sup>2</sup>	
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



Article number:  
213 94 00 0 000



Article number:  
213 95 00 0 000



Article number:  
282 50 20 0 000

only in  
combination  
with tubular  
stand



Light source

See pages 120-122 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 (Ø 100 mm)



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

P 300 FLF

P 300 FLH



Range as per EN 54



Range as per EN 54



Protection system

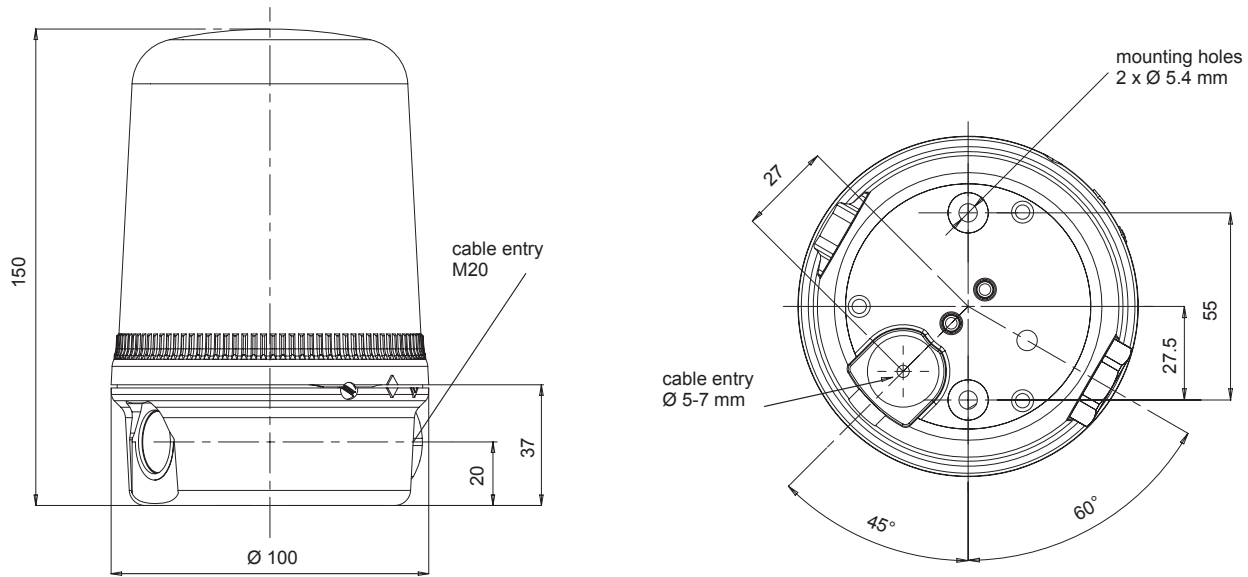


Operating temperature

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 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	207 – 253 V	100 – 130 V	20 – 28 V	207 – 253 V	100 – 130 V	20 – 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
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 <sup>2</sup>	
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



Article number:  
213 92 00 0 000



Article number:  
213 93 00 0 000



Article number:  
282 50 20 0 000

only in  
combination  
with tubular  
stand



Light source

See pages 120-122 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

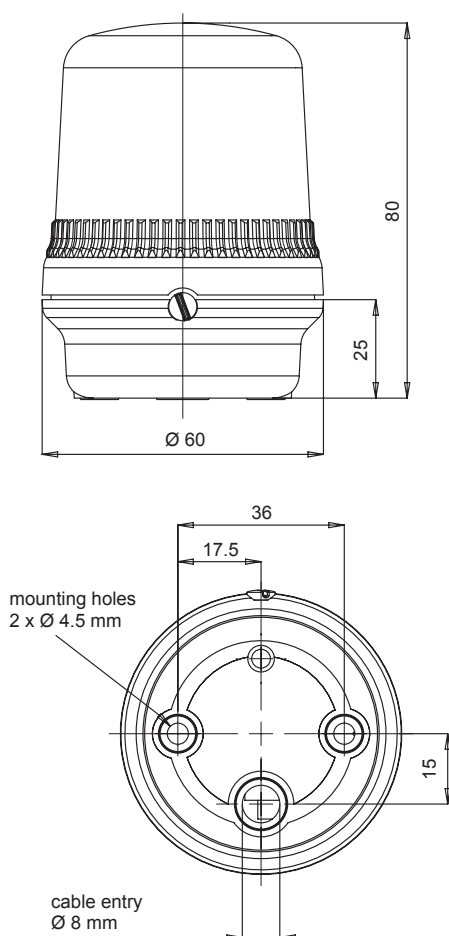
Electrical data	P 200 FLF			P 100 FLF		
Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	207 – 253 V	100 – 130 V	10 – 30 V	207 – 253 V	100 – 130 V	20 – 28 V
Nominal current consumption	25 mA	35 mA	250 mA	25 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 mm <sup>2</sup>	screw terminals 1.5 mm <sup>2</sup> pluggable
Weight	79 g	93 g

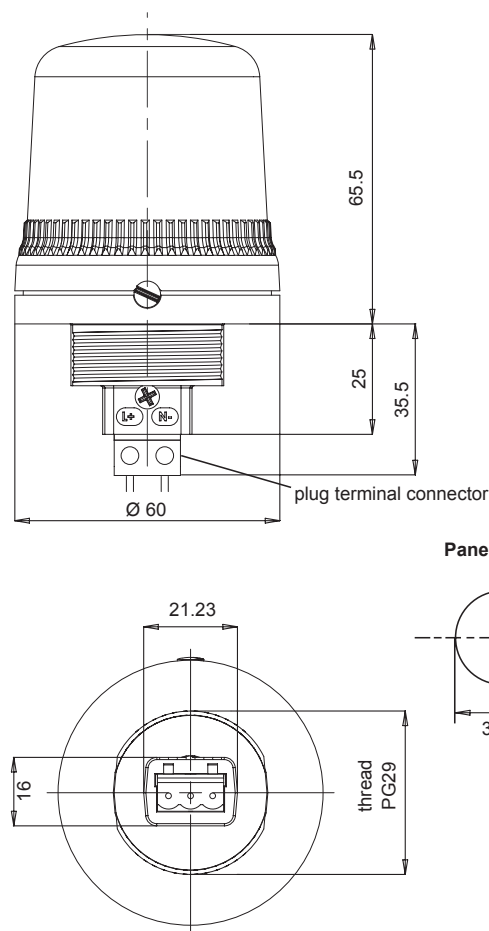


## Dimensions

### P 200 FLF



### P 100 FLF



## 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



only for  
P 200 FLF

Article number:  
213 90 00 0 000



only for  
P 200 FLF

Article number:  
213 91 00 0 000



only in  
combination  
with tubular  
stand

Article number:  
282 50 20 0 000



Light source

See pages 120-122 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 Multi-function Light

## PMF-LED Flex



Multi-function 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



Range as  
per EN 54



Protection  
system



Operating  
temperature

Electrical data		PMF-LED Flex			
Rated voltage		115 V AC	230 V AC	230 V DC	24 V AC/DC
Operating range		95 – 253 V AC		100 – 350 V DC	10 – 60 V DC      15 – 40 V AC
Current consumption in 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 rate of the main flash			1.5 Hz	1 Hz	2.5 Hz
Light source		8 x 2 LEDs (3 chip version)			
Light intensity (DIN 5037) <sup>1</sup>		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		cage clamp terminal 0.08 - 2.5 mm <sup>2</sup>			
Weight		direct mounting: 620 g / bracket mounting: 900 g			

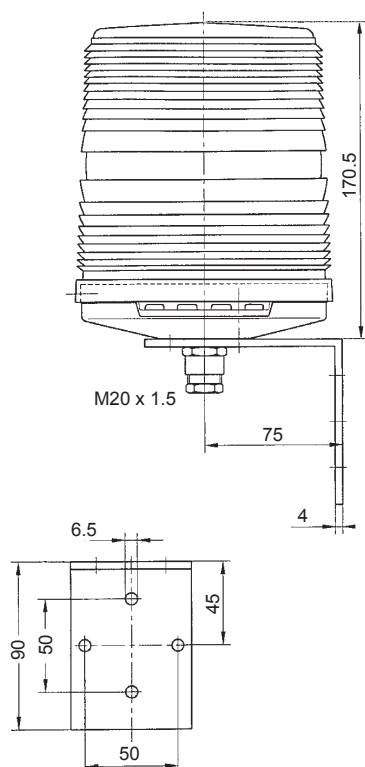
<sup>1</sup> with a clear lens

### Operating modes

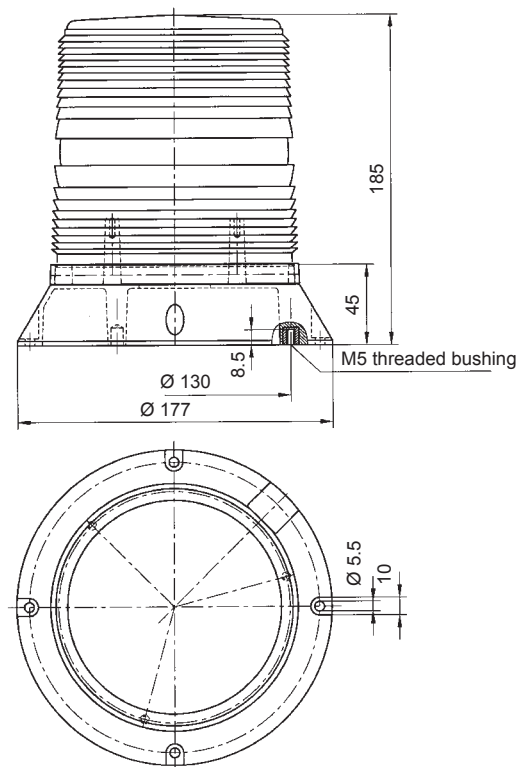
S1			Selection via internal DIP switch		S1 - X1 - 1 1 2 3 4 (S1-2 = OFF, S1-3 = OFF)		Selection via external control		S1 - X1 - 1 1 2 3 4 (S1-2 = OFF, S1-3 = OFF)		Selection via BAV option (24 V AC/DC only)	
1	2	3										
OFF	OFF	OFF	OFF		OFF	-/N	+/L		OFF (standby)	OFF	-/N	+/L
OFF	OFF	ON	all-round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

## Dimensions

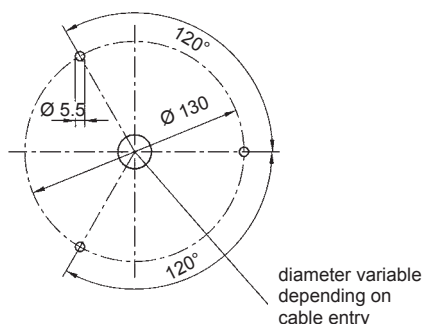
### Bracket mounting



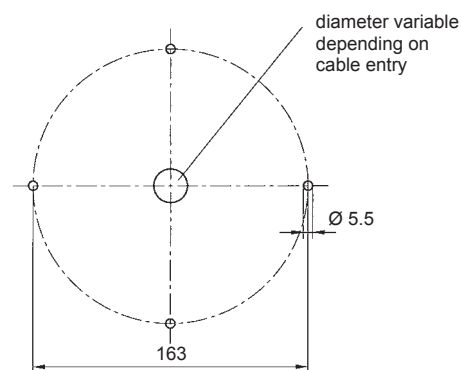
### Direct mounting



### 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 Multi-function Lights

## P 400 LDA (Ø 140 mm) / P 300 LDA (Ø 100 mm)



P 400 LDA

P 300 LDA

Range as  
per EN 54Range as  
per EN 54Protection  
systemOperating  
temperature

LED multi-function lights for extreme requirements

- energy-saving and durable thanks to the use of maintenance-free LED technology
- as standard with on-site selectable signaling 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 – 130 V	207 – 253 V	10 – 50 V	90 – 253 V	10 – 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 multi-function light with 9 internally selectable operating modes				
Light source		high output LED array				
Light intensity (DIN 5037) <sup>1</sup>		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 mm <sup>2</sup>				
Weight	AC	595 g			285 g	
	DC	845 g			285 g	

<sup>1</sup> with a clear lens

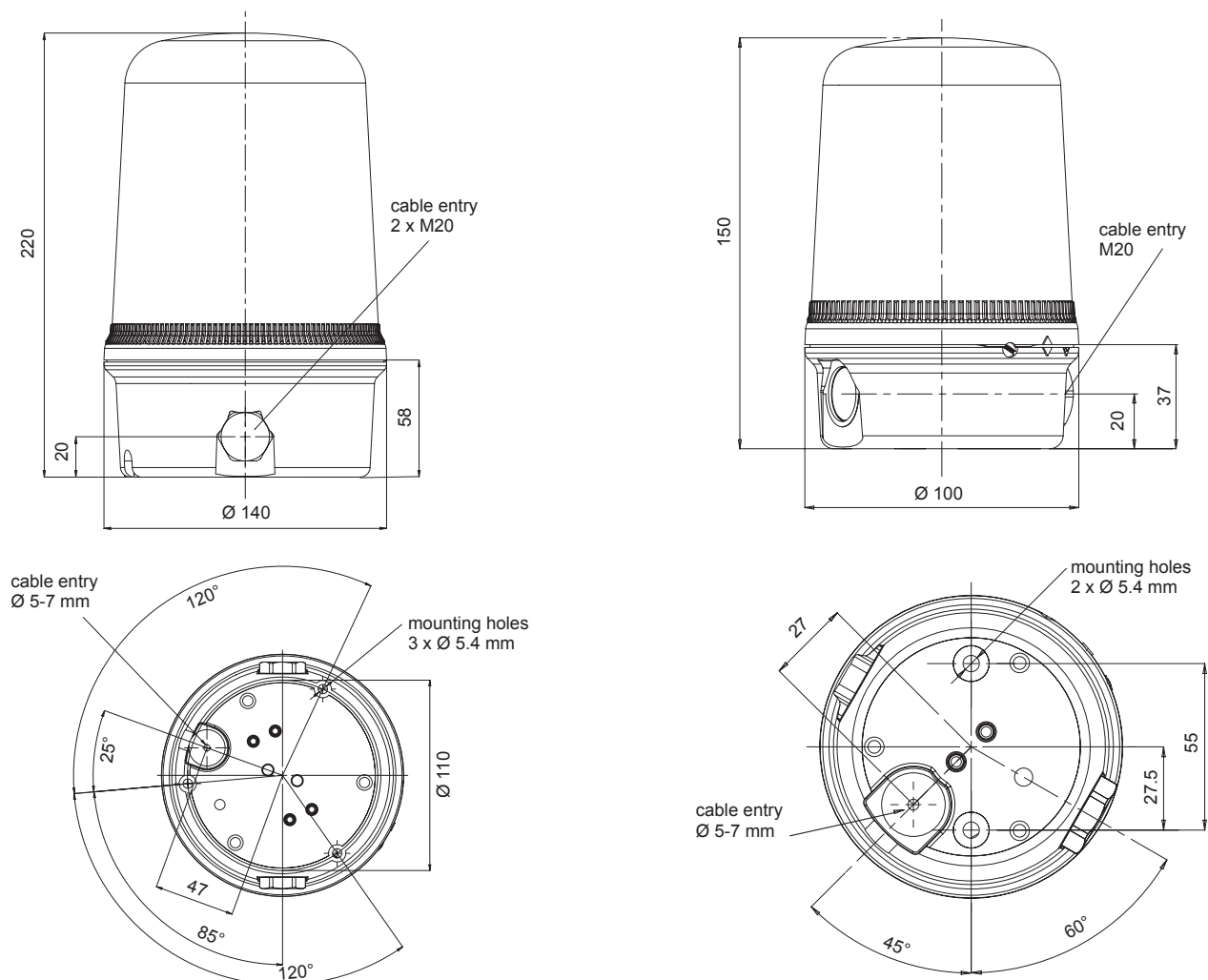
### Operating modes Stage 1: internally selectable, stages 2 & 3 externally controllable (DC lights only)

P 400 LDA				P 300 LDA	
Mode	Stage 1	Stage 2 (only DC)	Stage 3 (only DC)	Stage 1	Stage 2 (only DC)
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 2 Hz	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 15 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

<b>Wall bracket</b>	for P 400	<b>Wall bracket</b>	for P 300	<b>Tubular stand 145 mm</b>	for P 400	<b>Tubular stand 140 mm</b>	for P 300	<b>Wall holder</b>	only in combination with tubular stand	See pages 120/121 for further information
Article number:	213 94 00 0 000	Article number:	213 92 00 0 000	Article number:	213 95 00 0 000	Article number:	213 93 00 0 000	Article number:	282 50 20 0 000	

## 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".

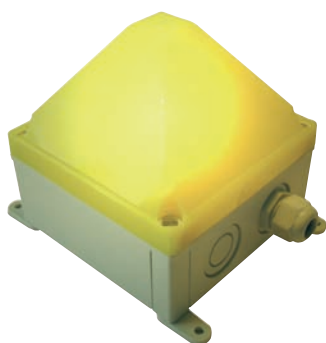
References to visual alarm devices can be found in the following standards:

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 Multi-function Light

## Quadro-LED-HI



Designed for tough requirements under industrial conditions

- innovative LED light with large signaling effect
- suitable for indoor and outdoor use
- extremely insensitive to shock and vibration
- internally and externally selectable operating mode as standard
- 3 different signal options can be selected:
  - continuous light
  - blinking light
  - flashing light
- 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



Range as  
per EN 54



Protection  
system



Protection  
system



Impact-proof  
housing



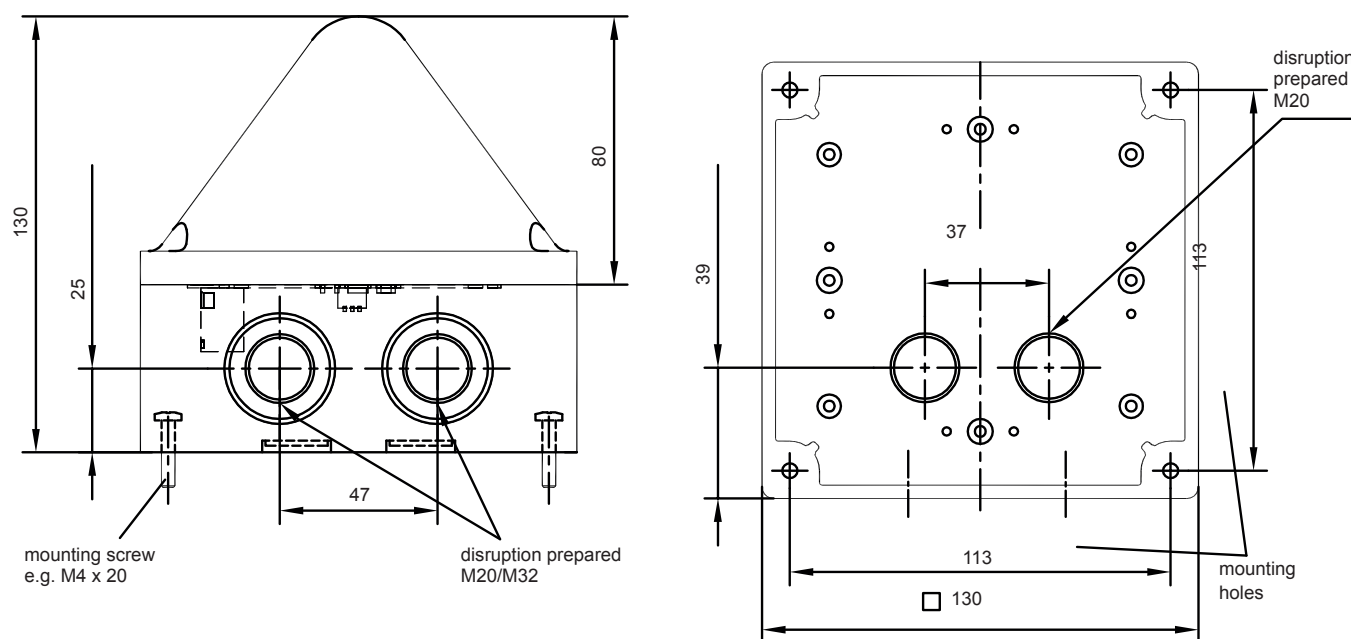
Operating  
temperature

Electrical data	Quadro-LED-HI	
Rated voltage	115 / 230 V AC/DC	24 V AC/DC
Rated frequency	50 / 60 Hz / DC	50 / 60 Hz / DC
Operating range	AC	95 – 253 V
	DC	100 – 350 V
Current consumption in continuous light mode	100 mA	1 A

Mechanical data	Quadro-LED-HI		
Operating mode (internally and externally selectable)	continuous light	blinking light	flashing light
Light alternation frequency		1.5 Hz	1 Hz
Light source	high output LED		
Light intensity (DIN 5037) <sup>1</sup>	100 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	cage clamp terminal 0.08 – 2.5 mm²		
Weight	500 g		

<sup>1</sup> with a clear lens

## Dimensions



Additional mounting possible via external lugs (included).

## Ordering details

Article numbers		Quadro-LED-HI	
Lens colour	Rated voltage	230 V AC/DC	24 V AC/DC
yellow		on request	on request
amber		on request	on request
red		on request	on request

Article numbers for other colours on request

## Options / Accessories



## 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.

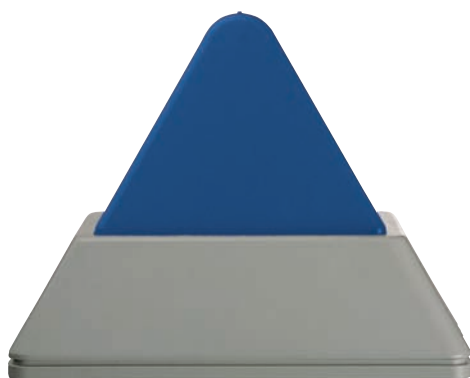
The colours 'red' for the emergency signal and 'yellow' for the warning signal conform to the requirements of IEC 73 / DIN EN 60073 / VDE 0199: "Coding of display devices and control elements using colours and supplementary means".

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



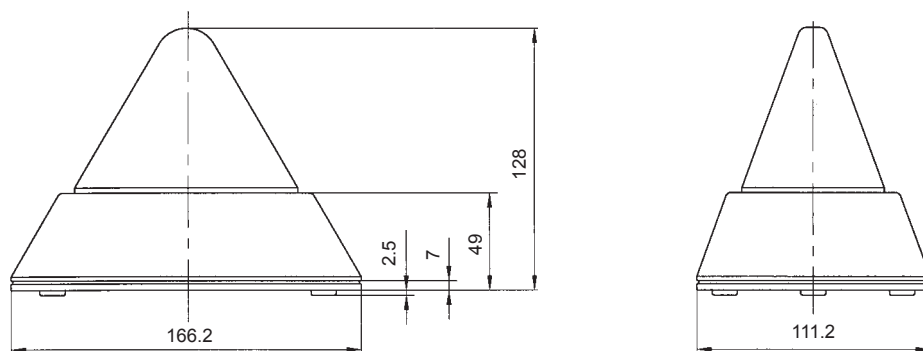
Operating  
temperature

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

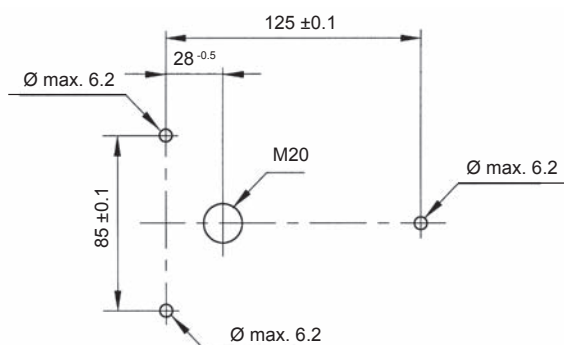
Mechanical data	PD 2100-LED	
Light source	LED	
Light intensity (DIN 5037) <sup>1</sup>	5 cd	
Lens colours	clear, white, yellow, amber, red, green, blue	
Operating temperature	- 25 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 80 °C	
Relative humidity	90%	
Protection system according to EN 60529	IP 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 mm <sup>2</sup>	
Weight	AC	380 g
	AC/DC	270 g

<sup>1</sup> with a clear lens

## 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



Article number:  
287 10 50 0 040



GOST

See page 119 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

# 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

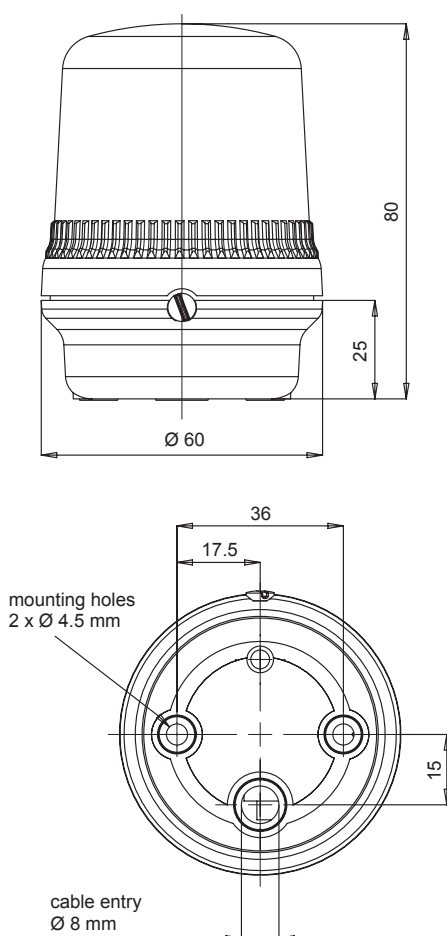
Electrical data	P 200 LDA		P 100 LDA	
Rated voltage	115 / 230 V AC	12 / 24 V DC	115 / 230 V AC	12 / 24 V DC
Rated frequency	50 / 60 Hz		50 / 60 Hz	
Operating range	90 – 253 V	10 – 30 V	90 – 253 V	10 – 30 V
Nominal current consumption	32 mA	80 mA	12 mA	80 mA

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 mm <sup>2</sup>	screw terminals 1.5 mm <sup>2</sup> pluggable
Weight	78 g	93 g

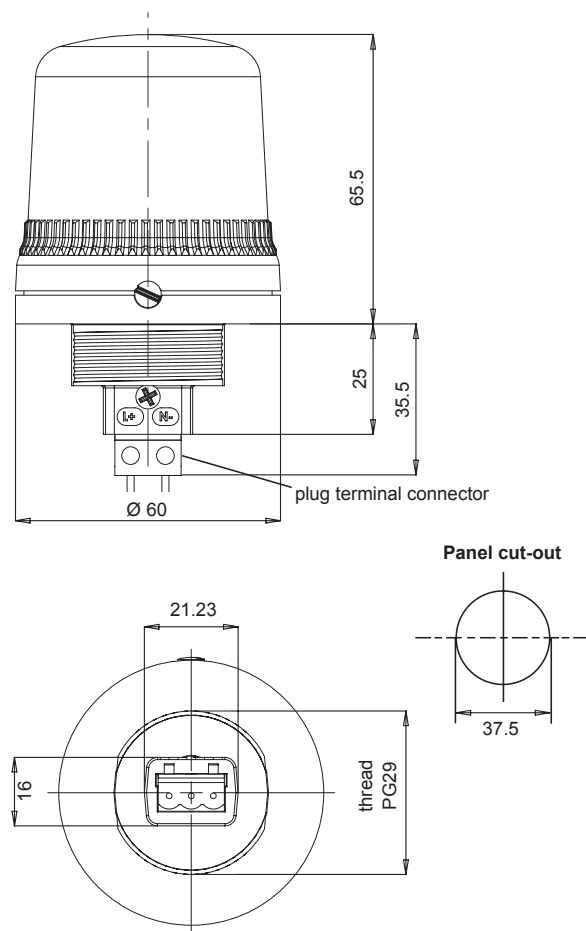


## Dimensions

### 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



only for  
P 200 LDA

Article number:  
213 90 00 0 000



only for  
P 200 LDA

Article number:  
213 91 00 0 000



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 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

# Traffic Light

## Quadro LED-TL



Protection system



Impact-proof housing



Operating temperature



Light sensor (optional)

Bright LED signal lights for traffic light applications, e.g. for

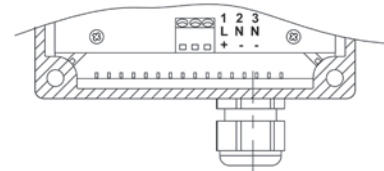
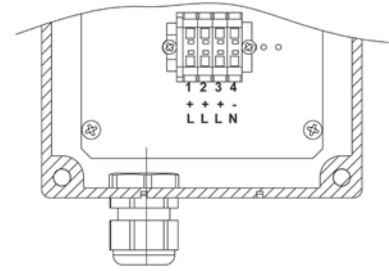
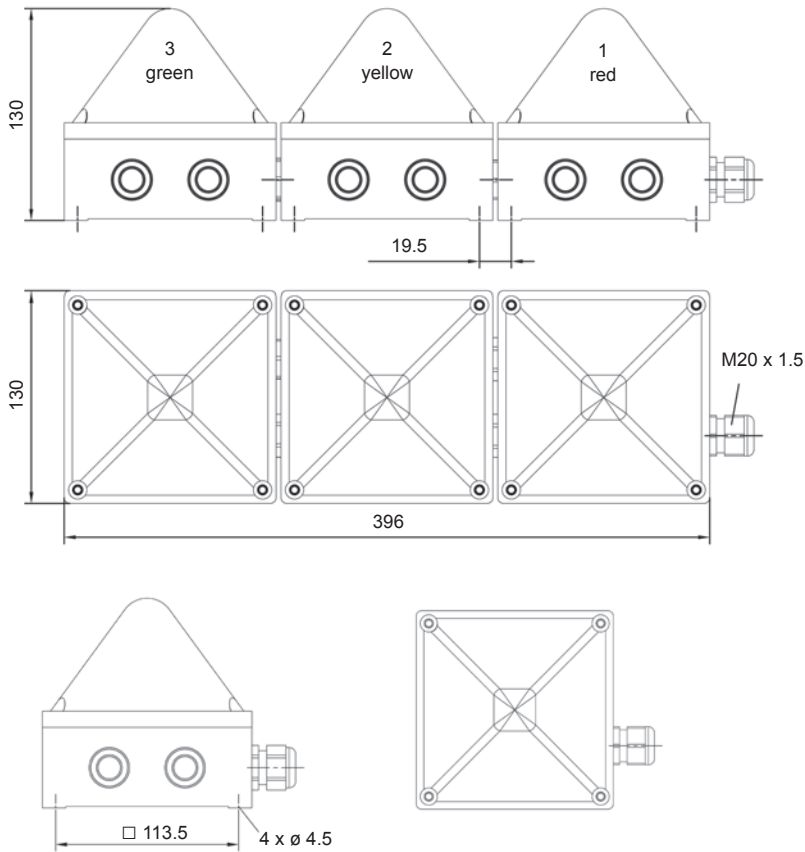
- traffic routing in non-public areas
- conveyer and storage systems
- crane safety (see also 'Regulations and standards for crane applications', page 81)
- container handling systems
- extraordinary housing protection (IP 66, IK0 8 and UV-protected PC housing) and innovative LED technology provide for 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)

Electrical data	Quadro LED-TL	
Rated voltage	115 / 230 V AC	24 V DC
Rated frequency	50 / 60 Hz	
Operating range	85 – 265 V	10 – 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	cage clamp terminal 0.08 – 2.5 mm <sup>2</sup> (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:

"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

## Regulations and standards for crane applications

<b>DIN-EN 13000:2004-09</b> <b>Cranes – truck-mounted cranes</b>	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
<b>DIN-EN 14439:2006</b> <b>Safety – rotating tower cranes</b>	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 (Ø 140 mm) / P 350 TLA (Ø 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 TLA

P 350 TLA



Range as per EN 54



Range as per EN 54



Protection system



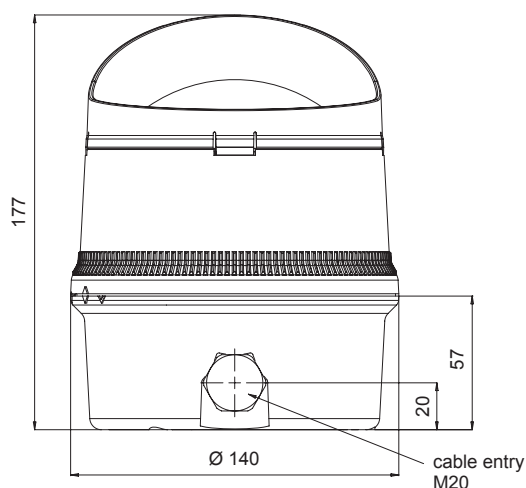
Operating temperature

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 – 253 V	10 – 30 V	90 – 253 V	10 – 30 V
Nominal current consumption	15 – 40 mA	175 mA	10 – 40 mA	140 mA

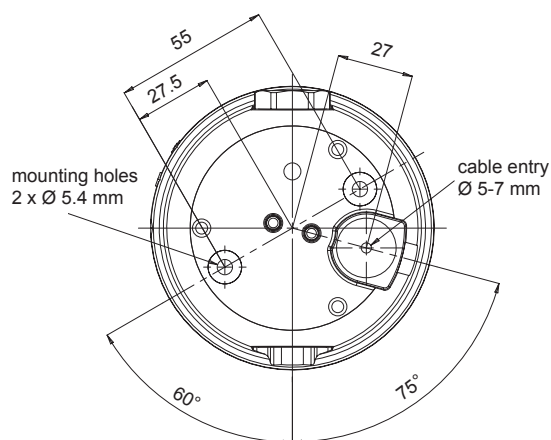
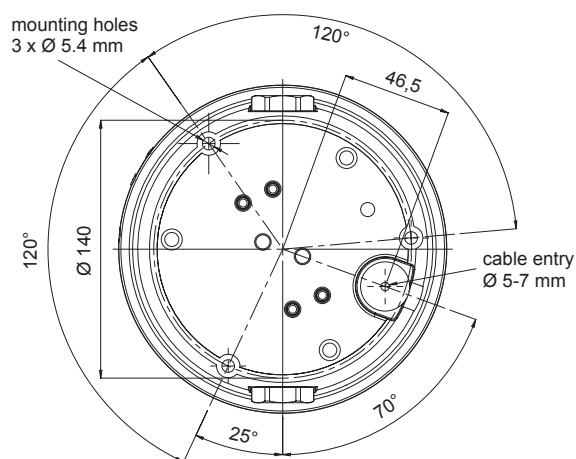
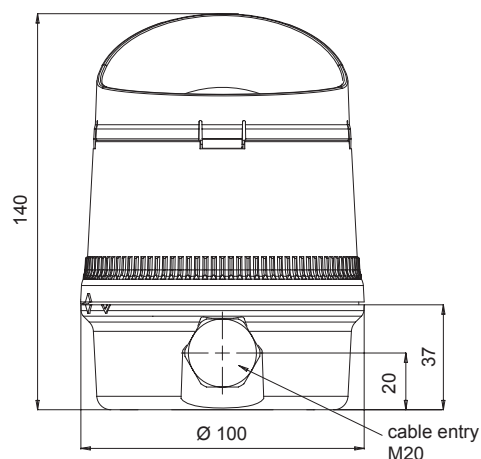
Mechanical data	P 450 TLA	P 350 TLA
Operating mode	LED continuous light	LED continuous light
Light source	high output LED array	
Light intensity (DIN 5037)	60 cd	45 cd
Lens colour	clear	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 60529	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 accessories)	
Connecting terminals	screw terminals 2 x 1.5 mm <sup>2</sup>	screw terminals 2 x 1.5 mm <sup>2</sup>
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 entries (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



for single  
mounting  
P 450

Article number:  
213 99 00 0 000



for single  
mounting  
P 350

Article number:  
213 98 00 0 000



for combinations  
of 2 or 3  
P 450

Article number:  
213 97 00 0 000



for combinations  
of 2 or 3  
P 350

Article number:  
213 96 00 0 000

See pages 120-122 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				

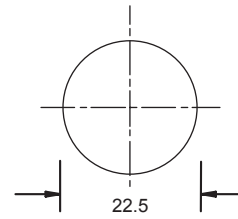
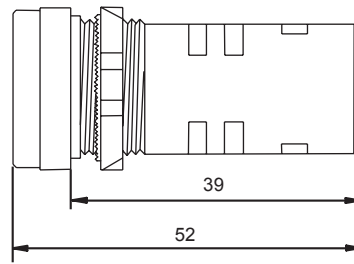
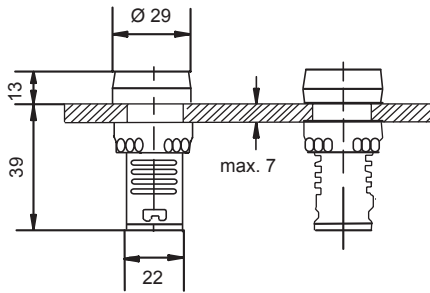
Mechanical data	P 22 D	P 22 DFS
Operating mode	continuous light	1 Hz blinking light
Light source	LED array	
Lens colours	white, amber, red, green, blue	red
Operating temperature	- 25 °C ... + 50 °C	
Storage temperature	90% @ + 20 °C	
Protection system according to EN 60529	IP 65 (to housing)	
Service life of light source	> 50 000 hrs	
Mounting	panel-mounting: Ø 22.5 mm	
Connecting terminals	screw terminals 1.5 mm <sup>2</sup>	
Weight	90 g	



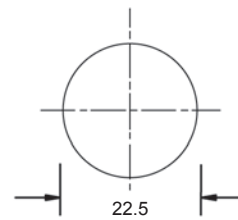
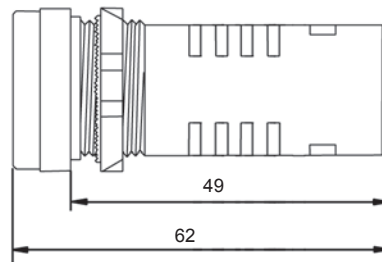
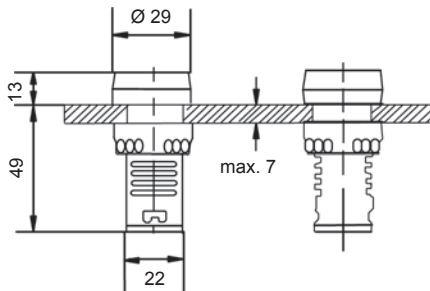
## Dimensions

## Panel cut-out

### P 22 D



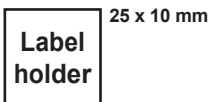
### P 22 DFS



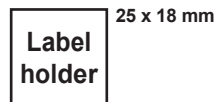
## Ordering details

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	

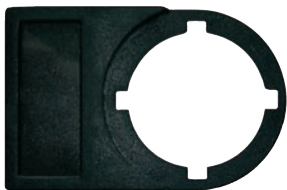
## Options / Accessories



Article number:  
232 92 00 0 000



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



Range as per EN 54



Range as per EN 54



Protection system



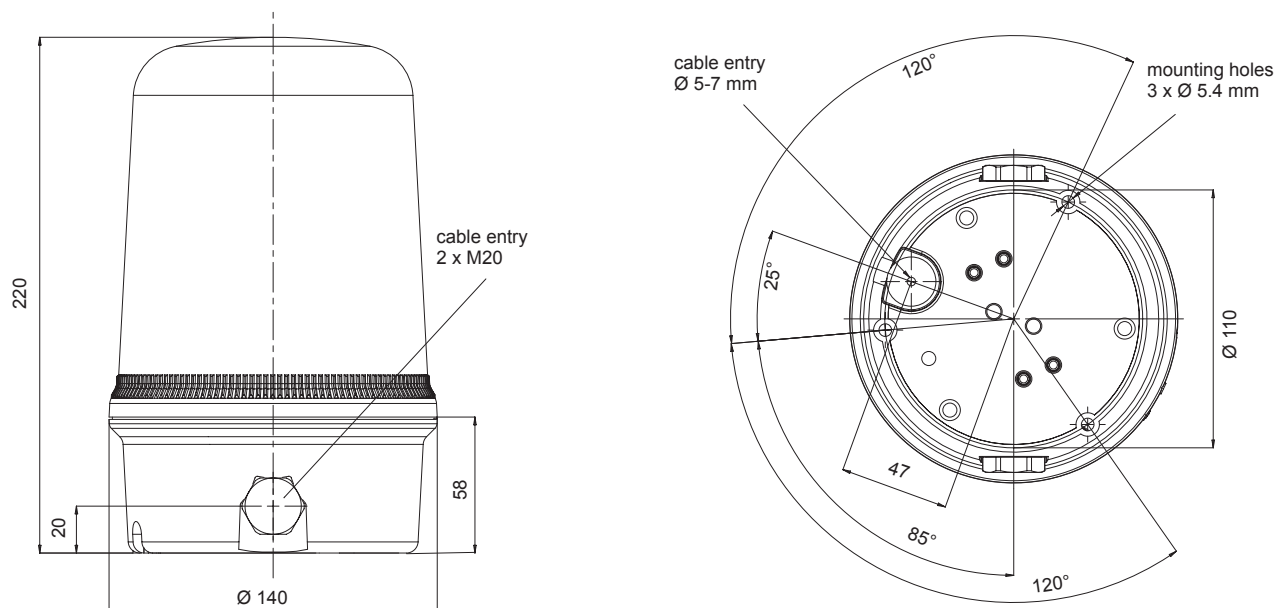
Operating temperature

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

\* 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 <sup>2</sup>	
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



Article number:  
213 94 00 0 000



Article number:  
213 95 00 0 000



Article number:  
282 50 20 0 000

only in  
combination  
with tubular  
stand



Light source

See pages 120-122 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 (Ø 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

P 300 SLH



Range as per EN 54



Range as per EN 54



Protection system



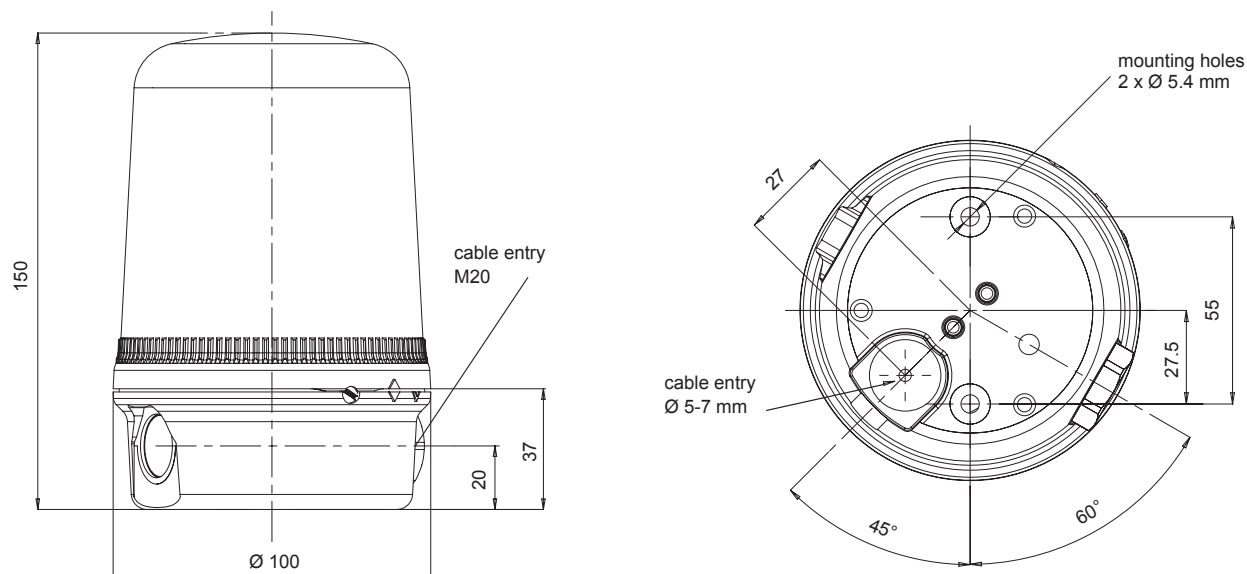
Operating temperature

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

\* 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 <sup>2</sup>	
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



Article number:  
213 92 00 0 000



Article number:  
213 93 00 0 000



Article number:  
282 50 20 0 000

only in  
combination  
with tubular  
stand



Light source

See pages 120-122 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:

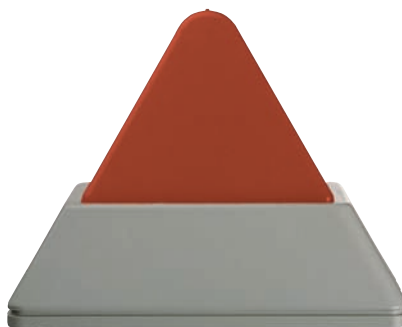
“**Coding of display devices and control elements using colours and supplementary means**”.

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 Light

## PD 2100



Status lights for universal use

- machine light in an elegant pyramid design



Range as  
per EN 54




Protection  
system



Operating  
temperature

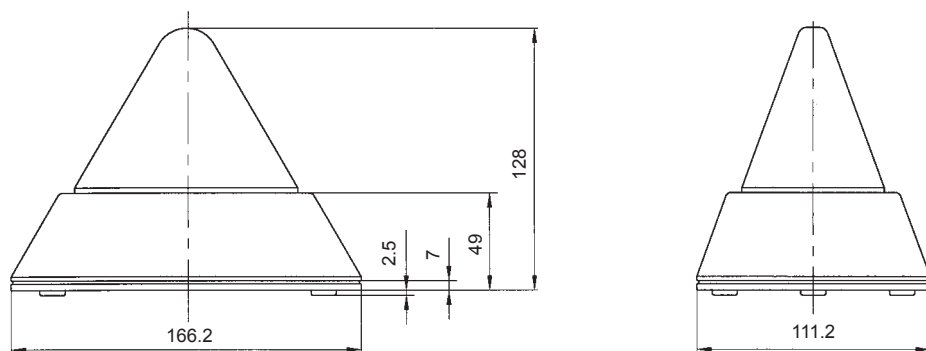
Electrical data	PD 2100
Rated voltage	max. 250 V
Power consumption	max. 15 W *

\* light source not included

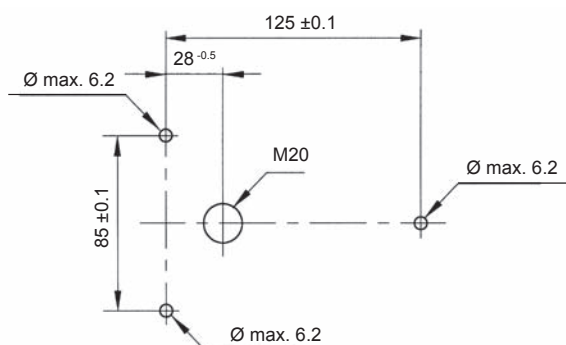
Mechanical data	PD 2100
Operating mode	continuous light
Light source	BA15d, E14
Light power	max. 15 W
Lens colours	clear, yellow, amber, red, green, blue
Operating temperature	- 40 °C ... + 32 °C
Storage temperature	- 40 °C ... + 80 °C
Relative humidity	90%
Protection system according to EN 60529	IP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



## Dimensions



## Mounting holes



## Ordering details

Article numbers		PD 2100	
Lens colour	Fassung	BA15d	E14
clear		211 20 30 1 000	211 20 10 1 000
yellow		211 20 30 3 000	211 20 10 3 000
amber		211 20 30 4 000	211 20 10 4 000
red		211 20 30 5 000	211 20 10 5 000
green		211 20 30 6 000	211 20 10 6 000
blue		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 page 119 for further information/122

## 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

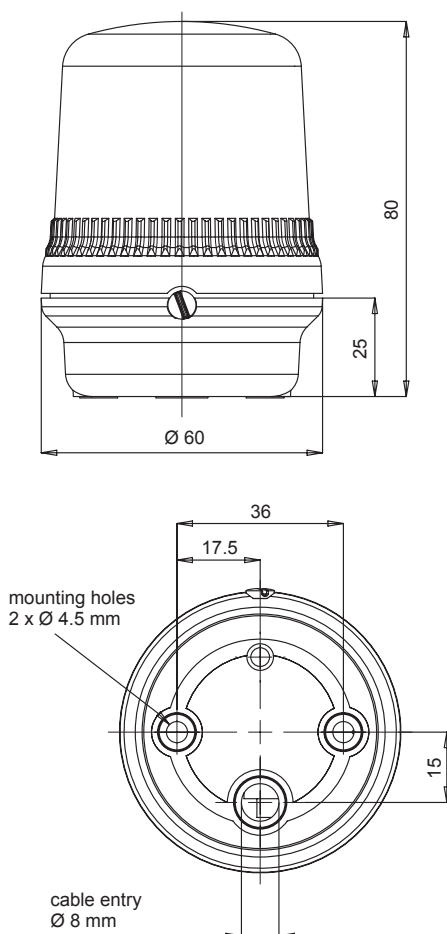
Electrical data	P 200 SLF	P 100 SLF
Rated voltage	12 – 250 V *	12 – 250 V *
Power consumption	5 W	5 W

\* light source not included

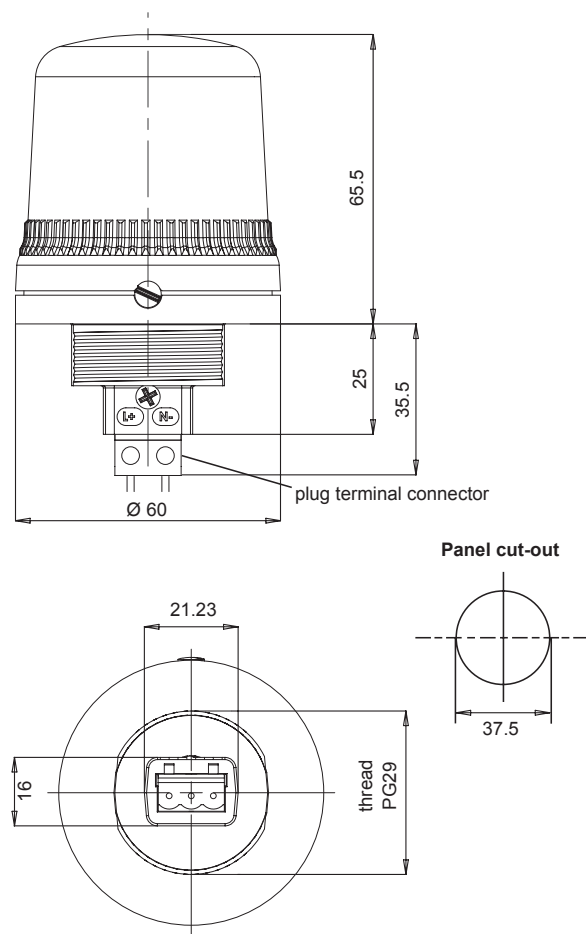
Mechanical data	P 200 SLF	P 100 SLF
Operating mode	continuous light	
Light source	filament lamp BA9s	
Light power	5 W	
Lens colours	clear, yellow, amber, red, green, blue	
Lens type	prismatic	
Operating temperature	- 25 °C ... + 50 °C	
Relative humidity	90% @ + 20 °C	
Protection system according to EN 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 mm <sup>2</sup>	screw terminals 1.5 mm <sup>2</sup> 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



only for  
P 200 SLF



only for  
P 200 SLF



only in  
combination  
with tubular  
stand



Light source

See pages 120-122 for further information

Article number:  
213 90 00 0 000

Article number:  
213 91 00 0 000

Article number:  
282 50 20 0 000

## 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 (Ø 140 mm) / P 350 TSB (Ø 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



Range as per EN 54

P 450 TDB



Range as per EN 54

P 350 TSB



Range as per EN 54



Protection system



Operating temperature

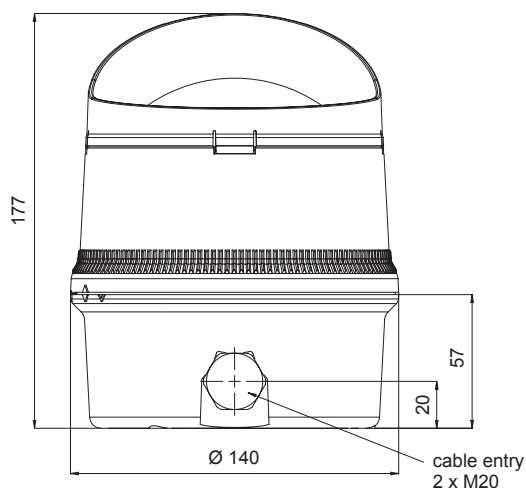
Electrical data	P 450 TSB	P 450 TDB	P 350 TSB
Rated voltage	12 – 250 V *	12 – 250 V *	12 – 250 V *
Power consumption	25 W	2 x 15 W	15 W

\* light source not included

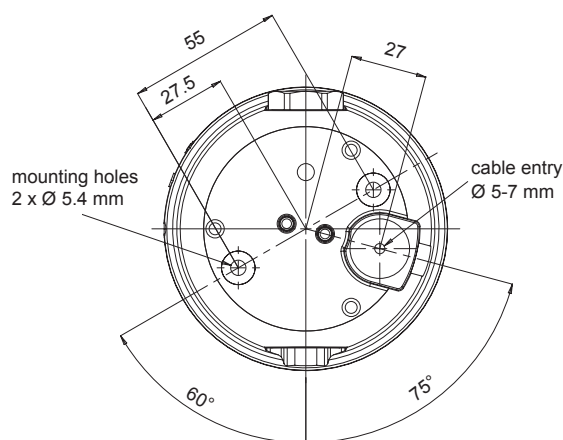
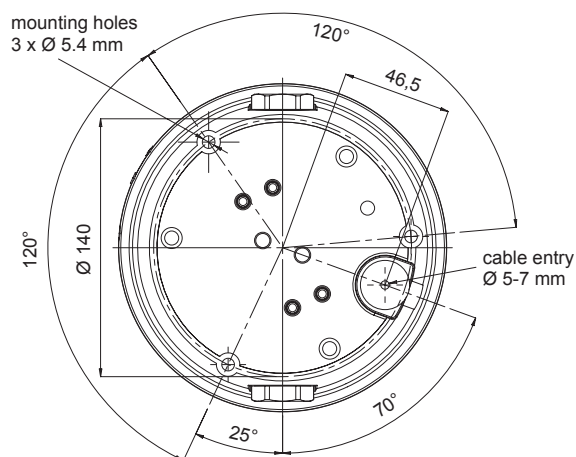
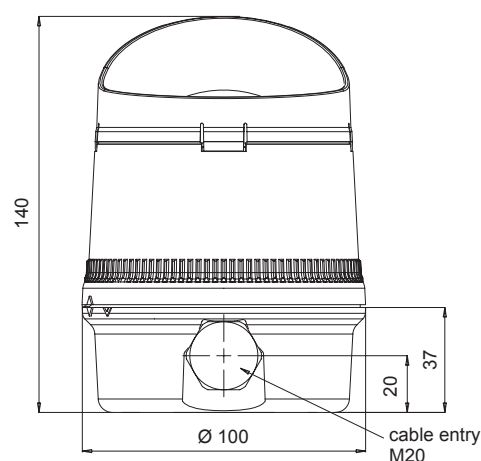
Mechanical data	P 450 TSB	P 450 TDB	P 350 TSB
Operating mode	continuous light	continuous light (redundant)	continuous light
Light source	filament lamp E27	2 x filament lamp E14	filament lamp E14
Lens colours	amber, red, green		
Operating temperature	- 25 °C ... + 50 °C		
Relative humidity	90% @ + 20 °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 accessories)		
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 mm <sup>2</sup>		
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



for single mounting  
P 450

Article number:  
213 99 00 0 000



for single mounting  
P 350

Article number:  
213 98 00 0 000



for combinations  
of 2 or 3  
P 450

Article number:  
213 97 00 0 000



for combinations  
of 2 or 3  
P 350

Article number:  
213 96 00 0 000



Light source

See pages 120-122 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 (Ø 140 mm) / P 300 RTH (Ø 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

P 300 RTH



Range as  
per EN 54



Range as  
per EN 54



Protection  
system



Operating  
temperature

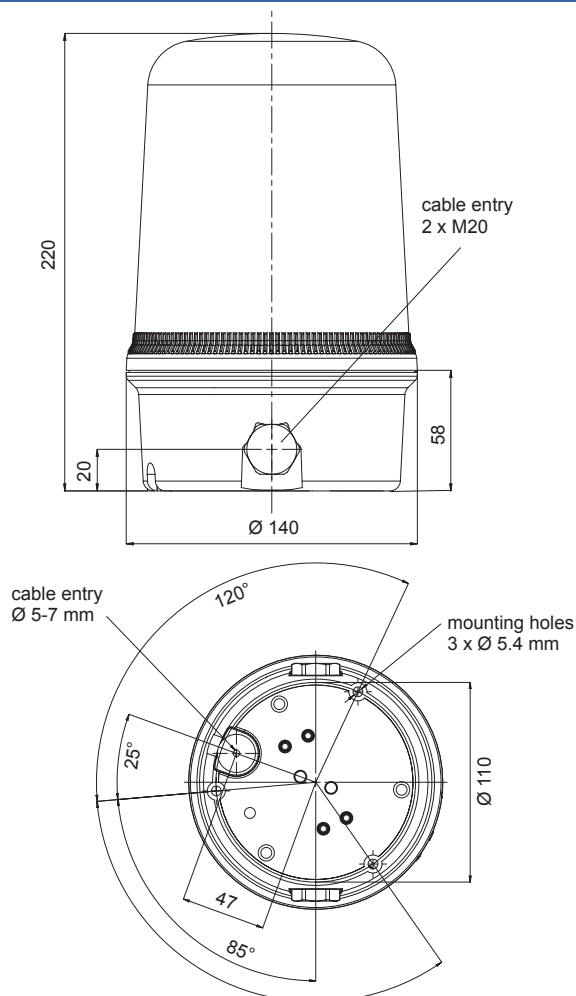
Electrical data	P 400 RTH				P 300 RTH			
Rated voltage	230 V AC	115 V AC	24 V DC	12 V DC	230 V AC	115 V AC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			50 / 60 Hz	50 / 60 Hz		
Nominal current consumption	186 mA	338 mA	1.54 A	3 A	117 mA	216 mA	0.91 A	1.72 A
Capacity of light source	40 W	40 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 rpm	
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%	
Lebensdauer	> 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 <sup>2</sup>	
Cable entry	1 x 5-7 mm push through grommet (bottom side); 1 x M20 cable entry sideways	
Weight	578 g	370 g

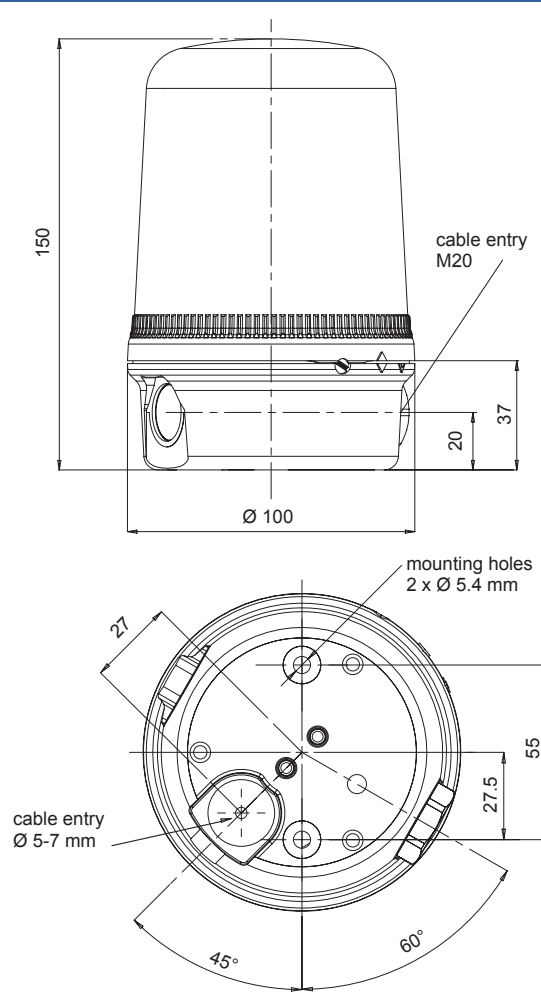


## Dimensions

### 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

<b>Wall bracket</b>	for P 400	<b>Wall bracket</b>	for P 300	<b>Tubular stand 145 mm</b>	for P 400	<b>Tubular stand 140 mm</b>	for P 300	<b>Wall holder</b>	only in combination with tubular stand
Article number: 213 94 00 0 000		Article number: 213 92 00 0 000		Article number: 213 95 00 0 000		Article number: 213 93 00 0 000		Article number: 282 50 20 0 000	

See pages 120/121 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 Light 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



Inrush current limited to < 1A



Sync



Operating temperature

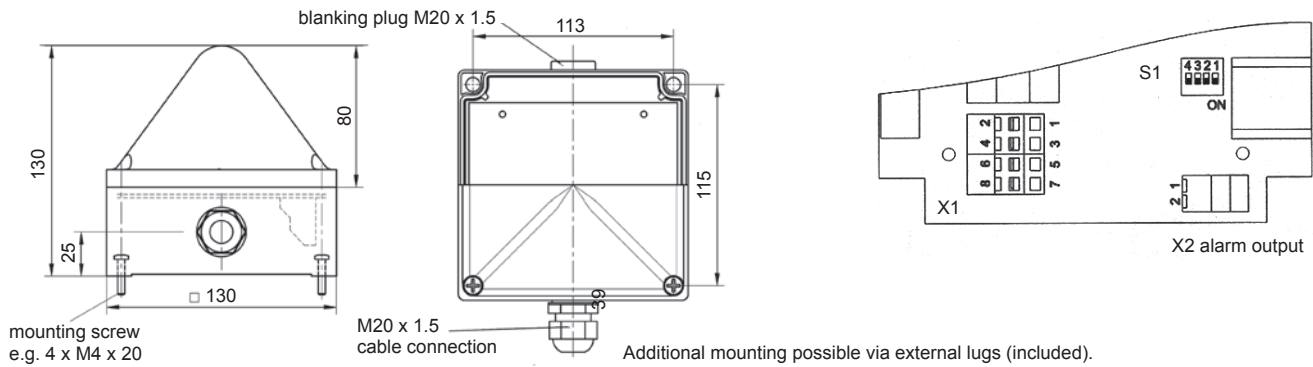
Electrical data	Quadro S-M-Flex	
Rated voltage	230 V AC	115 V AC
Rated frequency	50 / 60 Hz	50 / 60 Hz
Operating range	195 – 253 V	95 – 127 V
Nominal current consumption	250 mA (1 Hz / 13 J)	350 mA (1 Hz / 13 J)
Initial current limited to	< 1 A / 10 ms	
Alarm output	230 V / 80 mA	

Mechanical data	Quadro S-M-Flex	
Flash rate	adjustable (1 Hz = 60 flashes/min. factory setting)	
Flash energy	max. 13 J	
Light intensity (DIN 5037) <sup>1</sup>	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	cage clamp terminal 0.08 - 2.5 mm <sup>2</sup>	
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	

<sup>1</sup> with a clear lens

## Dimensions

## Fault message contact



DIP switch setting				Setting for Quadro S-M-Flex	
4	3	2	1	Frequency (Hz)	Flash energy (J)
			ON	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



## 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 / 60 Hz	50 / 60 Hz			
Operating range	185 – 242 V	37 – 47 V	40 – 57 V	18 – 35 V	10 – 15 V
Nominal current consumption	0.07 A	0.5 A	0.18 W	0.25 A	0.6 A

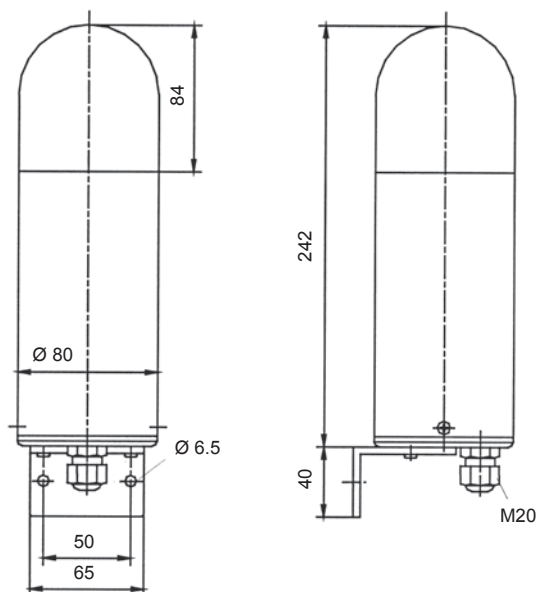
### Switching capacity of the failure indication

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 J	
Light intensity (DIN 5037) <sup>1</sup>	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 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , with cable end sleeves DIN 46228/1	
Weight	700 g	

<sup>1</sup> with a clear lens

## 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



See page 119 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 Light

## PMF 2015-M



Extremely bright due to 14 Joules total flash energy of the impulse group and light bundling with fensel 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 – 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)	1 500 VA
	recommended minimum load	> 50 mW

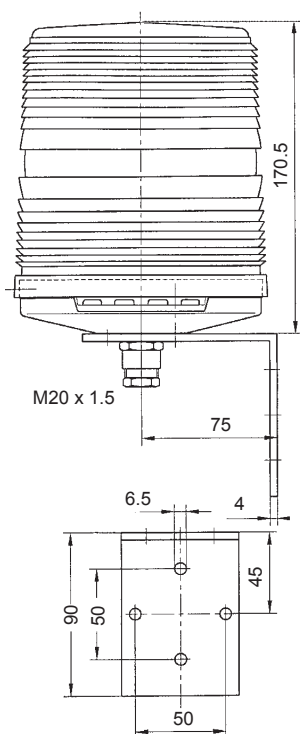
Mechanical data		PMF 2015-M
Operating mode		double flash
Light source		xenon flash tube
Flash rate of the main flash		1 Hz = 60 flashes/min.
Flash energy of the main flash		7 J
Light intensity (DIN 5037) <sup>1</sup>		200 cd
Lens colours		clear, amber, red, green, blue
Lens type		lens with fresnel characteristic
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	bracket mounting	M20 x 1.5 for cables 6.5 – 13.5 mm
Connecting terminals		0.08 – 2.5 mm²

<sup>1</sup> with a clear lens

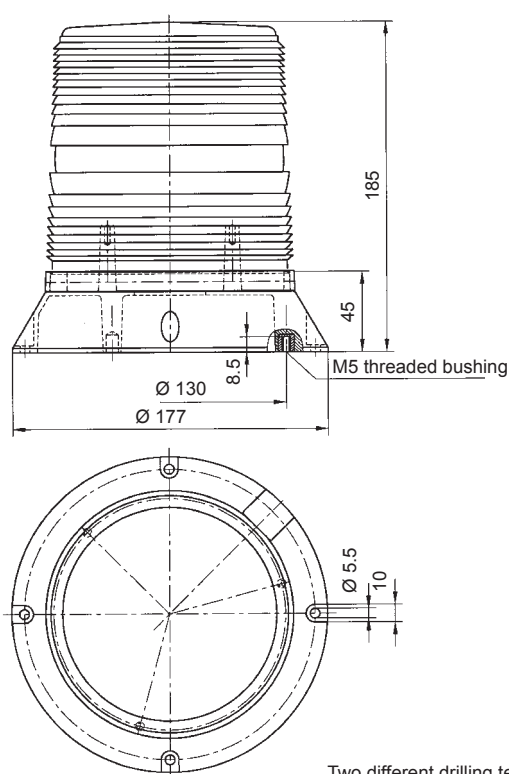


## Dimensions

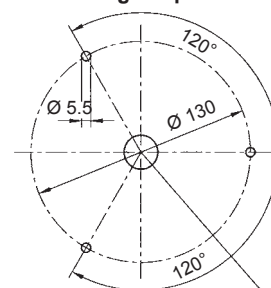
### Bracket mounting



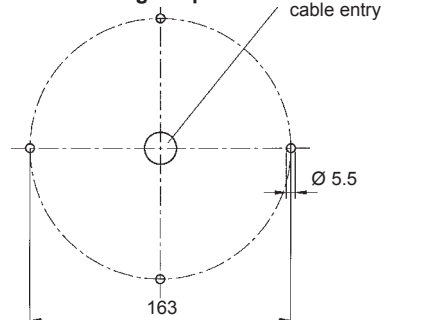
### Direct mounting



### Drilling template 1

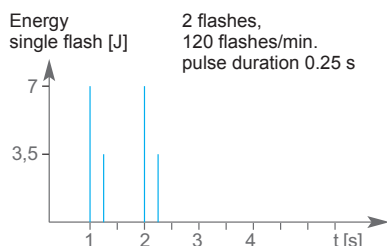


### Drilling template 2



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



## 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



## Conformity to standards

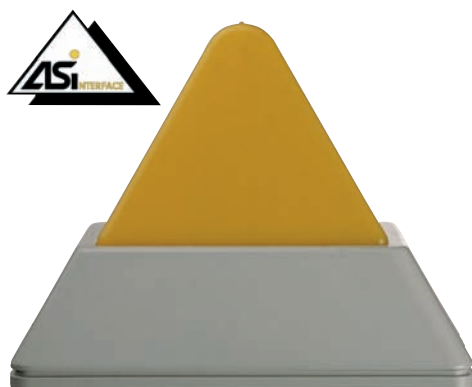
The visual characteristics of flashing lights conform to the European standard DIN EN 842: "Machine safety - visual alarm signals". Requirements contained in the DIN EN 981 standard: "Machine safety - system of acoustic and visual alarm and information signals", can be fulfilled. The colours 'red' for 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 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
- minimised maintenance costs
- non-compromising safety
- outstanding illumination of the coloured lens due to scattering lens
- 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



Range as  
per EN 54



Protection  
system

M-AS-i



Operating  
temperature

LED-M



Operating  
temperature

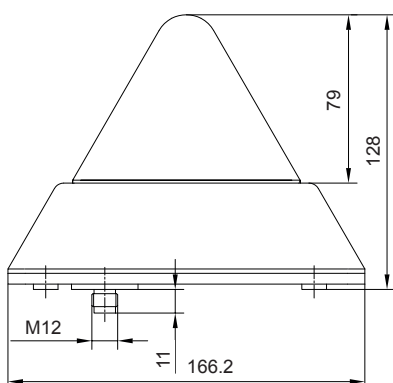
Electrical data	PD 2100-M-AS-i	PD 2100-LED-M	
Rated voltage	28 V	230 V AC	24 V DC
Nominal current consumption	approx. 250 mA	12 mA	65 mA
Rated frequency		50 / 60 Hz	
Operating range	26.5 – 32.6 V	± 10%	21 – 29 V
Alarm output	via AS-i Bus	230 V / 80 mA (MOS relay, R <sub>ON max.</sub> = 35 Ω) (NC)	

Mechanical data	PD 2100-M-AS-i	PD 2100-LED-M
Operating mode	continuous light	
Light source	LED	
Light intensity (DIN 5037) <sup>1</sup>	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 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 mm <sup>2</sup>	
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 specification	AS-i 2.1, A/B capable EN 50295	
Weight	300 g	AC: 380 g / DC: 270 g

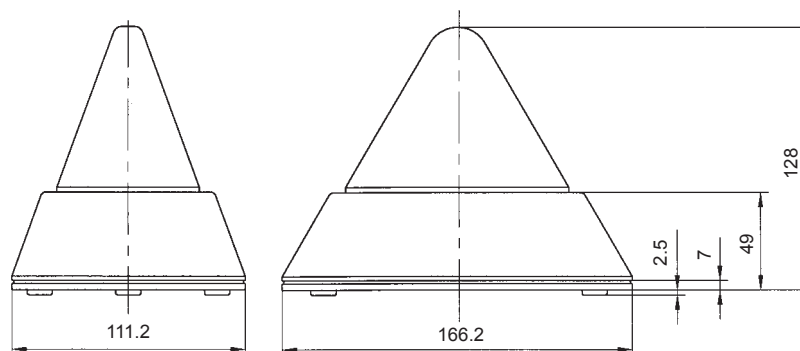
<sup>1</sup> with a clear lens

## Dimensions

PD 2100-M-AS-i

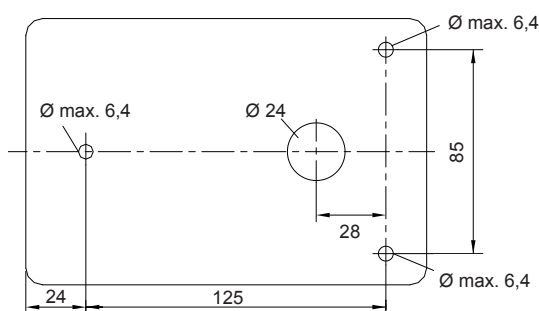


PD 2100-LED-M

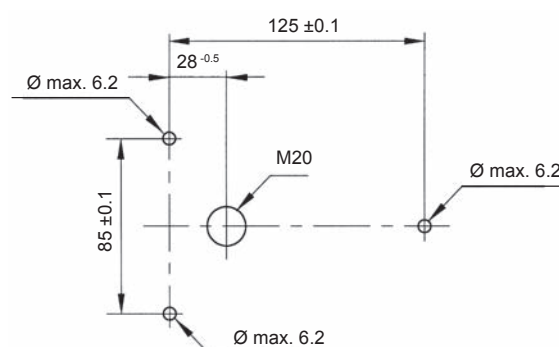


## Mounting holes

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



See page 119 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

# LED Obstacle Lights

## POL 32 / POL 10



**IP 68**

Protection  
system

**+ 55 °C**  
**- 40 °C**

Operating  
temperature

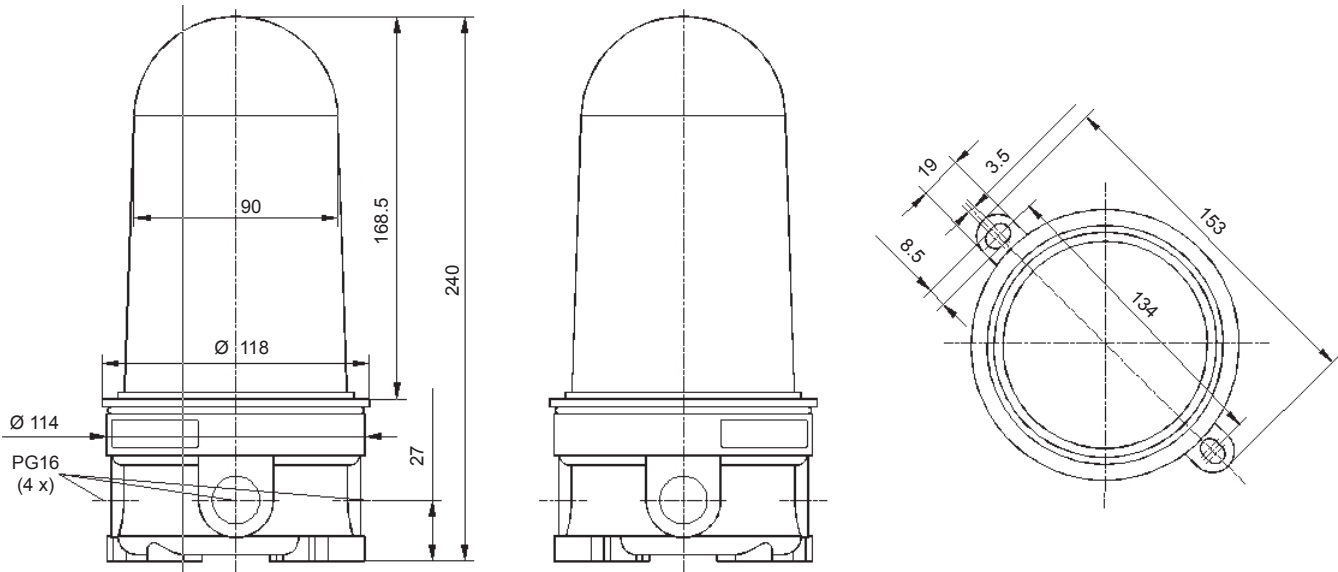
LED obstacle lights, AVV-approved, conforms to ICAO, Annex 14, Volume 1, Chapter 6

- omnidirectional light with a radiation angle of 360° for operation at night and at twilight (night identification 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.
- automatic switching over to standby light in case of error or by means of external control system
- 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

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 / 60 Hz			50 / 60 Hz		
Operating range		85 – 265 V	40 – 57 V	9.6 – 28.8 V	85 – 265 V	40 – 57 V	9.6 – 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

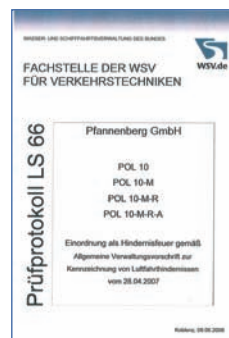
Article numbers	POL 32-M	POL 10-M	POL 10-M-R	POL 10-M-RA
<b>Rated voltage</b>				
<b>115 / 230 V AC</b>	211 05 68 1 005	211 05 64 1 005	211 05 64 1 011	211 05 64 1 010
<b>48 V DC</b>	211 05 66 1 005	211 05 65 1 005	211 05 65 1 011	211 05 65 1 010
<b>12 / 24 V DC</b>	211 05 67 1 005	211 05 63 1 005	211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

## Options / Accessories

**Plug  
connec-  
tor**

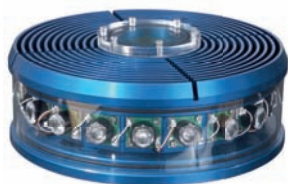
## Conformity to standards

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 Obstruction Lights

## POL 170W-R, POL 2.000R



LED obstruction lights for the night identification of aviation obstructions such as wind energy turbines and high buildings/structures

- dimmable light intensity depending upon the visual range
- integrated degradation and function monitoring of the LEDs
- integrated lightning protection
- passive cooling; no wearing parts requiring maintenance
- extremely long useful life of more than 20 years (depending upon ambient temperature)
- extreme vibration resistance due to LED technology
- sea-water resistant housing material
- mechanically compatible to combi lights
- integrated GPS for synchronisation of several lights
- integrated twilight switch for switching between day/night operation
- integrated data logger for visibility adjustment



Approval  
(POL 170W-R,  
POL 2.000R)



Approval  
(POL 2.000R)



Sea water  
resistance



Protection  
system



Operating  
temperature

Electrical data	POL 170W-RED	POL 170W-RED-ES <sup>1</sup>	POL 2.000R
Rated voltage	24 V DC (15 - 30 V DC)		
Power consumption @ 100%	25 W	25 W	90 W

Mechanical data	POL 170W-RED	POL 170W-RED-ES <sup>1</sup>	POL 2.000R
Operating mode	blinking light	blinking light	blinking or continuous light
Light source	18 high output LEDs	144 medium output LEDs	24 high output LEDs
Blinking rate	1 s ON - 0.5 s OFF - 1 s ON - 1.5 s OFF	1 s ON - 0.5 s OFF - 1 s ON - 1.5 s OFF	20/min. or 40/min. (type B) steady (type C)
Light intensity (DIN 5037)	170 cd according to AVV	170 cd according to AVV	2 000 cd according to ICAO
Intensity control	30% / 10% (only in connection with a visibility measuring device)		
Lens colour	clear		
Light colour	aviation red		
Operating temperature	- 40 °C ... + 50 °C		
Storage temperature	- 55 °C ... + 55 °C		
Relative humidity	100%		
Protection system according to EN 60529	IP 68		
Duty cycle	100%		
Service life of light source	> 100 000 hrs @ 25 °C		
Material	lens	polymethyl methacrylate (PMMA), UV resistant	
	housing	sea water-resistant aluminium (anodised) and sea water-resistant stainless steel	
Type of connection	plug connection, Hummel M23		
Weight	8 kg	15 kg	15 kg
Approvals	AVV	AVV	ICAO / AVV
ICAO type	–	–	Medium Intensity, type B or C

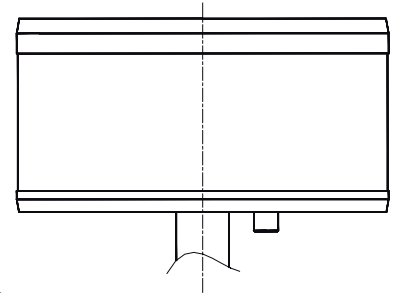
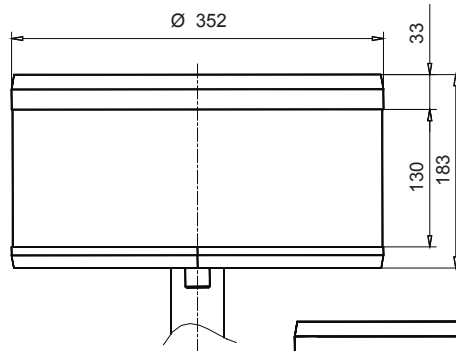
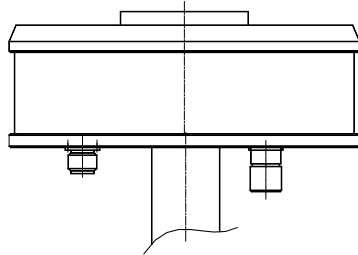
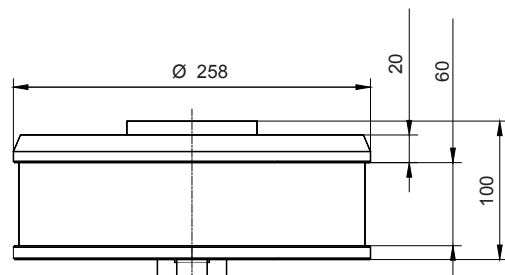
<sup>1</sup> ES = Extended Specification according to AVV



## Dimensions

### POL 170W-RED

### POL 170W-RED-ES / POL 2.000R



## Ordering details

Article numbers	POL 170W-RED	POL 170W-RED-ES	POL 2.000R-B	POL 2.000R-C
Standard	2146131010	21461631011	21464631004	21464631006
with radio transmitter	2146131013	21461631012	21464631005	21464631007

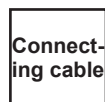
## Options / Accessories



Article number:  
see page 112



Article number:  
see page 113



Article number:  
see page 113

## 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 (Combi) Obstruction Lights POL 20.000/2.000R POL 20.000/170W-R, POL 20.000/2.000W



LED obstruction lights for the night identification of aviation obstructions such as wind energy turbines and high buildings/structures

- dimmable light intensity depending upon the visual range
- integrated degradation and function monitoring of the LEDs
- integrated lightning protection
- passive cooling; no wearing parts requiring maintenance
- extremely long useful life of more than 20 years (depending upon ambient temperature)
- extreme vibration resistance due to LED technology
- sea-water resistant housing material
- integrated GPS for synchronisation of several lights
- integrated twilight switch for switching between day/night operation
- integrated data logger for visibility adjustment



Approval



Approval



Sea water resistance



Combi light (Day/Night)



Protection system

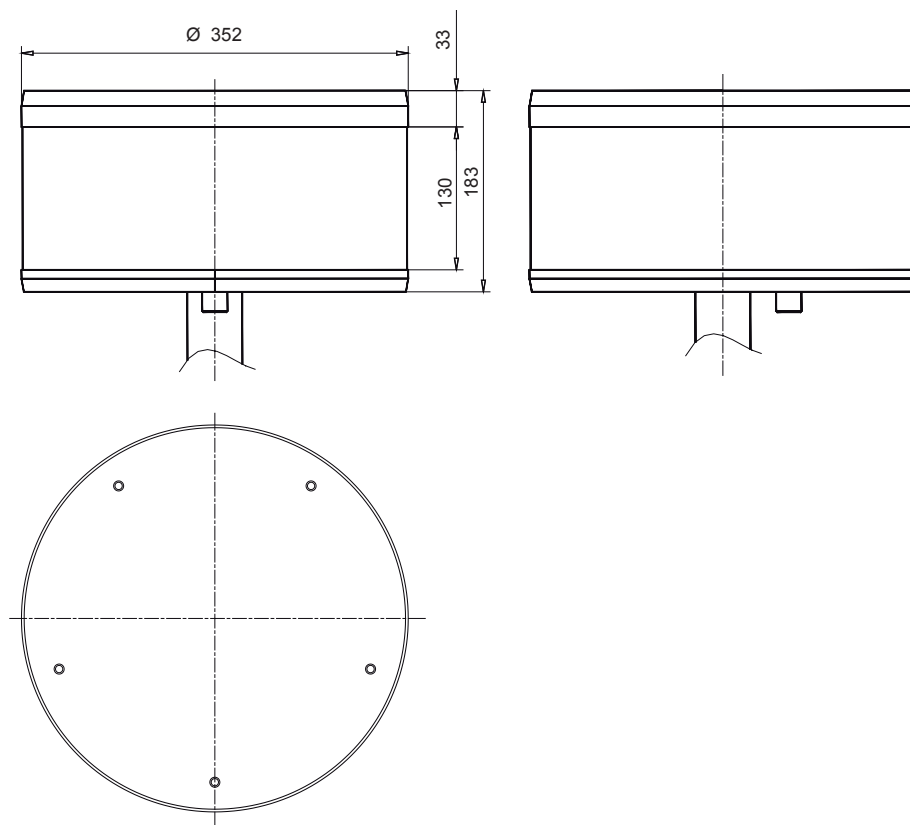


Operating temperature

Electrical data	POL 20.000/2.000R-C	POL 20.000/170W-RED-ES	POL 20.000/2.000R-B	POL 20.000/2.000W
Rated voltage	24 V DC (15 - 30 V DC)			
Power consumption @ 100%	240 W / 90 W	240 W / 25 W	240 W / 90 W	240 W / 90 W

Mechanical data		POL 20.000/2.000R-C	POL 20.000/170W-RED-ES	POL 20.000/2.000R-B	POL 20.000/2.000W
Operating mode		blinking or continuous light	blinking light		
Light source		24 LEDs (white) & 24 LEDs (red)	24 LEDs (white) & 144 LEDs (red)	24 LEDs (white) & 24 LEDs (red)	24 LEDs (white)
Blinking rate		20/min. or 40/min. / steady	20/min. or 40/min. / 1 s ON - 0.5 s OFF - 1 s ON - 1.5 s OFF	20/min. or 40/min. / 20/min. or 40/min.	20/min. or 40/min. / 20/min. or 40/min.
Light intensity (DIN 5037)	day identification	20 000 according to ICAO			
	night identification	2 000 cd according to ICAO	170 cd according to AVV	2 000 cd according to ICAO	2 000 cd
Intensity control		30 % / 10% (only in connection with a visibility measuring device)			
Lens colour		clear			
Light colour	day identification	white	white	white	white
	night identification	red	red	red	white
Operating temperature		- 40 °C ... + 50 °C			
Storage temperature		- 55 °C ... + 55 °C			
Relative humidity		100%			
Protection system according to EN 60529		IP 68			
Duty cycle		100%			
Service life of light source		> 100 000 hrs @ 25 °C			
Material	lens	polymethyl methacrylate (PMMA), UV resistant			
	housing	sea water-resistant aluminium (anodised) and sea water-resistant stainless steel			
Type of connection		plug connection, Hummel M23			
Weight		15 kg			
Approvals		ICAO / AVV	AVV	ICAO / AVV	ICAO
ICAO type		Medium Intensity, type A&C	Medium Intensity, type A	Medium Intensity, type A&B	Medium Intensity, type A&A

## Dimensions



## Ordering details

Article numbers	POL 20.000/2.000R-C	POL 20.000/170W-RED-ES	POL 20.000/2.000R-B	POL 20.000/2.000W
Standard	21460631006	21460631011	21460631004	21460631008
with radio transmitter	21460631007	21460631012	21460631005	21460631009

## Options / Accessories

### Visibility sensor

Article number:  
see page 112

### Assembly kit

Article number:  
see page 113

### Connecting cable

Article number:  
see page 113

## 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).



## Accessories for obstruction lights



### Power Supply / Battery Backup

- power supply unit for the 230 V power supply / main supply of the entire cabinet
- charge monitor for generating the temperature-controlled battery charging current
- fuse (40 A) to protect the battery circuit
- two high-strength rechargeable batteries
- fan with connected thermostat for control
- terminal clamps for 230 V power supply, two beacon systems, visibility meter, RS485 terminal port and error signal loop

Technical data	for POL 170W-RED	for all others
Rated voltage	200 – 240 V / 3.5 A	200 – 240 V / 5 A
Rated frequency	50 / 60 Hz	50 / 60 Hz
Output voltage	24 V / 22 A	2 x 24 V / 22 A
Rated charge	51 Ah	51 Ah
Operating temperature	- 15 °C ... + 50 °C	- 15 °C ... + 50 °C
Storage temperature	- 20 °C ... + 65 °C	- 20 °C ... + 65 °C
Dimensions (HxWxD)	540 x 500 x 225 mm	540 x 500 x 225 mm
Weight	approx. 50 kg	approx. 50 kg

### Ordering details

Article numbers	Power Supply / Battery Backup
for POL 170W-RED	28011000002
for all others	28011000003



### Visibility Sensor

The visibility sensor identifies different precipitation types, such as rain, drizzle, leet, snow and other weather-related constraint factors such as fog, mist or haze caused by smoke and sand. It allows a reliable determination of visibility over a range from 10 to 20,000 meters and is designed for both onshore and offshore use.

Technical data	Visibility Sensor
Rated voltage	electronics: 12 – 50 V DC
	hood heating: 24 V AC/DC
Power consumption	incl. window heater: 3 W @ 12 V DC
	incl. hood heating: 65 W
Functional principle	optical forward scattering
Relay contacts	3 pieces, programmable visibility alarm thresholds and delays can be configured, error message
Serial ports	RS-232, RS 485
Analog exit	0 – 1 mA, 4 – 20 mA
Operating temperature	- 40 °C ... + 60 °C
Relative humidity	0 – 100%
Protection system	IP 66
Dimensions (HxWxD)	199 x 695 x 404 mm
Weight	3 kg

### Ordering details

Article number	Visibility Sensor
PWD 20W	28013000001



## Thermo-Reflector

Use in regions with strong sunlight: The heat shield, made of 1 mm stainless steel sheet enhances the effectiveness of the passive cooling systems of obstruction lights of the Pfannenberg POL series.

### Ordering details

Article number	Thermo-Reflector
POL-Thermo-Reflector	28013000004



## Assembly kits

The range of accessories for Pfannenberg obstruction lights includes several assembly kits, where the extent and compilation of components vary depending on the respective installation tasks.

In general, the Pfannenberg package for the provision of obstructions lights and their installation also includes the corresponding sets.

### Ordering details

Assembly components	Article numbers
Mounting base, aluminium (seawater-resistant)	on request
Mounting pillar, aluminium (seawater-resistant)	
Outrigger, aluminium, as support for lightning arrester	
Fixing screw set stainless steel (A4) natural	
Stainless steel cable ties, natural, for outdoor use, minimum retention force 670 N	
Cable ties, plastic for indoor installation	
Sturdy UV and weather-resistant special cables of various lengths, finished on the lamp side with a Hummel M23 stainless steel connector. The side opposite the cable can be customized freely	
Cable glands, filler plugs and sealing plugs	
Cable lugs / cable end ferrules for replacement sets	
Fuses for replacement sets	
Service terminals	
Lighting arrester for installation at the outrigger	
Mounting magnet, rubberised, M6, 40 kg holding load, NdFeB magnet system, anisotropic, 88 x 8.5 mm, threaded pin M8x15; for power supply cabinet	
Mounting magnet, rubberised, M10, 175 kg holding load, NdFeB flat pot magnet, with female thread (galvanised); for power supply cabinet	

Overview	AVV	ICAO type A	ICAO type B	ICAO type C	beacon w, red	beacon w, red ES	20,000 cd white	GPS	visibility control	logbook	onshore/offshore	trans-mitter
POL 10-M	●	●									●	
POL 10-M-R	●	●									●	
POL 10-M-RA	●	●									●	
POL 32-M			●								●	
POL 170W-RED	●				●			●	●	●	●	○
POL 170W-RED-ES <sup>1</sup>	●					●		●	●	●	●	○
POL 2.000R-B			●					●	●	●	●	○
POL 2.000R-C				●				●	●	●	●	○
POL 20.000/2.000R-C		●		●			●	●	●	●	●	○
POL 20.000/170W-RED-ES	●	●				●	●	●	●	●	●	○
POL 20.000/2.000R-B	●	●	●				●	●	●	●	●	○
POL 20.000/2.000W	●	●					●	●	●	●	●	○

● Standard, ○ Option

<sup>1</sup> ES = Extended Specification according to AVV

# 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/PLd**

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



Range as per EN 54



Protection system



Protection system



Impact-proof housing



Operating temperature

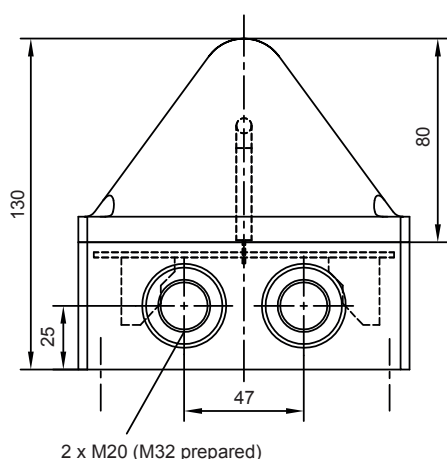
Electrical data		Quadro F12-SIL		
Rated voltage		230 V AC	115 V AC	24 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	
Operating range		195 – 253 V	95 – 127 V	18 – 30 V
Nominal current consumption	flashing light	250 mA	350 mA	700 mA
	diagnostics channel	100 mA	100 mA	65 mA
Alarm contact	contact version	positively driven contact (1 x NC, 1 x NO)		
	switching current	max. 6 A		
	switching voltage	max. 250 V AC		
	max. switching power (AC)	1 500 VA		
	recommended minimum load	> 50 mW		

Mechanical data		Quadro F12-SIL	
Flash rate		1 Hz = 60 flashes/min.	
Flash energy		10 J	
Light intensity (DIN 5037) <sup>1</sup>		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		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 <sup>2</sup>	
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	

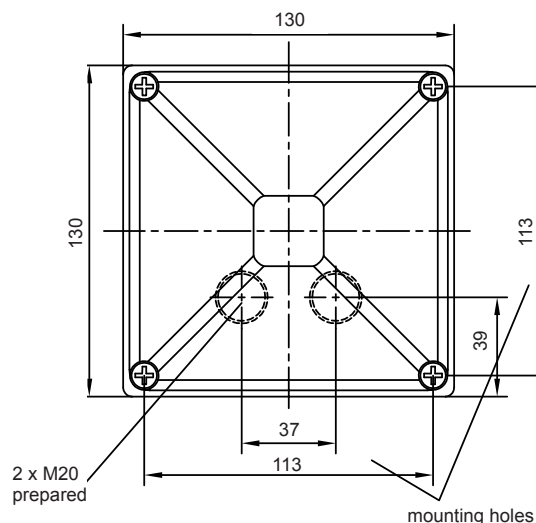
<sup>1</sup> with a clear lens



## Dimensions



2 x M20 (M32 prepared)



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



## 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 01990: "Coding of display devices and control elements using colours and supplementary means".

The visual 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 Light 10 Joules

## PMF 2015-SIL



Extremely bright flashing light by light bundling with fensel 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/PLd**

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
Rated frequency		50 / 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
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)	1 500 VA	
	recommended minimum load	> 50 mW	

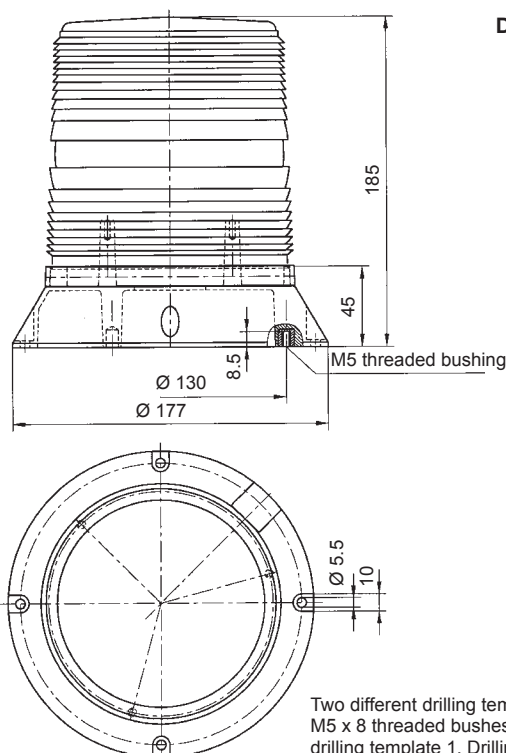
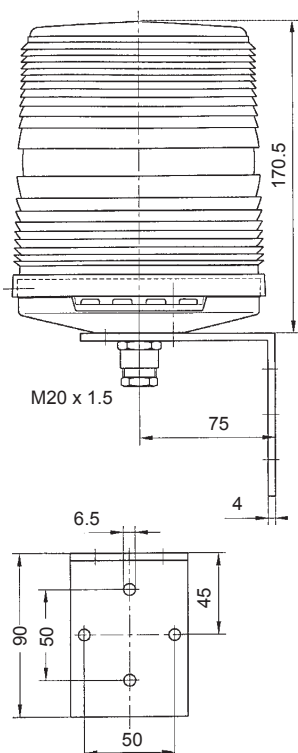
Mechanical data		PMF 2015-SIL	
Flash rate of the main flash		1 Hz = 60 flashes/min.	
Flash energy of the main flash		10 J	
Light intensity (DIN 5037) <sup>1</sup>		200 cd	
Lens colours		clear, amber, red, green, blue	
Lens type		lens with fresnel characteristic	
Beam angle	vertical	approx. 16 °	
	horizontal	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	bracket mounting	M20 x 1.5 for cables 6.5 - 13,5 mm	
Connecting terminals		single wire 0.5 – 2.5 mm <sup>2</sup> , fine wire 0.5 – 1.5 mm <sup>2</sup> , 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	

<sup>1</sup> with a clear lens

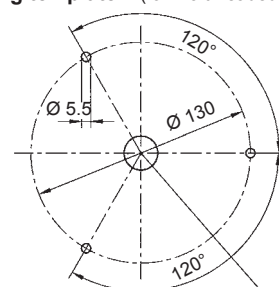
## Dimensions

### Bracket mounting

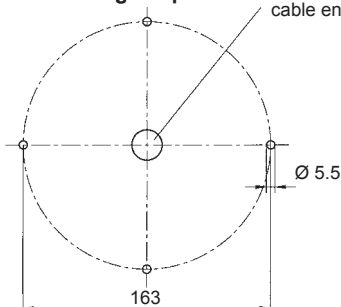
### Direct mounting



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.

## 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



## 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".

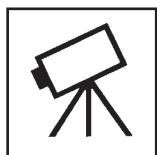
The visual alarms fulfill the requirements to the functional safety according to:

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.

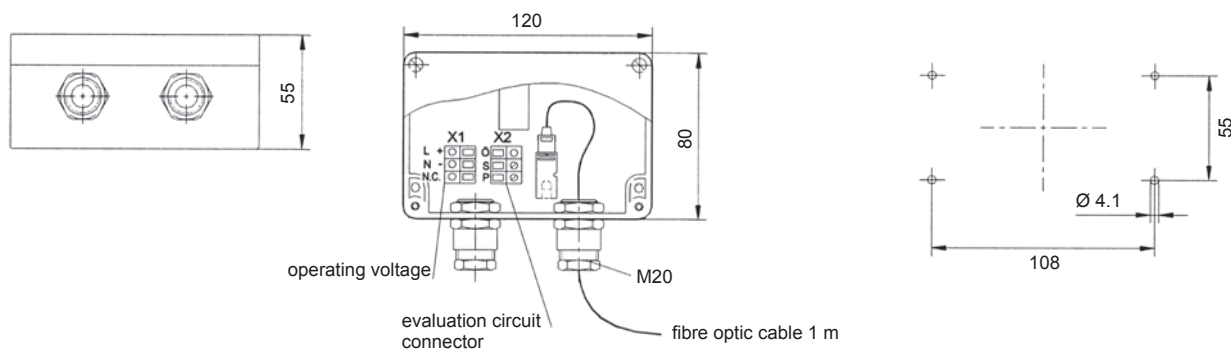
This method of operation represents the fail-safe normally-closed circuit function and guarantees an alarm even if the operating voltage fails. On the other hand, the changeover contact serves to continue an alarm, e.g. in a failure message line, or the direct blocking of further machine processes.

Electrical data	External flash monitoring			
Rated voltage	230 V AC	12 V DC	24 V DC	48 V DC
Rated frequency	50 / 60 Hz			
Operating range	198 – 242 V	11 – 15 V	16 – 34 V	38 – 52 V
Nominal current consumption	0.001 A	0.05 A	0.05 A	0.05 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

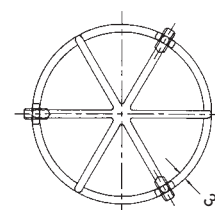
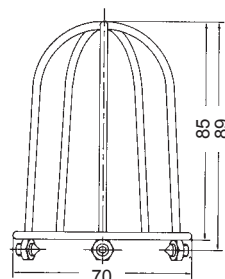
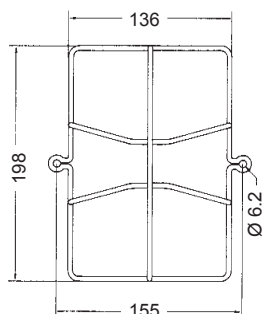
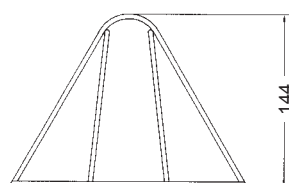


## Protective cages

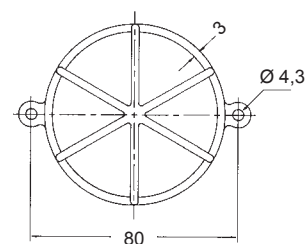
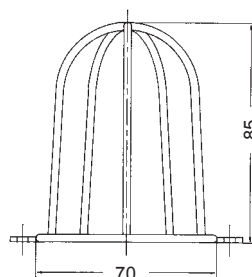
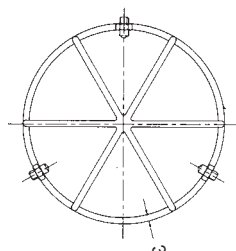
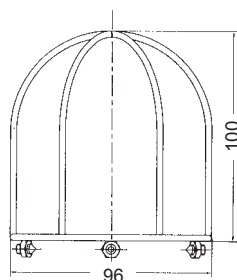
For protection against large mechanical demands. A very useful accessory for visual signaling devices fitted to vehicles, such as fork lift trucks or driverless transport vehicles.

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

Dimensions
for PB- / PD series



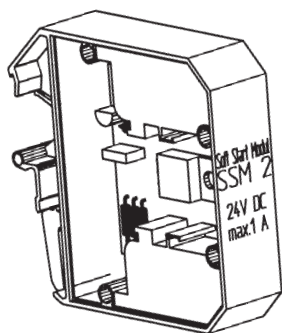
for ABL/ABL, WB-M
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Ordering details		
suitable for ...	Weight	Article number
PB-/PD series	165 g	287 10 50 0 040
WBL/WBS, DWBL/DWBS	55 g	287 10 50 0 041
ABL/ABS, WBL-M/WBS-M	65 g	287 10 50 0 042
WBLR/WBSR	52 g	287 10 50 0 043

## Accessories flashing light PY-S

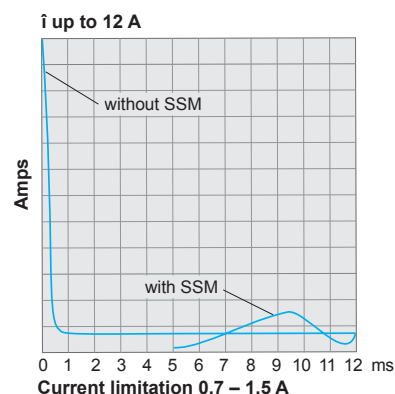
Ordering details		
Article numbers		PY-S
Enclosure fitting	For connection (daisy-chaining) of several flashing lights of the PY series.	283 00 00 0 003
Surface gasket	Sealing of the flashing light installation surface when, e.g. cable entry is executed from the back.	283 00 00 0 004
Tamper-proof sealing (pack of 4)	Anti-tamper sealing for fasteners of the PY-S devices after installation in order to prevent manipulation of the devices.	283 00 00 0 002
Panel mount installation kit PY	The PY-S devices are also suitable for panel mounting. This kit consists of a plug connector for the electrical contact, as well as all installation materials.	283 00 00 0 010



### 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 – 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



### Tubular stands

Tubular stands for mounting SPECTRA lights.

Dimensions			
P 200 TMA001	P 300 TMA001	P 400 TMA001	

### Ordering details

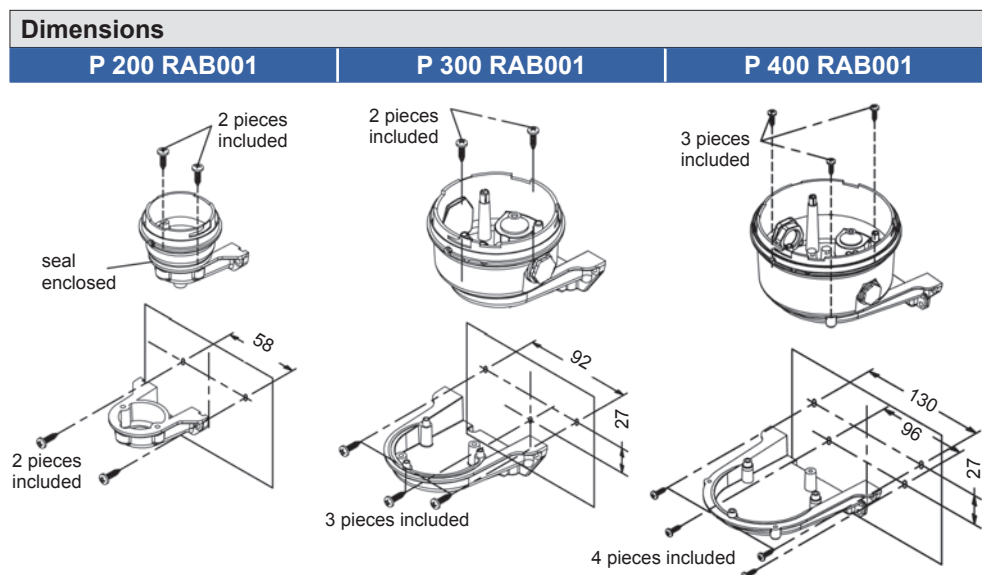
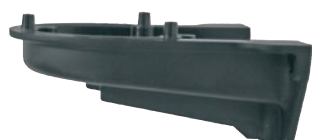
Article numbers	Height	P 200 TMA001	P 300 TMA001	P 400 TMA001
for P 200 series	137 mm	213 91 00 0 000	–	–
for P 300 series	140 mm	–	213 93 00 0 000	–
for P 400 series	145 mm	–	–	213 95 00 0 000

further tubular stand lengths on enquiry



## Wall bracket

Wall bracket for mounting SPECTRA lights.

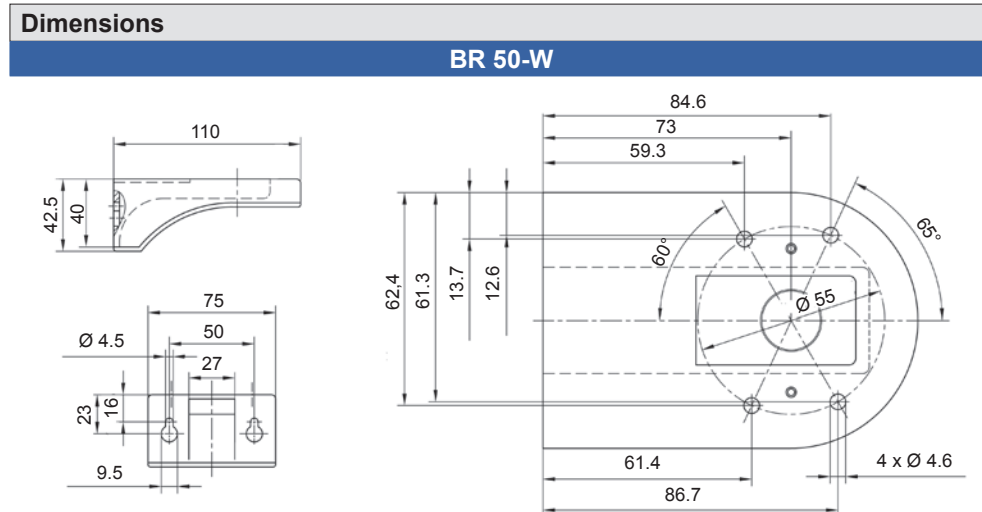


### Ordering details

Article numbers	P 200 RAB001	P 300 RAB001	P 400 RAB001
for P 200 series	213 90 00 0 000	—	—
for P 300 series	—	213 92 00 0 000	—
for P 400 series	—	—	213 94 00 0 000

## Wall holder with hood

Wall holder for mounting SPECTRA lights on tubular stands.



### 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 / 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 / P 350 TSB / P 450 TDB	48 V	281 13 00 0 002
Filament lamp E14 15 W	PD / P 350 TSB / P 450 TDB	110 V	281 13 00 0 003
Filament lamp E14 15 W	PD / 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 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
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

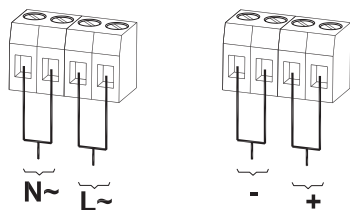
PMF 2030	PMF 2020	PMF 2015
	<p>The operating modes quad flash (factory setting), double flash and single flash can be set via the DIP switch, which is accessible from the side.</p>	<p>The operating modes quad flash (factory setting) and double flash can be set via the DIP switch, which is accessible from the side.</p>

ABL	ABS / WBS / DWBS WBS-M	WBL / WBL-PX DWBL	WBL-M 230 V AC

Quadro F12	Quadro S / Quadro S-M-Flex

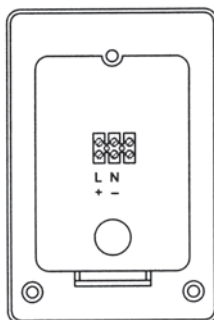
P 300/400 STR / P 300/400 STS P 300/400 FLF / P 300/400 FLH P 300/400 SLF / P 300/400 SLH	P 400 LDA	P 300 STF																																				
<table border="1"> <thead> <tr> <th>Colour</th> <th>D/C</th> <th>A/C</th> </tr> </thead> <tbody> <tr> <td>brown</td> <td>+</td> <td>L~</td> </tr> <tr> <td>blue</td> <td>-</td> <td>N~</td> </tr> </tbody> </table>	Colour	D/C	A/C	brown	+	L~	blue	-	N~	<table border="1"> <thead> <tr> <th>Colour</th> <th>D/C</th> <th>A/C</th> </tr> </thead> <tbody> <tr> <td>red / brown</td> <td>+</td> <td>L~</td> </tr> <tr> <td>blue</td> <td>-</td> <td>N~</td> </tr> <tr> <td>green stage 2</td> <td>-</td> <td></td> </tr> <tr> <td>yellow stage 3</td> <td>-</td> <td></td> </tr> </tbody> </table>	Colour	D/C	A/C	red / brown	+	L~	blue	-	N~	green stage 2	-		yellow stage 3	-		<table border="1"> <thead> <tr> <th>Colour</th> <th>D/C</th> <th>A/C</th> </tr> </thead> <tbody> <tr> <td>red</td> <td>+</td> <td>L~</td> </tr> <tr> <td>blue</td> <td>-</td> <td>N~</td> </tr> <tr> <td>green</td> <td>-</td> <td>N~</td> </tr> </tbody> </table>	Colour	D/C	A/C	red	+	L~	blue	-	N~	green	-	N~
Colour	D/C	A/C																																				
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green stage 2	-																																					
yellow stage 3	-																																					
Colour	D/C	A/C																																				
red	+	L~																																				
blue	-	N~																																				
green	-	N~																																				

## PMB 010 / PMB 005 AC DC

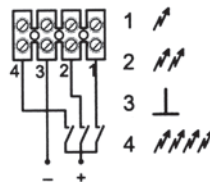


## PB 2010 / PMB 2010 / PB 2005

standard version

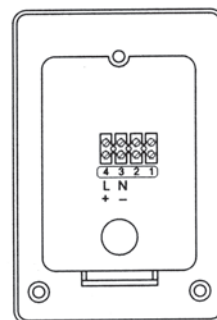


flash rate is set via the DIP switch in the PMB (standard version)



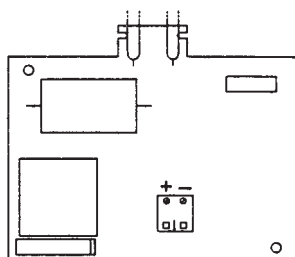
## PMB 2010 external operation controller <sup>1</sup>

version for external operating controller

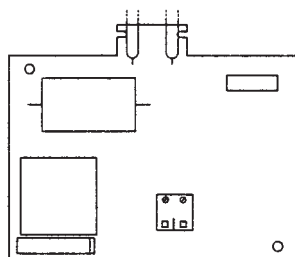


<sup>1</sup> optional for DC types from the PMB 2000 series

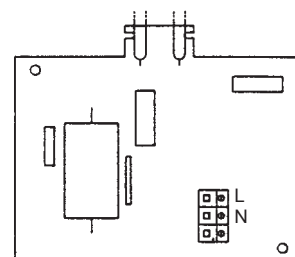
## WBSR



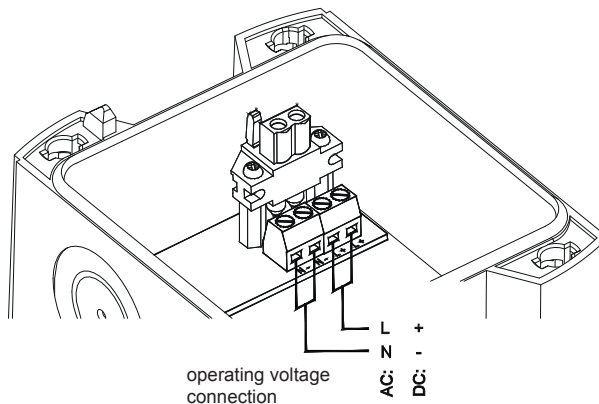
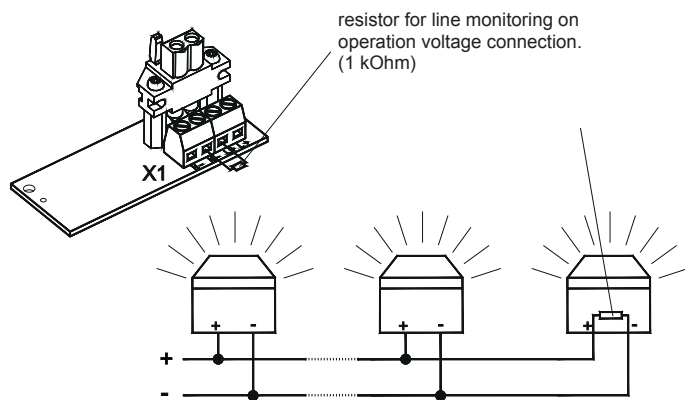
## WBLR (< 42 V AC)



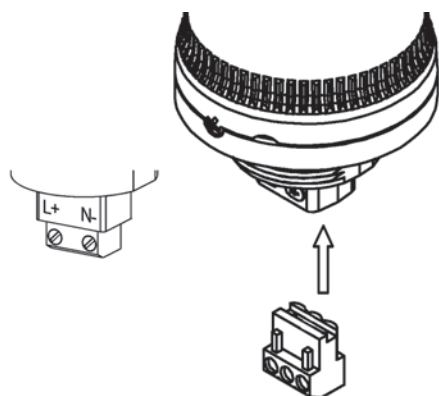
## WBLR (> 110 V AC)



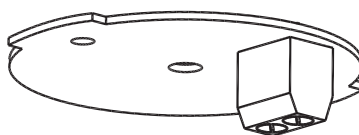
## PY X-S-05



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

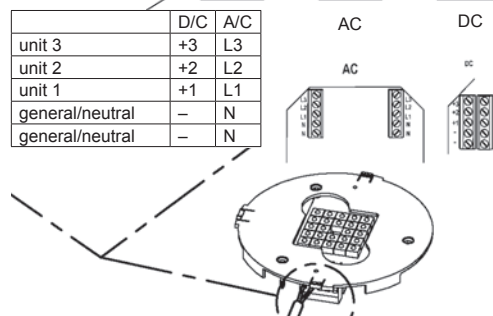
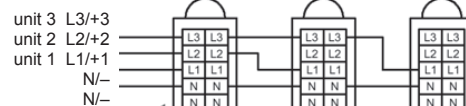


## P 200 STR / P 200 FLF P 200 SLF / P 200 LDA



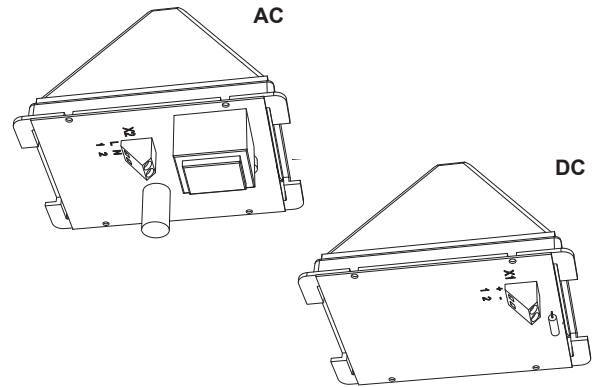
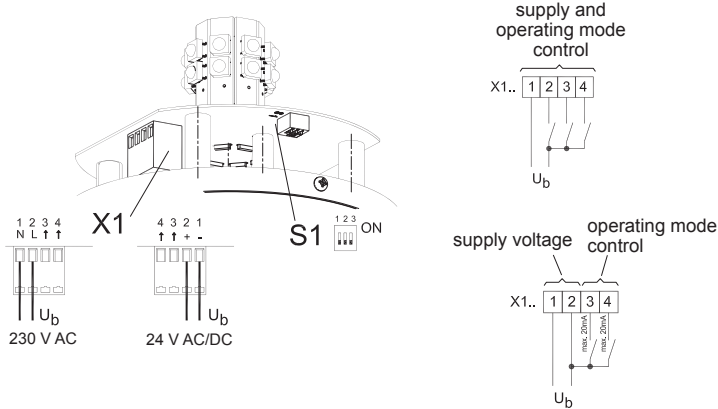
DC	AC
+	L~
-	N~

## P 450 TLA / P 350 TLA



## PMF-LED Flex

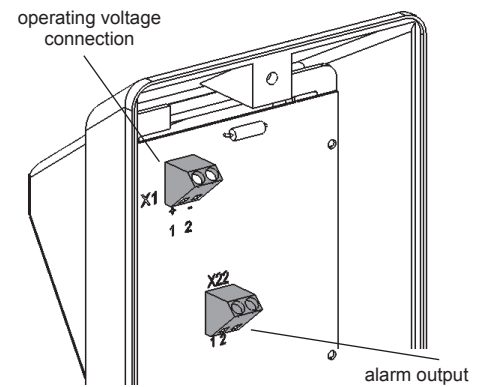
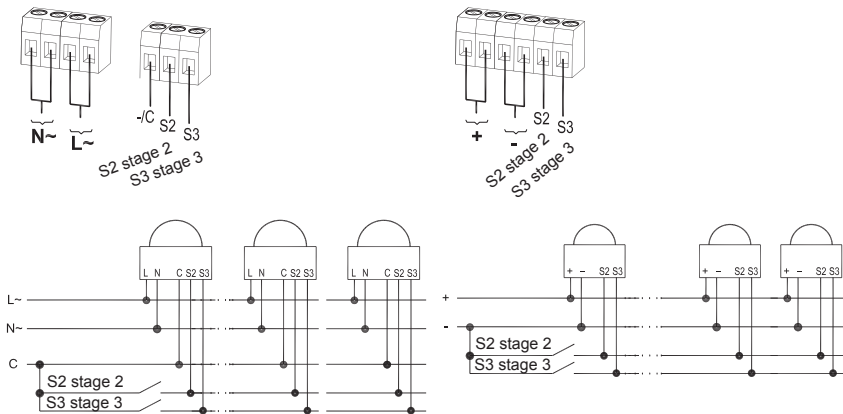
## PD 2100-LED



## PMBL1 – AC

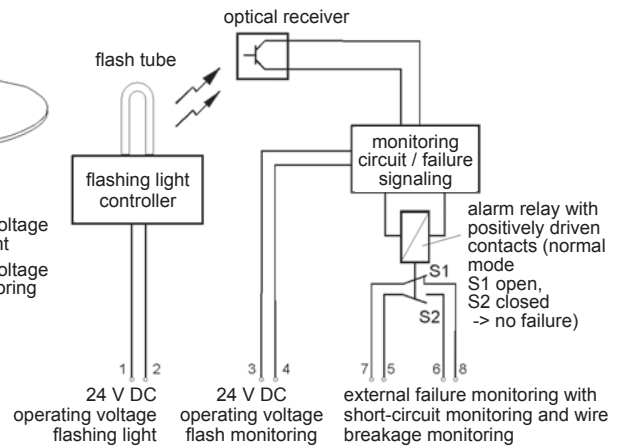
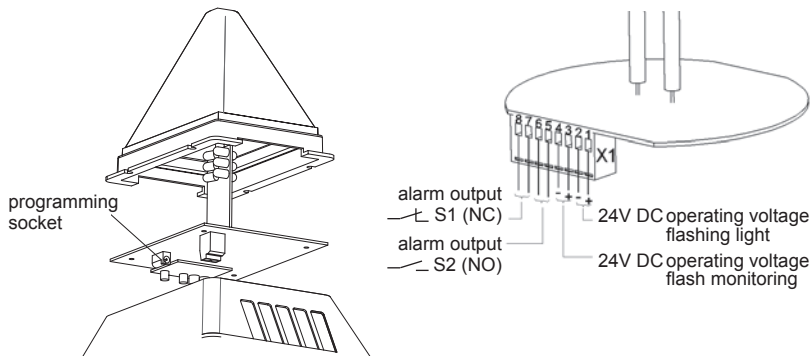
## PMBL1 – DC

## PD 2100-LED-M



## PD 2100-M-AS-i

## PMF 2015-M

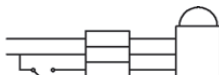


## P 300 LDA

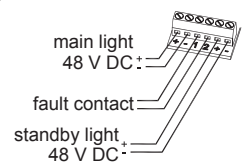
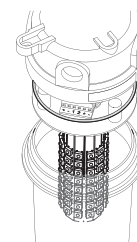
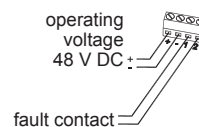
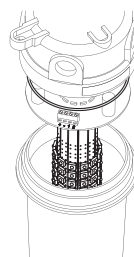
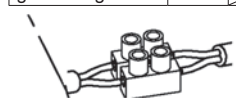
## POL 32-M

## POL 10

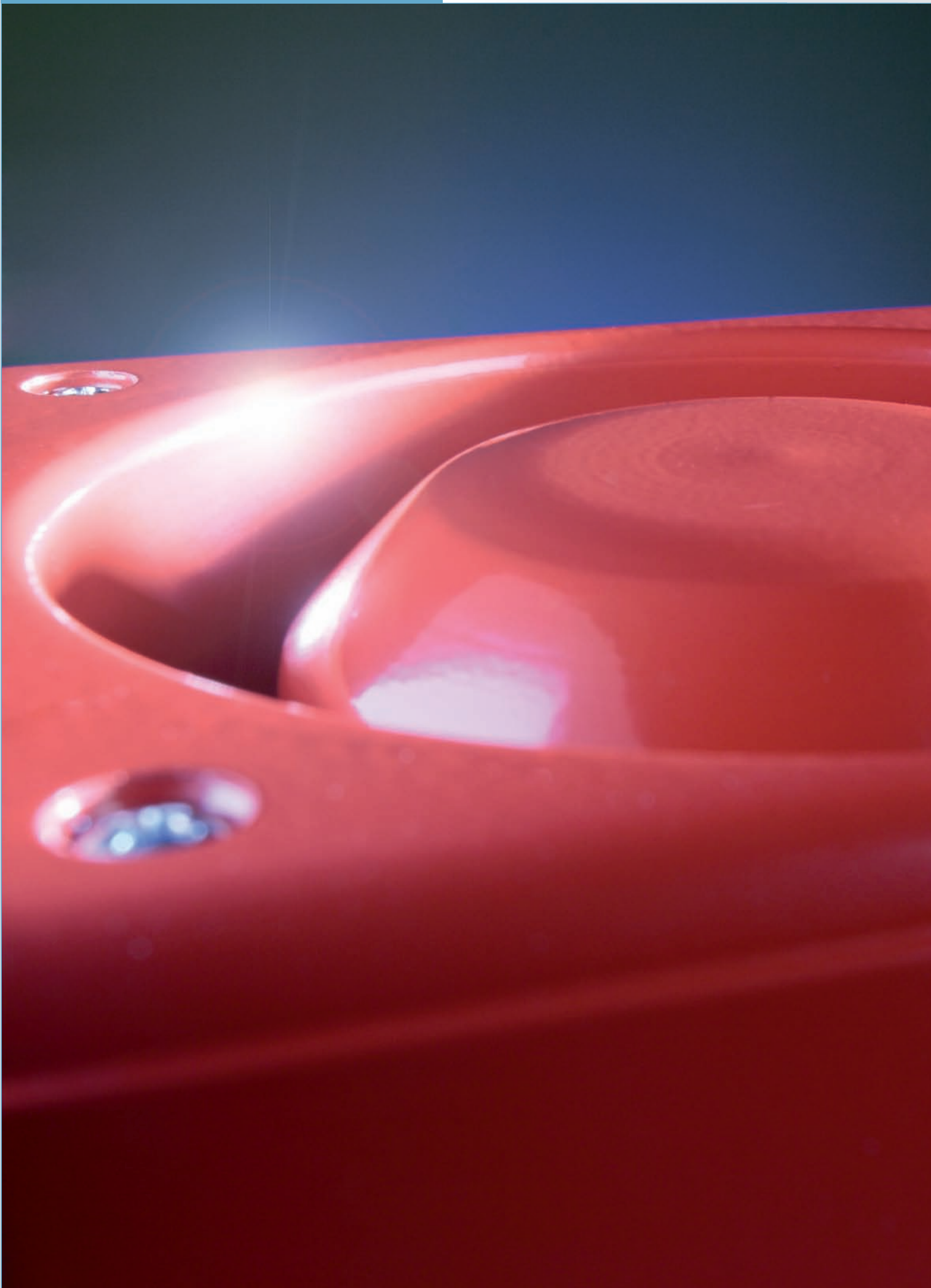
+ red L~ brown  
- N ~ blue  
- N ~ green stage 2



Colour	D/C	A/C
red / brown	+	L~
blue	-	N ~
green stage 2	-	
































# 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 <sup>1</sup>					Sound pressure level	Protection system	Dimensions (HxWxD) mm	Approvals / Standards						Page
	10	100	250	500	1500				GL	GOST	UL	VdS	EN 54-3	RS	
Sounders															
	SON 2					100 dB (A)	IP 56	86 x 86 x AC: 89.5 DC: 64.5		○					130
	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	●	●	●	●	●	●	132
	DS 10					110 dB (A)			●	●	●	●	●	●	
	DS 5-DN					105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143							134
	PA 1					100 dB (A)	IP 66	86 x 109.5 x 80.6	● <sup>1</sup>	●	○	●	●	●	136
	PA 5					105 dB (A)	IP 66	135 x 163.4 x 132	● <sup>1</sup>	●	○	●	●	●	136
	PA 10					110 dB (A)	IP 66	170 x 214 x 156	● <sup>1</sup>	●	○	●	●	●	138
	PA 20					120 dB (A)	IP 66	170 x 214 x 181	● <sup>1</sup>	●	○	●	●	●	138
	PA 130					130 dB (A)	IP 54	285 x 490 x 595		●					142
Safety-related Sounders															
	DS 5-SIL					105 dB (A)	IP 66 IP 67	133.5 x 133.5 x 143	●	●	●	●	●	●	144
	DS 10-SIL					110 dB (A)			●	●	●	●	●	●	144

● available  
○ in preparation  
<sup>1</sup> option



Type	Maximum signal reception range for a 65 dB ambient noise level in metres <sup>1</sup>					Sound pressure level	Protection system	Dimensions (HxWxD) mm	Approvals / Standards						Page
	10	100	250	500	1500				GL	GOST	UL	VdS	EN 54-3	RM	
Voice Sounders															
PAS 110						110 dB (A)	IP 66	168 x 168 x 156.5		●					146
PAS 106						105 dB (A)	IP 66	DC: 130 x 130 x 132 AC: 130 x 185 x 132		●					146
PAS 106 SYNC						100 dB (A)	IP 66	130 x 130 x 132		●					148
Loudspeakers															
PS15R						122 dB (A)	IP 54	117 x 181 x 230		●					150
PS15B										●					150
PS50B						125 dB (A)	IP 66	144 x 218 x 145		●					151
Electronic Buzzers															
P 22 DBZ						80 dB (A) @ 10 cm	IP 65	Ø 29 x 62							152
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)									

<sup>1</sup> 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  $\geq 120$  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](http://www.pfannenberg.com) · [www.pfannenberg-spareparts.com](http://www.pfannenberg-spareparts.com)  
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[newsletter.pfannenberg.com](http://newsletter.pfannenberg.com)

# Sounders 100 dB(A) SON 2 / SON F1



- reverse polarity protection
- automatic synchronisation of several sounders
- 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



max. signal  
reception range



Protection  
system



Operating  
temperature



Standard



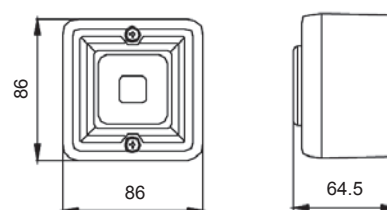
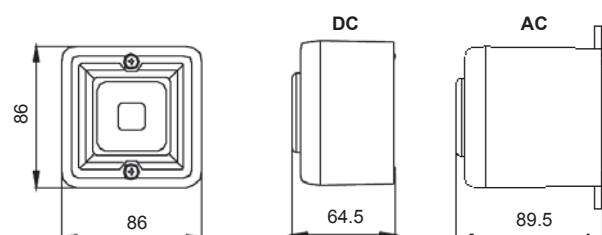
Standard

only for  
SON F1  
24 V DC

Electrical data	SON 2			SON F1
Rated voltage	230 V AC	115 V AC	24 V DC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz		
Operating range	± 10%	± 10%	± 25%	10 – 30 V
Nominal 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 - 2 / - 6 dB		by - 9 dB
Alarm tones	32 tones / 3-stage alarm		10 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 56		
Material	UL 94 VO & 5VA classified ABS		
Colour	RAL 3000 (flame red)		
Cable entry	4 knock-outs prepared on the side and bottom		
Connecting terminals	0.5 – 2.5 mm <sup>2</sup>		
Weight	AC	400 g	260 g
	DC	300 g	260 g

## Dimensions





## Tone table SON 2

Tone	Description - Frequency	Stage		Tone	Description - Frequency	Stage	
		2	3			2	3
1	Continuous tone	340 Hz		2	5	17	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	EN54-3	17	5	18	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s 500 Hz 0,5 s	EN54-3	2	5	19	5
4	Sweeping (fast)	1000 Hz 10 ms 800 Hz 10 ms		6	5	20	5
5	Continuous tone	2400 Hz		3	20	21	5
6	Sweeping	2900 Hz 70 ms 2400 Hz 70 ms		7	5	22	5
7	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms		10	5	23	5
8	Sweeping	1200 Hz 3 s 500 Hz 3 s		2	5	24	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	EN54-3	15	2	25	5
10	Alternating tone	2900 Hz 20 ms 2400 Hz 20 ms		7	5	26	15
11	Interrupted tone	1000 Hz 10 ms 10 ms		2	5	27	5
12	Alternating tone	1000 Hz 0,875 s 800 Hz 0,875 s		4	5	28	5
13	Interrupted tone	2400 Hz 10 ms 10 ms		15	5	29	5
14	Interrupted tone	800 Hz 0,25 s 1 s		4	5	30	26
15	Continuous tone	800 Hz		2	5	31	5
16	Interrupted tone	660 Hz 150 ms 150 ms	EN54-3	18	5	32	26
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,4 s 440 Hz	EN54-3	2	27		
18	Interrupted tone, Sweden SS031711 (air raid warning)	680 Hz 1,8 s 1,8 s		2	5		
19	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s		2	5		
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz		2	5		
21	Alternating tone	554 Hz 10 ms 440 Hz 10 ms		2	5		
22	Interrupted tone	544 Hz 0,875 s 0,875 s		2	5		
23	Interrupted tone	800 Hz 20 ms 20 ms		6	5		
24	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s 800 Hz 0,5 s		29	5		
25	Sweeping	2900 Hz 0,5 s 2400 Hz 0,5 s		29	5		
26	Simulated bell	1450 Hz 0,69 ms		2	15		
27	Continuous tone	800 Hz		26	5		
28	Continuous tone	440 Hz		2	5		
29	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms		7	5		
30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s		32	26		
31	Sweeping	1200 Hz 10 ms 660 Hz 10 ms		26	5		
32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,75 s 500 Hz 0,25 s		30	26		

## Tone table SON F1

Tone	Description - Frequency	Stage 2	Tone	Description - Frequency	Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	8	6	Sweeping (fast), UK BS5839-1	8
2	Slow whoop, evacuation alarm Netherlands NEN 2575	1	7	Slow whoop, Australian evacuation alarm AS2220	10
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	8	8	Continuous tone	-
4	Alternating tone, France NFS 32-001 (fire alarm)	9	9	Continuous tone	-
5	Simulated bell	1	10	Interrupted tone, Australia AS2220, AS1610, AS1670	-

## 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



# Sounders 105 / 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



max. signal  
reception range

DS 10



max. signal  
reception range



Protection  
system



Standard



Standard



Operating  
temperature



Acoustic  
penetration

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 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	10 – 15 V	19 – 29 V	41 – 53 V
Nominal 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 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	10 – 15 V	19 – 29 V	41 – 53 V
Nominal current consumption	0.06 A	0.12 A	0.42 A	0.3 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	- 40 °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 mm <sup>2</sup>	
Weight	AC	2.15 kg
	DC	1.95 kg

### Options / Accessories



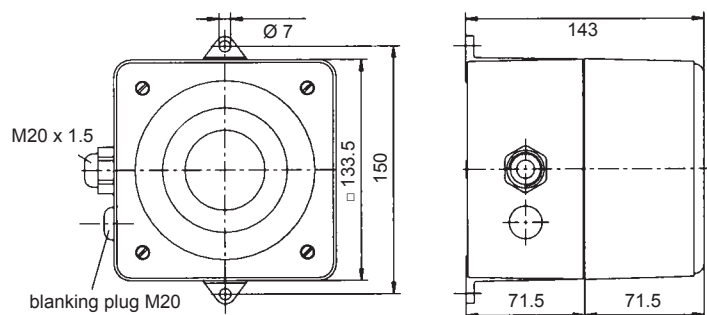
External tone selection (2 variants) for controlling several tones over great distances:  
1. for all voltages = potential-free NO function  
2. for 12 V / 24 V = voltage input



30457-83-HH



## Dimensions



## Tone table

Tone	Description - Basic tone (preset: tone no. 1)		Stage				Tone	Description - Basic tone (preset: tone no. 1)			Stage			
			2	3	4						2	3	4	
0	no tone		1	5	4		18	Interrupted tone	800 Hz	1 s	19	7	4	
1	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 500 Hz	3	2	4		19	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 800 Hz	0.25 s	27	13	23	
2	Interrupted tone, ISO 8201 (emergency evacuation signal)	950 Hz	1	4	3		20	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	825 Hz	2.5 s	9	21	26	
3	Alternating tone	1025 Hz 825 Hz	1	2	4		21	Interrupted tone, IMO (leave ship)	950 Hz	1 s	20	9	26	
4	Continuous tone, UK BS5839-1	950 Hz	1	3	5		22	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 800 Hz	3.5 s	19	14	2	
5	Interrupted tone	950 Hz	1	4	3		23	Siren	2400 Hz 500 Hz	3 s	27	12	2	
6	Sweeping	1200 Hz 500 Hz	1	4	9		24	Alternating tone	1075 Hz 825 Hz	0.5 s	1	16	12	
7	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 440 Hz	3	10	4		25	Alternating tone	900 Hz 500 Hz	0.25 s	1	14	5	
8	Interrupted tone, Sweden SS031711 (emergency signal)	700 Hz	2	3	4		26	Alternating tone	1400 Hz 1200 Hz	20 ms	4	9	27	
9	Interrupted tone (fast), horn	800 Hz	1	3	4		27	Siren	1200 Hz 300 Hz	3 s	13	23	19	
10	Continuous tone	500 Hz	27	9	26		28	Sweeping	1500 Hz 700 Hz	1.5 s	7	10	4	
11	Continuous tone	725 Hz	1	17	9		29	Pulsating tone, industrial alarm Germany	1000 Hz 150 Hz	10 s	1	30	9	
12	Continuous tone	825 Hz	27	9	26		30	Interrupted tone, industrial alarm (Germany)	680 Hz	0.875 s	1	4	26	
13	Continuous tone	1200 Hz	1	5	3		31	Sweeping, France NFC48-265	1600 Hz 1400 Hz	1 s	3	14	4	
14	Continuous tone	1500 Hz	1	4	10		32	selection of available tone combinations in stages 2, 3 and 4						
15	Interrupted tone	500 Hz	1	24	12									
16	Interrupted tone	825 Hz	1	24	15									
17	Interrupted tone	725 Hz	1	11	9									

## 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  
EN 50 130-4: 1996

EN 61 000-6-2  
EN 61 000-6-3

EN 60 947-1: 2003  
EN 60 529: 2000

Fire alarm systems - part 3: fire alarm devices;  
Audible signaling devices and annex A1  
Stability of system components for fire and burglar alarm systems  
EMV, stability for industrial areas  
EMV, emission standard for residential commercial, and light-industrial environments  
Low voltage switchgear standard  
Protection system by enclosure (IP code)

DIN EN ISO 7731

DIN 33 404/3: 1982  
ISO 8201: 1987  
DIN EN 981: 1997

ISO 11 429: 1996

Ergonomic – alarms for public areas and workplaces – acoustic alarms  
Alarms for workplaces, unified emergency signal  
Evacuation alarm  
System of acoustic and visual alarm signals and information signals  
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



Acoustic  
penetration

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 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	10 – 15 V	19 – 29 V	41 – 53 V
Nominal 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 tone table page 133)
Operating temperature	- 40 °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 mm <sup>2</sup>
Weight	AC 2.15 kg
	DC 1.95 kg

## Options / Accessories

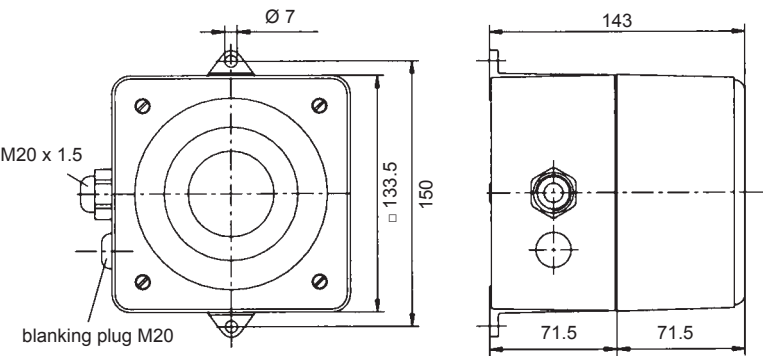


External tone selection (2 variants) for controlling several tones over great distances:  
1. for all voltages = potential-free NO function  
2. for 12 V / 24 V = voltage input



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

# Sounders PATROL series 100 / 105 dB(A) PA 1 / PA 5



PATROL - the new generation of sounders.

Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

PA 1



max. signal  
reception range

PA 5



max. signal  
reception range



Protection  
system



Operating  
temperature



Acoustic  
penetration



24–48 V DC



24–48 V DC



Electrical data	PA 1			
Rated voltage	230 V AC	115 V AC	24 V AC	10 – 57 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
Operating range	195 – 253 V	95 – 127 V	18 – 30 V	10 – 57 V
Nominal current consumption	9 – 15 mA	8 – 30 mA	59 – 120 mA	6 – 80 mA
Electrical data	PA 5			
Rated voltage	230 V AC	115 V AC	24 V AC	10 – 57 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	
Operating range	± 10%	± 10%	± 10%	10 – 57 V
Nominal current consumption <sup>1</sup>	9 – 15 mA	8 – 30 mA	59 – 120 mA	6 – 80 mA

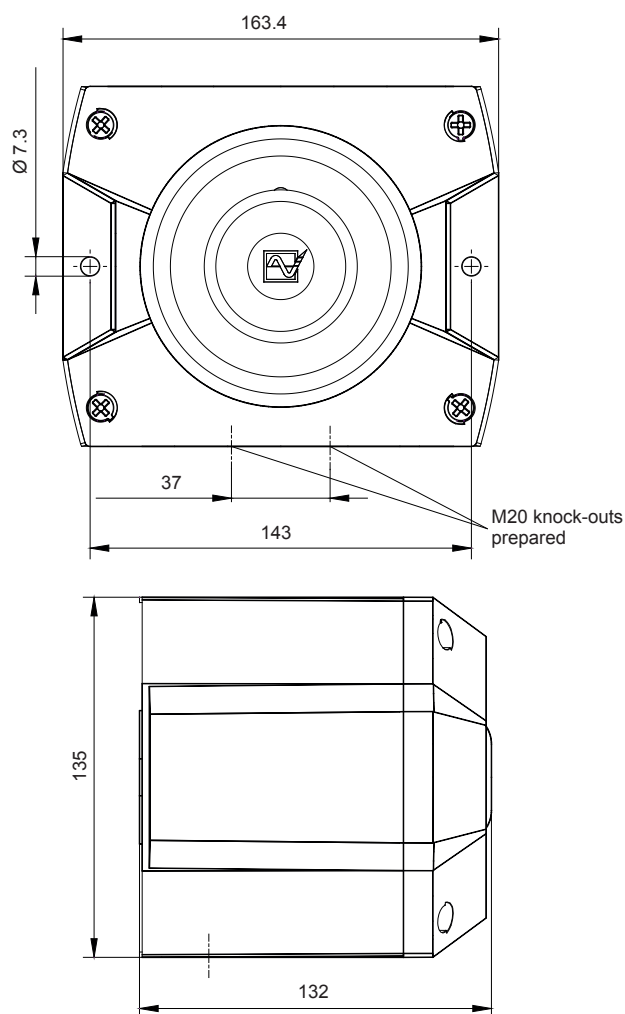
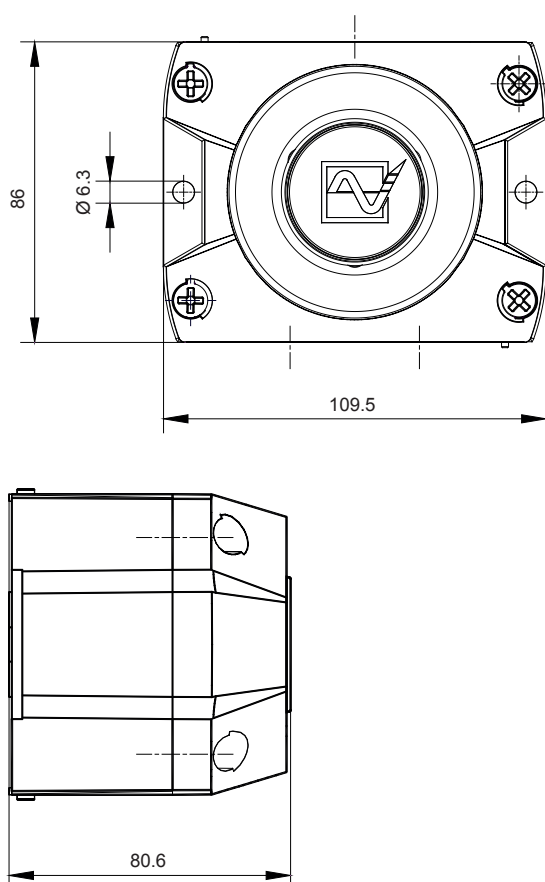
<sup>1</sup> power consumption dependent on operating voltage

Mechanical data	PA 1	PA 5
Sound pressure level	100 dB (A)	105 dB (A)
Sound level reduction	max. - 16 dB via potentiometer	
Alarm tones	80 (see tone table page 140/141)	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	90%	
Protection system according to EN 60529	IP 66	
Protection class	II	
Duty cycle	100%	
Material	PC / ABS blend	
Colour	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)	
Cable entry	3 x M20 knock-outs on side, 1 knock-out on back	5 x M20 knock-outs on side, 1 knock-out on back
Integrated seal with cable entry	6 – 13 mm (feed-through grommet)	
Connecting terminals	2.5 mm <sup>2</sup> fine wire with cable end sleeve, AWG 16	
Weight	AC	405 g
	DC	270 g
Weight	AC	778 g
	DC	643 g

## Dimensions

PA 1

PA 5



## Ordering details

Article numbers		PA 1			PA 5		
Version	Rated voltage	230 V AC	115 V AC	10-57 V DC	230 V AC	115 V AC	10-57 V DC
Standard	housing red	233 10 10 0 000	233 10 15 0 000	233 10 63 0 000	233 50 10 0 000	233 50 15 0 000	233 50 63 0 000
GL	housing red	233 10 10 0 001	233 10 15 0 001	233 10 63 0 001	233 50 10 0 001	233 50 15 0 001	233 50 63 0 001
Standard	housing grey	233 10 10 0 055	233 10 15 0 055	233 10 63 0 055	233 50 10 0 055	233 50 15 0 055	233 50 63 0 055
GL	housing grey	233 10 10 0 056	233 10 15 0 056	233 10 63 0 056	233 50 10 0 056	233 50 15 0 056	233 50 63 0 056

Article numbers for other voltages and versions on request

## Options / Accessories



Enclosure fitting

Surface gasket

Tamper-proof sealing

Panel mounting kit



SSM  
(only for 24 V DC)

See page 141 for further information

## 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

# Sounders PATROL series 110 / 120 dB(A) PA 10 / PA 20



PATROL - the new generation of sounders.

Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders

PA 10



max. signal  
reception range

PA 20



max. signal  
reception range

IP 66

Protection  
system

+ 55 °C  
- 40 °C

Operating  
temperature



Acoustic  
penetration

EN  
54-3

24–48 V DC  
115–230 V AC

VdS

24–48 V DC  
115–230 V AC

UL

Electrical data	PA 10		
Rated voltage	95 – 265 V AC	24 V AC	10 – 60 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	
Operating range	95 – 265 V	20 - 30 V	10 – 60 V
Nominal current consumption	20 – 115 mA	250 – 900 mA	60 – 485 mA
Electrical data	PA 20		
Rated voltage	95 – 265 V AC	24 V AC	10 – 60 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	
Operating range	95 – 265 V	20 - 30 V	10 – 60 V
Nominal current consumption <sup>1</sup>	75 – 330 mA	500 – 1 800 mA	120 – 880 mA

<sup>1</sup> power consumption dependent on operating voltage

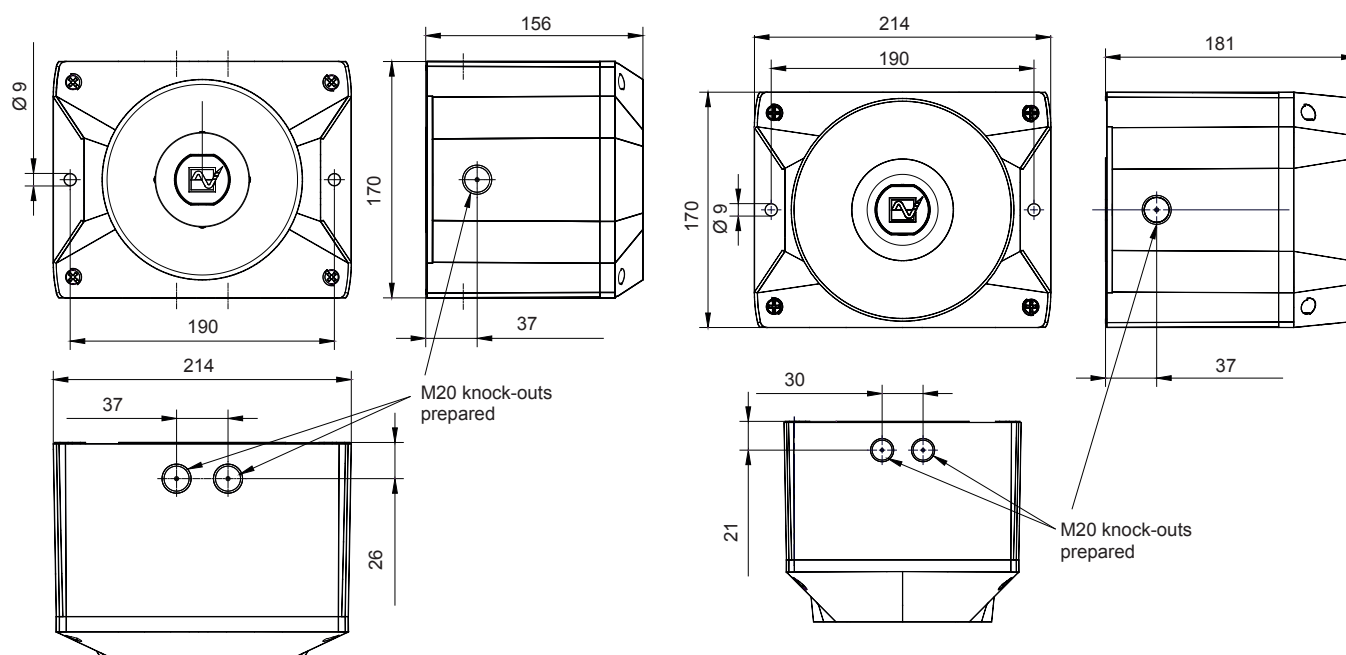
Mechanical data	PA 10	PA 20
Sound pressure level	110 dB (A)	120 dB (A)
Sound level reduction	max. - 12 dB via potentiometer	
Alarm tones	80 (see tone table page 140/141)	
Duty cycle	100%	
Operating temperature	- 40 °C ... + 55 °C	
Storage temperature	- 40 °C ... + 70 °C	
Relative humidity	90%	
Protection system according to EN 60529	IP 66	
Protection class	II	
Material	PC / ABS blend	
Colour	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)	
Cable entry	5 x M20 knock-outs on side, 1 knock-out on back	
Integrated seal with cable entry	6 – 13 mm (feed-through grommet)	
Connecting terminals	2.5 mm <sup>2</sup> fine wire with cable end sleeve, AWG 16	
Weight	AC	1 060 g
	DC	1 050 g
		1 200 g
		1 090 g



## Dimensions

### PA 10

### PA 20



## Ordering details

Article numbers		PA 10			PA 20		
Version	Rated voltage	95-265 V AC	24 V AC	10-60 V DC	95-265 V AC	24 V AC	10-60 V DC
Standard	housing red	233 60 64 0 000	233 60 30 0 000	233 60 63 0 000	233 70 64 0 000	233 70 30 0 000	233 70 63 0 000
GL	housing red	233 60 64 0 001	233 60 30 0 001	233 60 63 0 001	233 70 64 0 001	233 70 30 0 001	233 70 63 0 001
Standard	housing grey	233 60 64 0 055	233 60 30 0 055	233 60 63 0 055	233 70 64 0 055	233 70 30 0 055	233 70 63 0 055
GL	housing grey	233 60 64 0 056	233 60 30 0 056	233 60 63 0 056	233 70 64 0 056	233 70 30 0 056	233 70 63 0 056

Article numbers for other voltages and versions on request

## Options / Accessories



Enclo-  
sure  
fitting

Surface  
gasket

Tamper-  
proof  
sealing

Panel  
mount-  
ing kit



SSM  
(only for 24 V DC)

See page 141 for further information

## 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

Tone table PA 1 / PA 5 / PA 10 / PA 20

Basic tone no.	Description		Basic tone no.	Description	
1	no tone		69	Continuous tone	440 Hz
2	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s  EN54-3	71	Continuous tone	340 Hz
9	Slow whoop, fire alarm, UK BS5839-1	970 Hz 1 s	77	Interrupted tone	2400 Hz
11	Interrupted tone (fast)	970 Hz 20 ms	82	Interrupted tone, PFEER (general alarm), UK BS5839-1 (back-up alarm)	1000 Hz
13	Interrupted tone	900 Hz 0,3 s	83	Interrupted tone, PFEER (general alarm)	1000 Hz
15	Slow whoop, evacuation alarm Netherlands NEN 2575	700 Hz 0,6 s	88	Interrupted tone	950 Hz
16	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,5 s  EN54-3	90	Interrupted tone	825 Hz
18	Slow whoop, NFPA	500 Hz 0,25 s	91	Interrupted tone	800 Hz
22	Pulsating tone, Australien alert AS1670, ISO8201	775 Hz 0,85 s	92	Interrupted tone	800 Hz
23	Siren	422 Hz 1 s	93	Interrupted tone (fast), electromechanical horn	800 Hz
24	Siren	1200 Hz 0,5 s	97	Interrupted tone	725 Hz
25	Siren	2400 Hz 3 s	98	Interrupted tone, Sweden SS031711 (emergency signal)	700 Hz
26	Pulsating tone, industrial alarm Germany	800 Hz 3 s	100	Interrupted tone, industrial alarm (Germany)	680 Hz
27	Sweeping	300 Hz 3 s	101	Interrupted tone, Sweden SS031711 (important message (pres-mess))	660 Hz
29	Sweeping (fast)	1000 Hz 10 s	102	Interrupted tone, Sweden SS031711 (local warning)	660 Hz
30	Sweeping	2900 Hz 70 ms	103	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz
31	Sweeping, France NFC48-265	2400 Hz 70 ms	104	Interrupted tone, Sweden SS031711 (emergency signal)	660 Hz  EN54-3
33	Sweeping (medium), UK BS5839-1	1600 Hz 1 s	107	Interrupted tone, Germany KTA3901 (evacuation alarm)	500 Hz
34	Sweeping (fast)	1400 Hz 0,5 s	109	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz
35	Sweeping (fast), UK BS5839-1	1000 Hz 0,5 s	110	Interrupted tone, (fast variable), bell	1450 Hz
36	Sweeping	800 Hz 10 ms	111	Interrupted tone, ISO8201 (emergency evacuation signal), USA (evacuation alarm)	470 Hz
43	Sweeping	800 Hz 70 ms	112	Interrupted tone, ISO8201 (emergency evacuation signal)	950 Hz
44	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1500 Hz 1,5 s	113	Interrupted tone, ISO8201 (emergency evacuation signal), sweeping	2850 Hz
45	Sweeping	1200 Hz 1 s	115	Interrupted tone, IMO (telephone call)	950 Hz
46	Sweeping, general alarm Finland	500 Hz 3 s	116	Interrupted tone, IMO (leave ship)	950 Hz
52	Continuous tone	1500 Hz 7 s	117	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	825 Hz
53	Continuous tone	2400 Hz	122	Alternating tone	2900 Hz
54	Continuous tone, Finland (all-clear signal)	2000 Hz	123	Alternating tone	2400 Hz
55	Continuous tone, PFEER gasalarm	1500 Hz	124	Alternating tone, Singapore	2900 Hz
56	Continuous tone	1200 Hz	125	Alternating tone	2400 Hz
57	Continuous tone, UK BS5839-1	1000 Hz	128	Alternating tone	1000 Hz
59	Continuous tone	880 Hz	130	Alternating tone, UK BS5839-1 (fire alarm)	1400 Hz
60	Continuous tone	825 Hz  EN54-3	131	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1200 Hz
61	Continuous tone	800 Hz	135	Alternating tone, UK BS5839-1 (fire alarm, increased urgency - railway crossing)	1025 Hz
63	Continuous tone	725 Hz	142	Alternating tone	825 Hz
65	Continuous tone, Sweden SS031711 (all-clear signal)	1000 Hz			
66	Continuous tone	800 Hz			
67	Continuous tone, Germany KTA3901 (all-clear signal)	660 Hz			
68	Continuous tone	554 Hz			

## Tone table PA 1 / PA 5 / PA 10 / PA 20

Basic tone no.	Description		Basic tone no.	Description	
143	Alternating tone, industrial alarm (Germany)	660 Hz 0,125 s 440 Hz 0,125 s	147	Alternating tone, Sweden SS031711	554 Hz 1 s 440 Hz 1 s
144	Alternating tone	650 Hz 1 s 440 Hz 1 s	148	Alternating tone, Sweden SS031711	554 Hz 0,5 s 440 Hz 0,5 s
146	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,25 s 440 Hz 0,4 s	152	Alternating tone (two tone chime)	800 Hz 0,25 s 650 Hz 0,25 s

## Control of the tones

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
1	2	3	4	5	6	Basic tone no.	C1	C2	C1+C2
						1	2	88	57
ON						2 *	128	112	57
	ON					2	26	100	93
ON	ON					2	61	131	112
		ON				9	57	11	82
ON		ON				15	131	52	112
	ON	ON				16	109	52	56
ON	ON	ON				18	111	57	68
			ON			22	16	109	68
ON			ON			23	131	52	112
	ON		ON			24	131	52	131
ON	ON		ON			25	131	52	92
		ON	ON			26	2	100	93
ON		ON	ON			27	123	52	92
	ON	ON				29	35	52	61
ON	ON	ON				30	27	52	77
				ON		31	131	52	57
ON				ON		33	30	52	35
	ON			ON		34	35	52	93
ON	ON			ON		35	27	52	110
		ON		ON		36	146	67	57
ON		ON		ON		43	131	52	91
	ON	ON		ON		45	2	57	93
ON	ON	ON		ON		52	15	65	82
			ON	ON		54	46	54	131
ON			ON	ON		55	131	52	128
	ON		ON	ON		56	82	35	33
ON	ON		ON	ON		59	143	59	101
			ON	ON		60	131	52	125
ON		ON	ON	ON		65	131	52	93
	ON	ON	ON	ON		66	110	52	107
ON	ON	ON	ON	ON		69	131	52	110

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
1	2	3	4	5	6	Basic tone no.	C1	C2	C1+C2
					ON	71	131	52	93
ON					ON	77	61	52	122
	ON				ON	82	131	52	83
ON	ON				ON	83	56	2	82
		ON			ON	88	2	57	128
ON		ON			ON	90	131	52	125
	ON	ON			ON	91	30	52	110
ON	ON	ON			ON	92	33	52	57
			ON		ON	93	2	128	57
ON			ON		ON	97	2	63	93
	ON		ON		ON	100	131	52	125
ON	ON		ON		ON	101	98	102	65
		ON	ON		ON	103	131	65	147
ON		ON	ON		ON	104	103	65	101
	ON	ON	ON		ON	109	16	52	22
ON	ON	ON	ON		ON	110	131	61	91
				ON	ON	112	2	57	128
ON				ON	ON	113	52	123	104
	ON			ON	ON	115	117	116	44
ON	ON			ON	ON	116	117	93	125
		ON		ON	ON	117	93	116	125
ON		ON		ON	ON	123	27	52	77
	ON	ON		ON	ON	124	53	83	2
ON	ON	ON		ON	ON	130	2	107	67
			ON	ON	ON	131	2	112	57
ON			ON	ON	ON	135	16	56	109
	ON		ON	ON	ON	142	2	54	88
ON	ON		ON	ON	ON	143	59	93	33
		ON	ON	ON	ON	144	110	61	2
ON		ON	ON	ON	ON	146	31	67	57
		ON	ON	ON	ON	148	131	52	92
ON	ON	ON	ON	ON	ON	152	110	61	13

\* factory setting

## Accessories

### Ordering details

Article numbers		PA 1	PA 5	PA 10 / PA 20
Enclosure fitting	For connection (daisy-chaining) of several sounders of the PATROL series	283 00 00 0 003		
Surface gasket	Sealing of the sounder installation surface when, e.g. cable entry is executed from the back.	283 00 00 0 004	283 00 00 0 005	283 00 00 0 006
Tamper-proof sealing (pack of 4)	Anti-tamper sealing for fasteners of the PATROL devices after installation in order to prevent manipulation of the devices.	283 00 00 0 002		
Panel mount installation kit PATROL	The PATROL devices are also suitable for panel mounting. This kit consists of a plug connector for the electrical contact, as well as all installation materials.	283 00 00 0 007	283 00 00 0 008	283 00 00 0 009

# 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 available:

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



max. signal  
reception range



Protection  
system



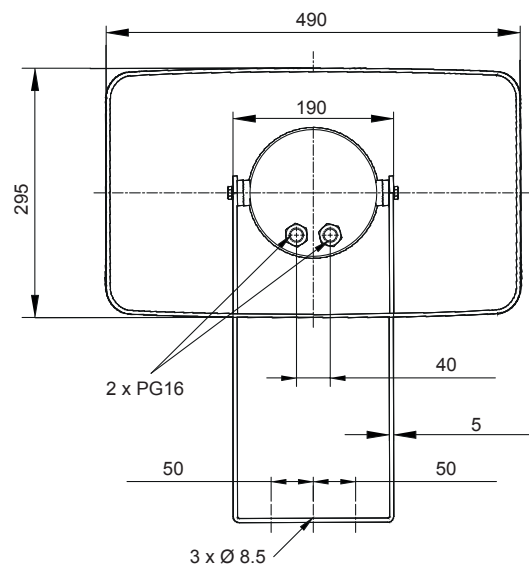
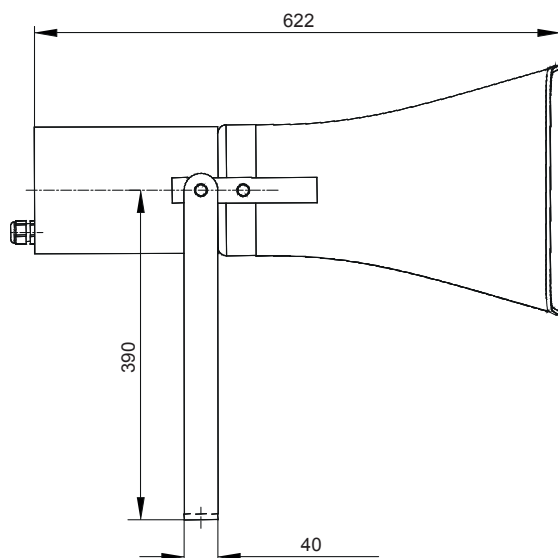
Operating  
temperature



Electrical data	PA 130	
Rated voltage	230 V AC	20-60 V DC
Rated frequency	50 / 60 Hz	
Operating range	- 25% / + 15%	20 V – 60 V
Nominal 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 mm <sup>2</sup>	
Weight	AC	7.45 kg
	DC	5.85 kg

## Dimensions



## Ordering details

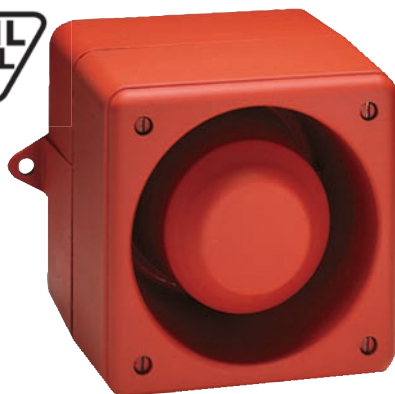
Article numbers	PA 130	
Rated voltage	230 V AC	20–60 V DC
	230 26 10 0 000	230 26 91 0 000

## Options / Accessories



# Sounders 105 / 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.
  - leaks / gas warning
  - high-pressure / overfilling
- and machine safety, e.g. as
  - 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/PLd**

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



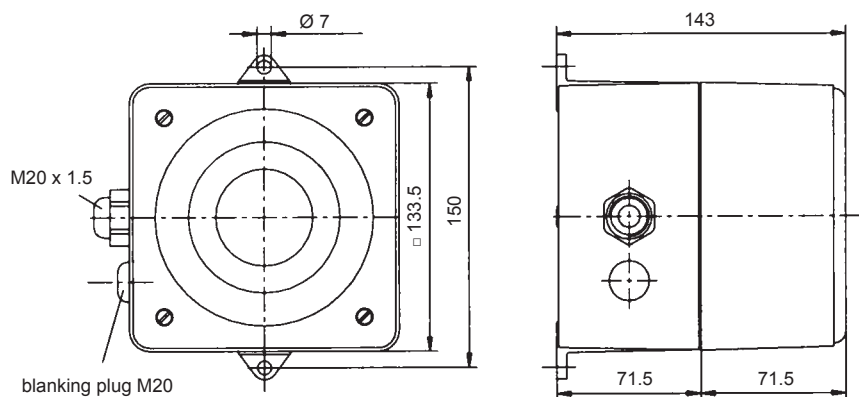
Acoustic  
penetration

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 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range		195 – 253 V	95 – 127 V	19 – 29 V	195 – 253 V	95 – 127 V	19 – 29 V
Nominal current consumption		0.03 A	0.06 A	0.28 A	0.06 A	0.12 A	0.42 A
Diagnostics channel	current 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 tone table page 133)	
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 mm <sup>2</sup>	
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



## 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)
- combination of tone / spoken message
- precise 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 reproduction

PAS 106



max. signal  
reception range

PAS 110



max. signal  
reception range

IP 66

Protection  
system

+ 55 °C

- 25 °C

Operating  
temperature

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

<sup>1</sup> at maximum volume

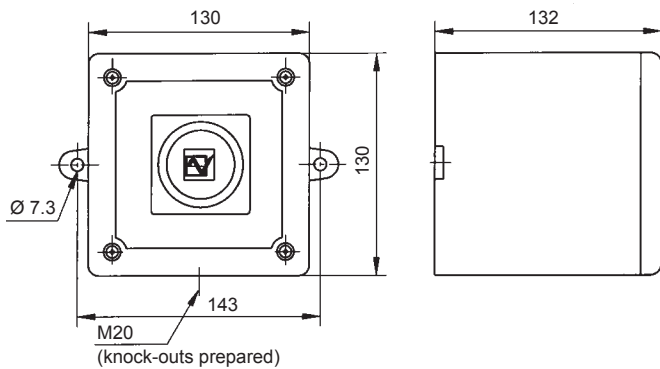
Mechanical data		PAS 106	PAS 110
Sound pressure level		105 dB (A), speech reproduction 5 dB lower	110 dB (A), speech reproduction 5 dB lower
Sound level reduction		by 20 dB via potentiometer	
Duty cycle		100%	
Operating temperature		- 25 °C ... + 55 °C	
Storage temperature		- 25 °C ... + 70 °C	
Relative humidity		90%	
Protection system according to EN 60529		IP 66	
Material		ABS, self-extinguishing, similar UL 94 VO	
Colour		similar to RAL 3000 (flame red), optionally grey or white	
Cable entry		M20 knock-outs prepared	
Weight	AC	1 kg	2.1 kg
	DC	0.75 kg	1.8 kg

## Options / Accessories

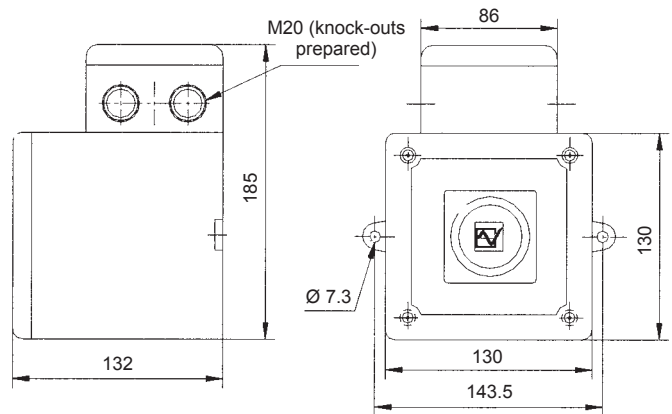


## Dimensions

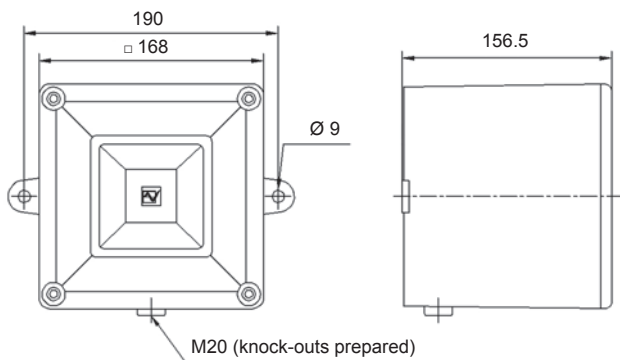
### PAS 106 – DC



### PAS 106 – AC



### PAS 110



## Tone table

Stage 1	Frequency description		Tone length	Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm)	1000 Hz 800 Hz 0.5 s	4 cycles	1
2	Slow whoop	1200 Hz 500 Hz 2.5 s 0.5 s	2 cycles	2
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 500 Hz 1 s EN54-3	4 cycles	3
4	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 440 Hz 0.4 s EN54-3	4 cycles	4
5	Continuous tone	1000 Hz	3	5
6	Simulated bell	1450 Hz 0.69 ms	7	6
7	Interrupted tone, PFEER (general alarm)	1000 Hz 1 s 1 s	3 cycles	7
8	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0.625 s 0.625 s	4 cycles	8
9	Pulsating tone, Australien alert AS1670, ISO8201	1200 Hz 500 Hz 0.5 s 0.5 s 1.5 s	2 cycles	9
10	no tone - 0.5 s gap between messages or 2 s gap, if 2 <sup>nd</sup> 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

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



- fully synchronised playback if several sounders are present; no synchronisation 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 durations possible using emergency voltage



max. signal  
reception range



Protection  
system



Operating  
temperature

Electrical data		PAS 106 SYNC	
Rated voltage		230 V AC	24 V DC
Rated frequency		50 / 60 Hz	
Operating range		210 V – 253 V	10 – 30 V
Nominal 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 UL 94 VO	
Colour		similar to RAL 3000 (flame red), optionally grey or white	
Cable entry		M20	
Weight	AC	1 kg	
	DC	0.75 kg	

## Options / Accessories



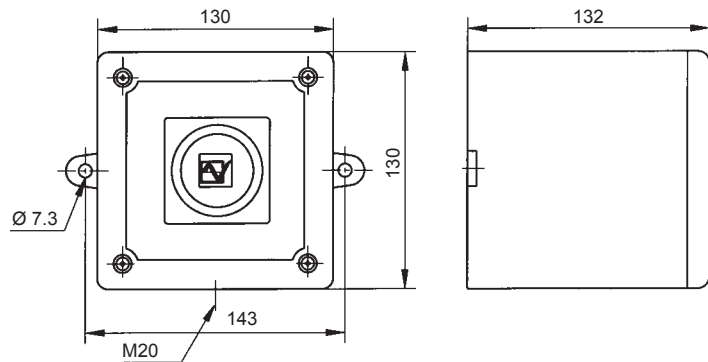
Article number:  
293 23 00 0 000

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



Article number:  
293 23 00 0 010

## Dimensions



## Tone table

Tone	Description		Stage 2 + 3 tone selection		
			Tone A	Tone B	Tone C
1	Pulsating tone, Australien alert AS1670, ISO8201	1200 Hz 0.5 s 500 Hz 0.5 s 1.5 s	5	8	4
2	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3.5 s 500 Hz 0.5 s EN54-3	10	8	12
3	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms	8	14	10
4	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3.75 s 500 Hz 0.25 s	1	8	5
5	Simulated bell	1450 Hz 0.69 ms	10	13	2
6	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz EN54-3	13	2	10
7	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0.1 s 440 Hz 0.4 s EN54-3	10	5	9
8	Continuous tone	1000 Hz	10	11	5
9	Continuous tone	554 Hz	5	7	12
10	Alternating tone	1000 Hz 20 ms 800 Hz 20 ms	8	6	11
tones 11 to 14 are only available for stage 2 or 3					
11	Interrupted tone, PFEER (general alarm), UK BS5839-1 (back-up alarm)	1000 Hz 0.5 s 0.5 s	-	-	-
12	Continuous tone	2400 Hz	-	-	-
13	Continuous tone	800 Hz	-	-	-
14	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms	-	-	-

## 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 SYNC	230 81 10 0 027	230 81 80 0 027

# Loudspeakers 122 dB(A) PS15R / PS15B



- powerful loudspeakers, up to 122 dB (A)
- adjustable volume
- sturdy IP 54 implementation
- for industrial and workshop applications both indoors and outdoors
- excellent transmission of speech, music and tones



max. signal  
reception range

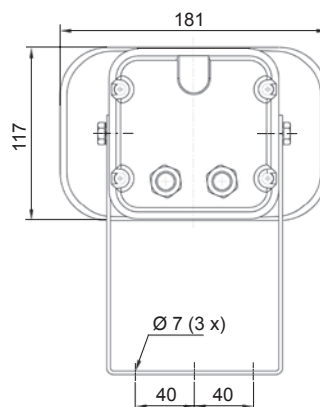
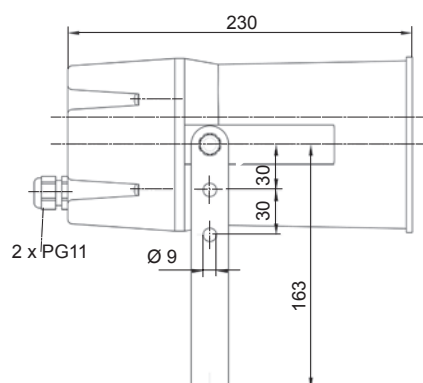


Protection  
system



Operating  
temperature

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



## Ordering details

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



# Loudspeaker 125 dB(A) PS50B



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



Range as  
per EN 54



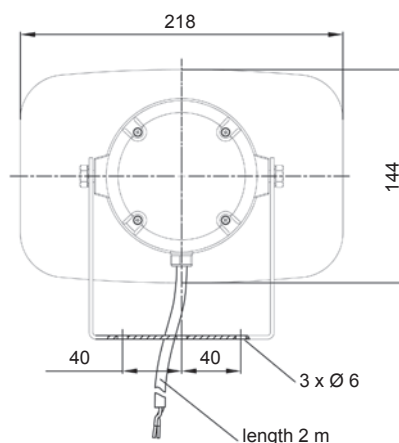
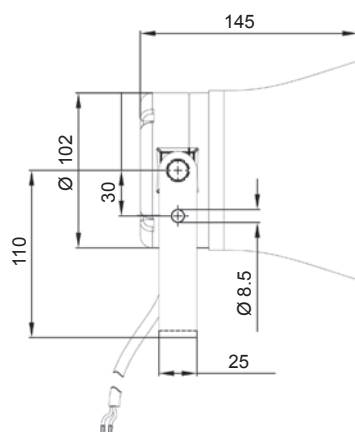
Protection  
system



Operating  
temperature

Mechanical data	PS50B
Sound pressure level	125 dB (A) @ 50 W
Rated power	50 W
Frequency range	600 Hz – 5 000 Hz
Dispersion	90°
Impedance	16 Ω
Operating temperature	- 25 °C ... + 50 °C
Storage temperature	- 30 °C ... + 60 °C
Relative humidity	100%
Protection system according to EN 60529	IP 66
Material housing	polycarbonate (PC)
Material mounting bracket	steel, galvanised
Colour	black
Type of connection	connecting cable (2 m)
Weight	1.3 kg

## Dimensions



## Ordering details

Article number	PS50B
	231 95 00 0 000

# 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 class (IP 65) to the housing
- also available with easily adjustable volume control

P22 DBZ



max. signal  
reception range

P28-Serie



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
Nominal current consumption	15 – 30 mA			

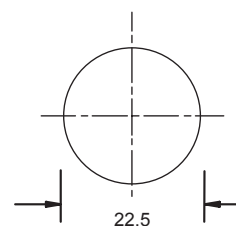
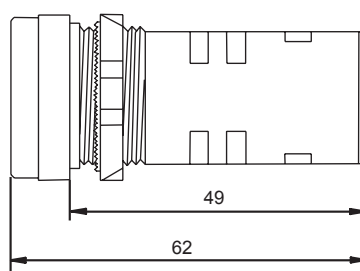
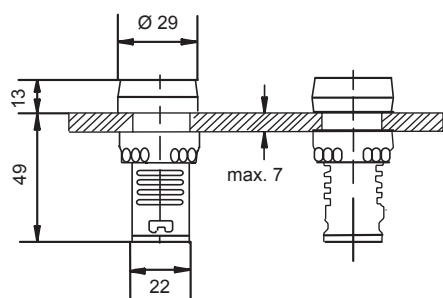
Electrical data	P 28 DMC948	P 28 DMC201	P 28 DMC301	P 28 DMB530
Rated voltage	48 V DC	110 V AC	230 V AC	30 V DC
Operating range	9 V – 48 V	30 V – 120 V	130 V – 230 V	5 V – 30 V
Nominal current consumption	5 mA @ 9 V 20 mA @ 48 V	7 mA @ 30 V 40 mA @ 120 V	20 mA @ 130 V 40 mA @ 220 V	2 mA @ 5 V 20 mA @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

Mechanical data	P 22 DBZ	P 28 DMC948	P 28 DMC201	P 28 DMC301	P 28 DMB530
Operating mode	pulsating tone	continuous tone	continuous tone	continuous tone	continuous tone / pulsating tone
Sound pressure level	80 dB (A) @ 10 cm	91 dB (A) @ 48 V	91 dB (A) @ 120 V	91 dB (A) @ 230 V	91 dB (A) @ 30 V
Sound level reduction	–	up to 20 dB			
Duty cycle	> 50 000 hrs	> 50 000 hrs			
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-mounting: Ø 22.5 mm	panel-mounting: Ø 28.6 mm			
Type of connection	screw terminals 1.5 mm <sup>2</sup>	quick connect blades, 6.3 mm wide, 0.8 mm thick			
Weight	30 g	40 g			

## Dimensions

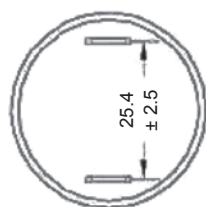
## Panel cutouts

### P 22 DBZ

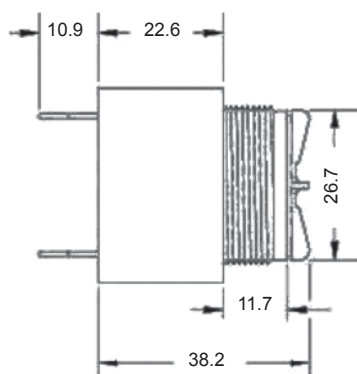


### P 28 DMC948 / P 28 DMC201 / P 28 DMC301

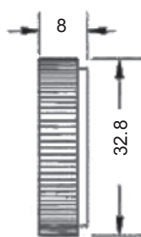
Rear view



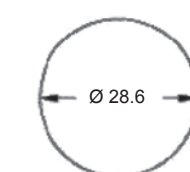
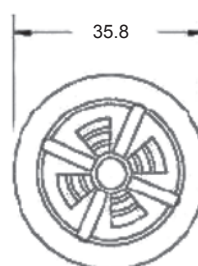
Side view



Ring



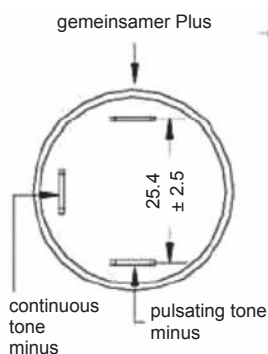
Front view



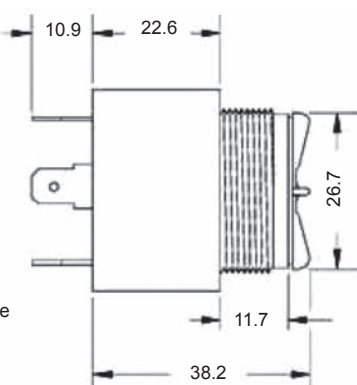
for mounting panels up to  
6.3 mm thick

### P 28 DMB530

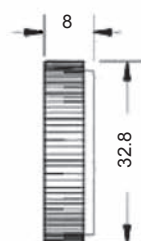
Rear view



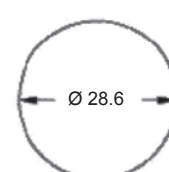
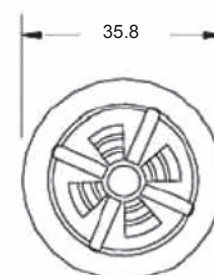
Side view



Ring



Front view



for mounting panels up to  
6.3 mm thick

## Ordering details

Article numbers				
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 DMB530				
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**

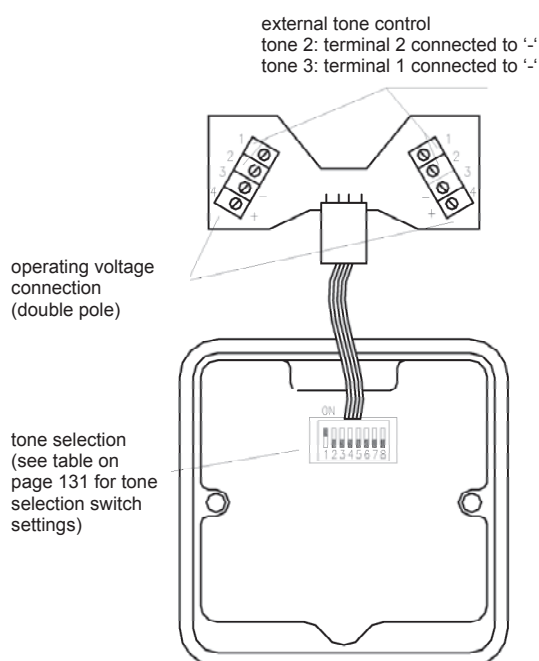
25 x 18 mm  
only for P 22 DBZ

Article number:  
232 91 00 0 000

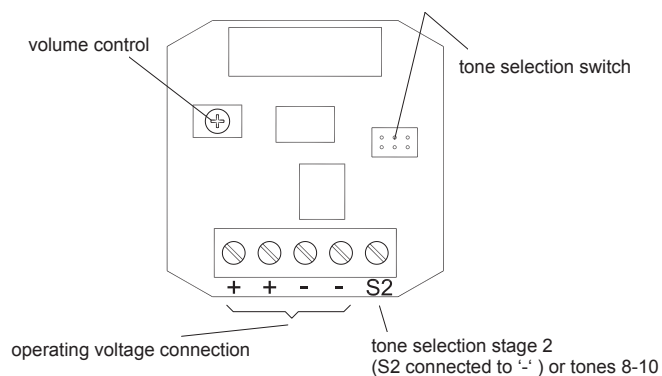
See page 85 for illustrations

# Connection diagrams

## SON 2



## SON F1

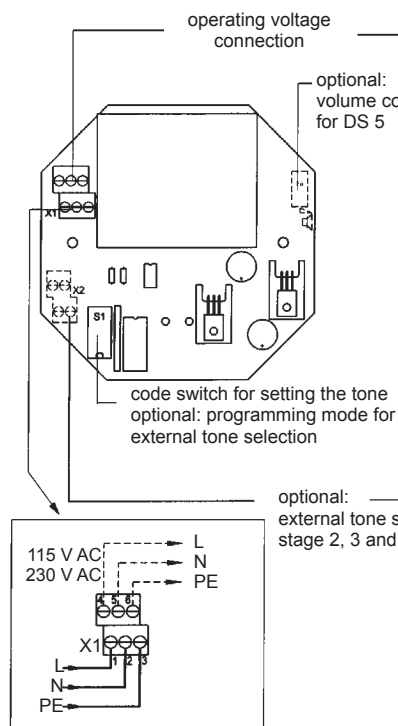


### Tone

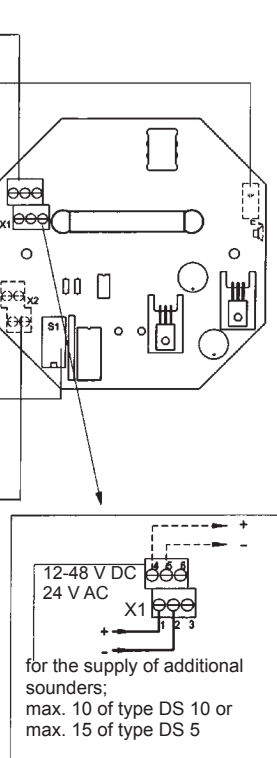
1	2	3	4	5	6	7	* 8	* 9	* 10

\* to select tones 8-10: connect S2 to '-'

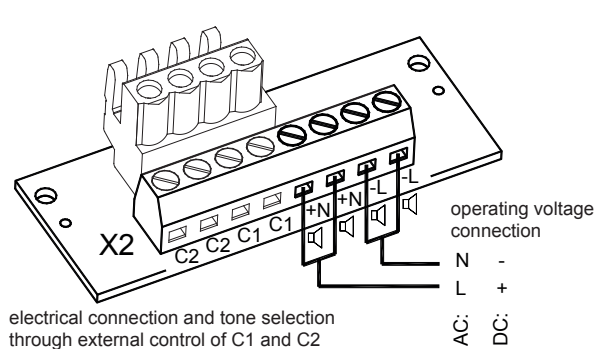
## DS 5 / DS 10 – AC



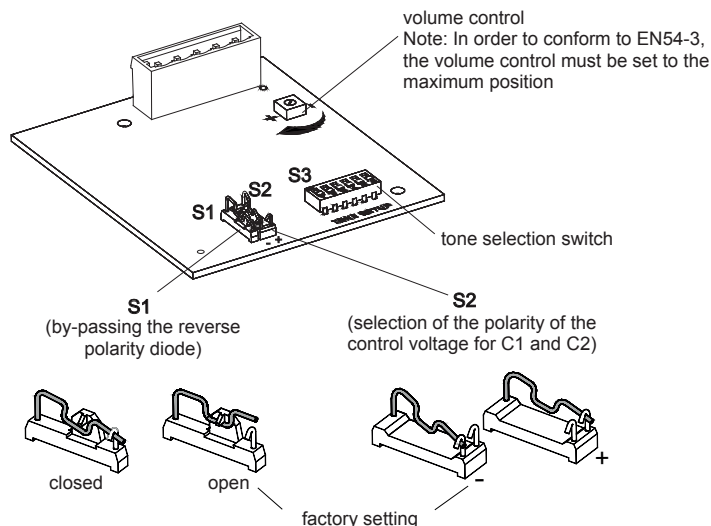
## DS 5 / DS 10 – DC



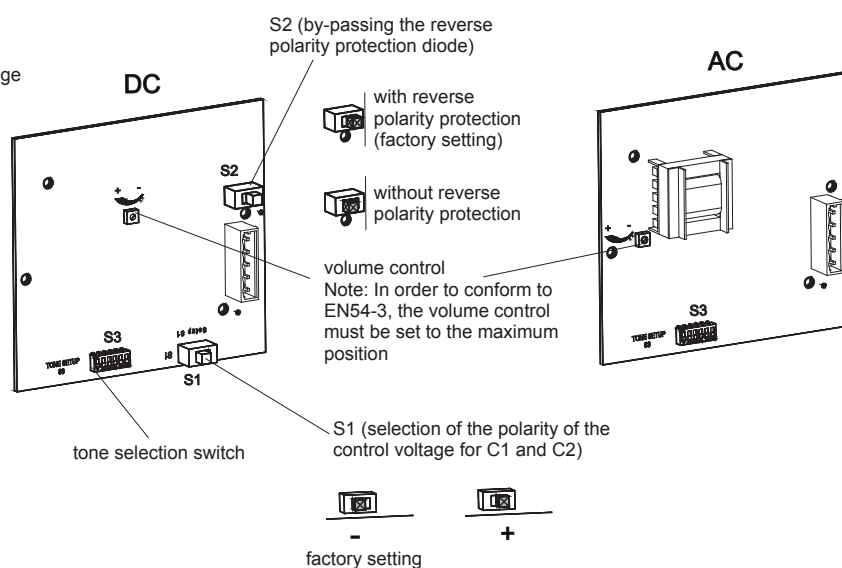
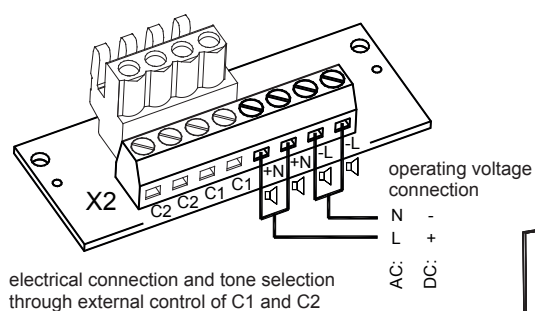
## PA 1 / PA 5



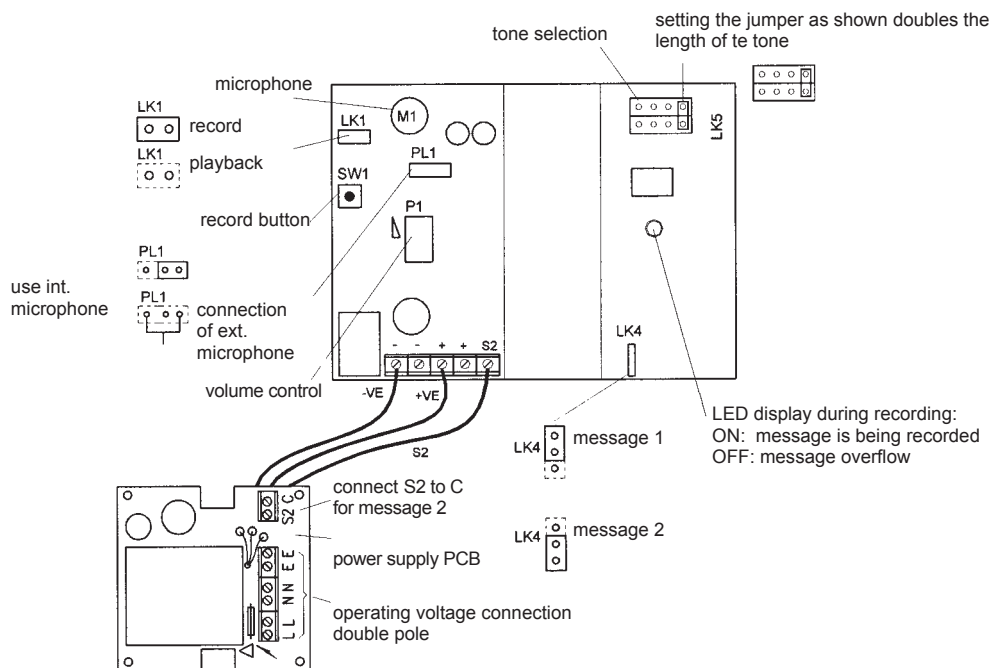
Caution:  
Position of changeover switch S2 only at „-“ or „+“ „open“ position is not permitted and leads to malfunction.



## PA 10 / PA 20

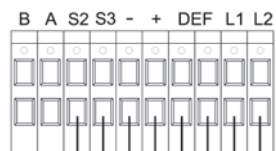


PAS 106 / PAS 110 – AC



PA 130

connecting terminal (removable)



audio input  
0 dB 600  $\Omega$

malfunction message-/  
aux. relay NO/NC

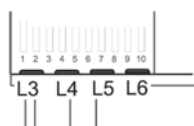
operating voltage  
24 V (48 V DC)

external  
tone selection

Code switch I  
ON

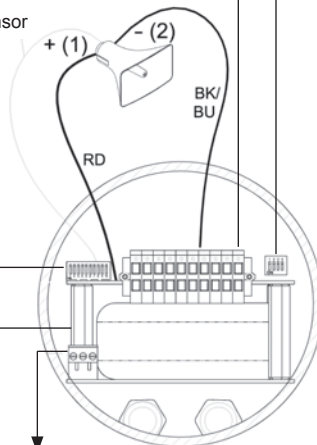
tone selection  
normally set  
to ON

self-test:  
switch 7 to OFF:  
activation of the self-test  
every 24 hrs (operating vol-  
tage, amplifier, driver, tone  
test - duration 2 s)



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

temperature sensor



230V AC

PE N L

GNVE BU BN

connecting terminal  
AC version

customer application

Code switch II



1: audio:

switch 1 to ON: activation of the terminal resistor  
(120  $\Omega$ ) for cable monitoring  
- audio input 0 dB 600  $\Omega$

2: not used (normally set to OFF)

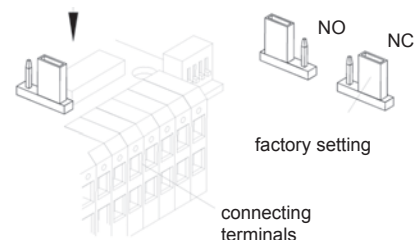
3: cable monitoring

switch 3 to ON: activation of the resistor (4K7) for  
cable monitoring (DC devices only)

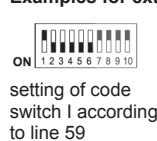
4: auxiliary relay

switch 4 to ON: malfunction message output  
switch 4 to OFF: activation of additional devices

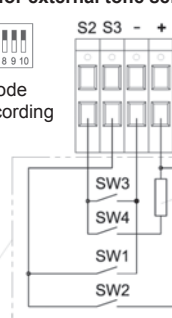
Relay energised during trouble-free operation



Examples for external tone selection



setting of code  
switch I according  
to line 59

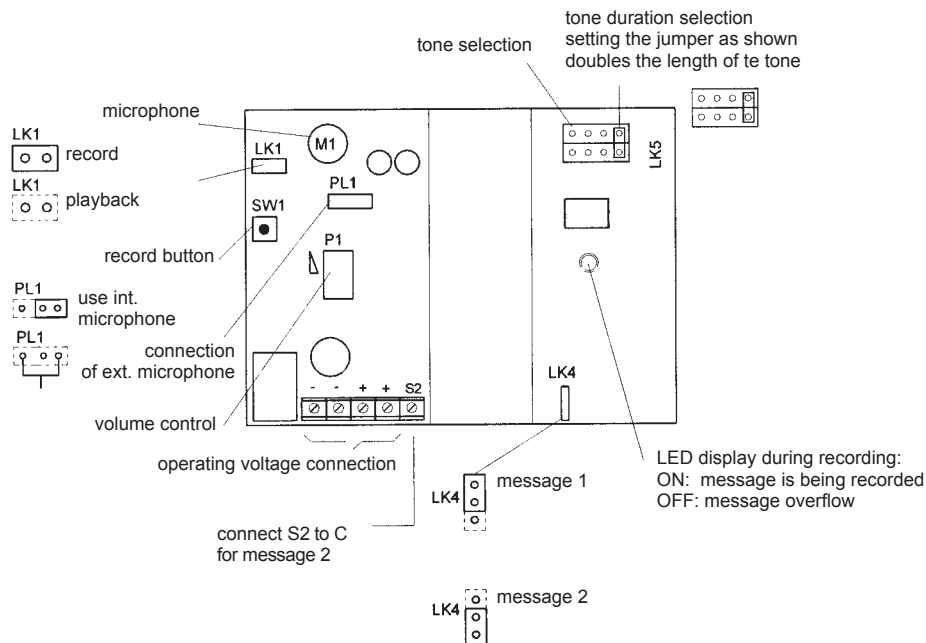


Tone	SW1	SW2	SW3	SW4
-				
51			x	
52				x
53	x			
54		x		
audio	x		x	
55	x			x
-		x	x	
56		x		x

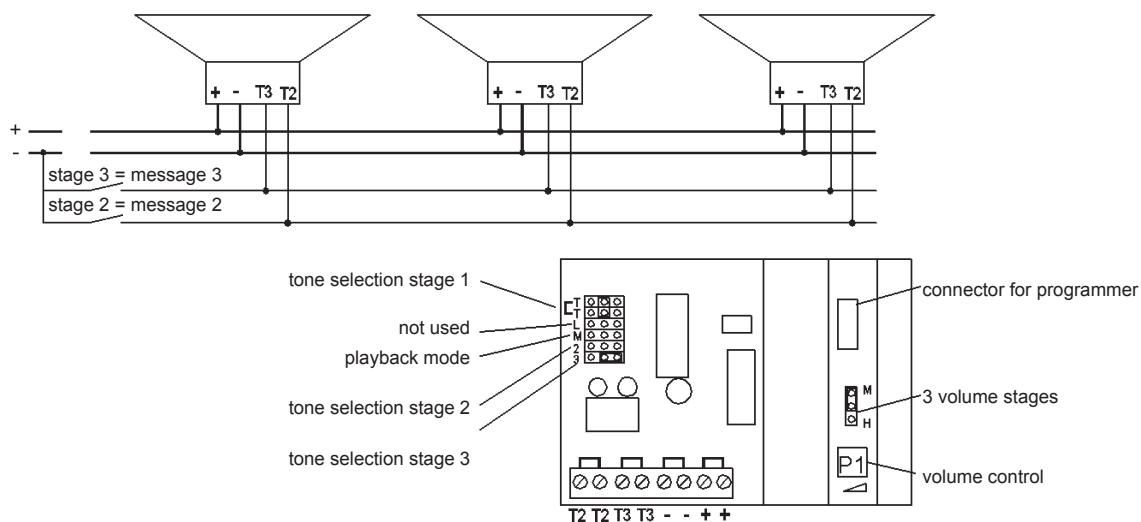
x = closed



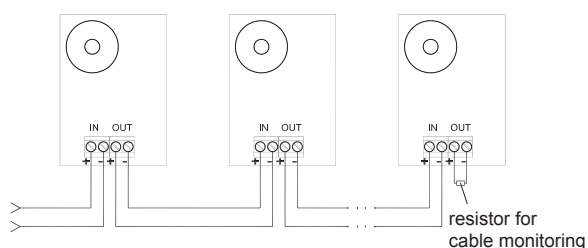
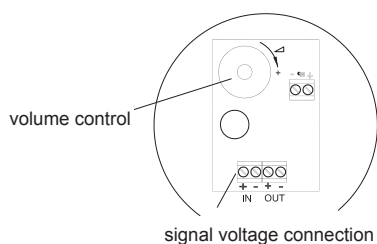
## PAS 106 / PAS 110 – DC



## PAS 106 SYNC



## PS15R / PS15B







# 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 <sup>1</sup>					Sound pressure level (tone) / Light power	Pro-tection system	Dimensions (HxWxD) mm	Approvals / Standards					Page
	2.5	5	25	75	150				GL	GOST	UL	VdS	EN 54-3 54-23	
 P 22 DBF						80 dB (A) @ 10 cm	IP 65	Ø 29 x 52						161
 SON 4						100 dB (A) 0.25 J	IP 56	86 x 86 x AC: 120 DC: 102		●		●	●	162
 SON 4L						100 dB (A)				●		●	●	
 SON FL1						100 dB (A) 5 J	IP 55	172 x 86 x 83		●	●			164
 DSF 5						105 dB (A) 13 J	IP 66 IP 67	263,5 x 133.5 x 143		●				166
 DSF 10						110 dB (A) 13 J				●				
 PA X 1-05						100 dB (A) 5 J	IP 66	172,4 x 109.5 x 80.6	● <sup>1</sup>	●	○	●	●	168
 PA X 5-05						105 dB (A) 5 J	IP 66	215 x 163.4 x 132	● <sup>1</sup>	●	○			168
 PA X 5-10						105 dB (A) 10 J			● <sup>1</sup>	●	○			
 PA X 10-10						110 dB (A) 10 J	IP 66	270 x 214 x 156	● <sup>1</sup>	●	○			170
 PA X 10-15						110 dB (A) 15 J			● <sup>1</sup>	●	○			
 PA X 20-10						120 dB (A) 10 J	IP 66	270 x 214 x 181	● <sup>1</sup>	●	○			170
 PA X 20-15						120 dB (A) 15 J			● <sup>1</sup>	●	○			

<sup>1</sup> 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  
<sup>1</sup> Option

## Note:

Using sounders with a sound pressure level of  $\geq 120$  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](http://www.pfannenberg.com) · [www.pfannenberg-spareparts.com](http://www.pfannenberg-spareparts.com)  
 Keep up to date. Subscribe to our newsletter now:  
[newsletter.pfannenberg.com](http://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 class (IP 65) to the housing
- superior shape, hence 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



Acoustic range  
according to EN 54



Protection  
system

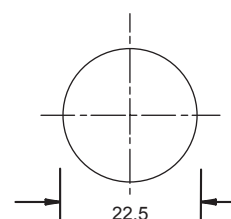
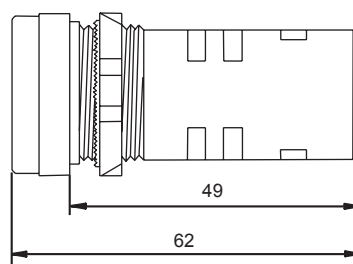
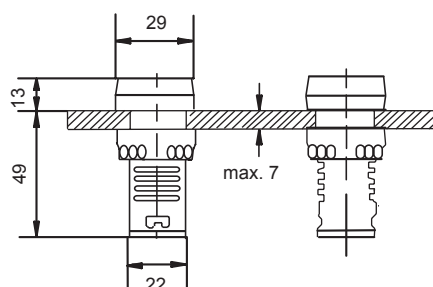


Operating  
temperature

Electrical data	P 22 DBF			
Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
Nominal current consumption	max. 30 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 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 mm <sup>2</sup>			
Weight	90 g			

## Dimensions

## Panel cut-out



## Ordering details

Article numbers					
Lens colour	Rated voltage	230 V AC	115 V AC	48 V AC/DC	24 V AC/DC
red		232 72 10 5 000	232 72 15 5 000	232 72 70 5 000	232 72 80 5 000

## Options / Accessories



25 x 10 mm

Article number:  
232 92 00 0 000



25 x 18 mm

Article number:  
232 91 00 0 000

See page 85 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



Acoustic  
range



Protection  
system



Operating  
temperature

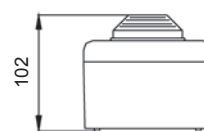
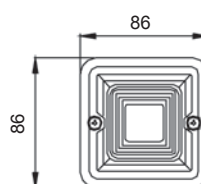
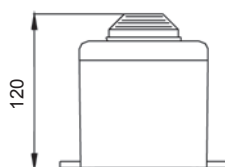
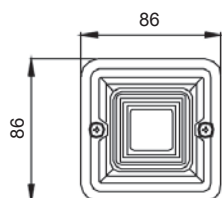


Standard



Standard

Electrical data	SON 4					
Rated voltage	230 V AC	115 V AC	24 V AC	24 V DC		
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 10%	± 25%		
Nominal 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 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 10%	± 25%	± 25%	± 25%
Nominal 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					
Sound level reduction	by - 2 / - 6 dB			by - 9 dB		
Flash energy	0.25 J					
Flashing / Blinking rate	1 Hz			2 Hz		
Light source	xenon flash tube			5 high output LEDs		
Lens colours	yellow, amber, red, green, blue			amber, red		
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	lens	polycarbonate (PC)				
	housing	UL 94 VO & 5VA classified ABS				
Colour	housing	RAL 3000 (flame red), optionally grey or white				
Cable entry	4 knock-outs 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			SON 4 / SON 4L – DC			





**Tone table SON 4**

Tone	Description - Frequency	Stage		Tone	Description - Frequency	Stage	
		2	3			2	3
1	Continuous tone	340 Hz		2	5	17	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	EN54-3	17	5	18	5
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s 500 Hz 0,5 s	EN54-3	2	5	19	5
4	Sweeping (fast)	1000 Hz 10 ms 800 Hz 10 ms		6	5	20	5
5	Continuous tone	2400 Hz		3	20	21	5
6	Sweeping	2900 Hz 70 ms 2400 Hz 70 ms		7	5	22	5
7	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms		10	5	23	5
8	Sweeping	1200 Hz 3 s 500 Hz 3 s		2	5	24	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	EN54-3	15	2	25	5
10	Alternating tone	2900 Hz 20 ms 2400 Hz 20 ms		7	5	26	15
11	Interrupted tone	1000 Hz 10 ms 10 ms		2	5	27	5
12	Alternating tone	1000 Hz 0,875 s 800 Hz 0,875 s		4	5	28	5
13	Interrupted tone	2400 Hz 10 ms 10 ms		15	5	29	5
14	Interrupted tone	800 Hz 0,25 s 1 s		4	5	30	26
15	Continuous tone	800 Hz		2	5	31	5
16	Interrupted tone	660 Hz 150 ms 150 ms	EN54-3	18	5	32	26
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,4 s 440 Hz	EN54-3	2	27		
18	Interrupted tone, Sweden SS031711 (air raid warning)	680 Hz 1,8 s 1,8 s		2	5		
19	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s		2	5		
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz		2	5		
21	Alternating tone	554 Hz 10 ms 440 Hz 10 ms		2	5		
22	Interrupted tone	544 Hz 0,875 s 0,875 s		2	5		
23	Interrupted tone	800 Hz 20 ms 20 ms		6	5		
24	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s 800 Hz 0,5 s		29	5		
25	Sweeping	2900 Hz 0,5 s 2400 Hz 0,5 s		29	5		
26	Simulated bell	1450 Hz 0,69 ms		2	15		
27	Continuous tone	800 Hz		26	5		
28	Continuous tone	440 Hz		2	5		
29	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms		7	5		
30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s		32	26		
31	Sweeping	1200 Hz 10 ms 660 Hz 10 ms		26	5		
32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,75 s 500 Hz 0,25 s		30	26		

**Tone table SON 4L**

Tone	Description - Frequency	Stage		Tone	Description - Frequency	Stage	
		2	3			2	3
1	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	EN54-3	8	6	6	8
2	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s 500 Hz 0,5 s	EN54-3	1	7	7	10
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	EN54-3	8	8	8	-
4	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,4 s 440 Hz	EN54-3	9	9	9	-
5	Simulated bell	1450 Hz 0,69 ms		1	10	10	-
6	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms		8			
7	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,75 s 500 Hz 0,25 s		10			
8	Continuous tone	1000 Hz		-			
9	Continuous tone	554 Hz		-			
10	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s		-			

## 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

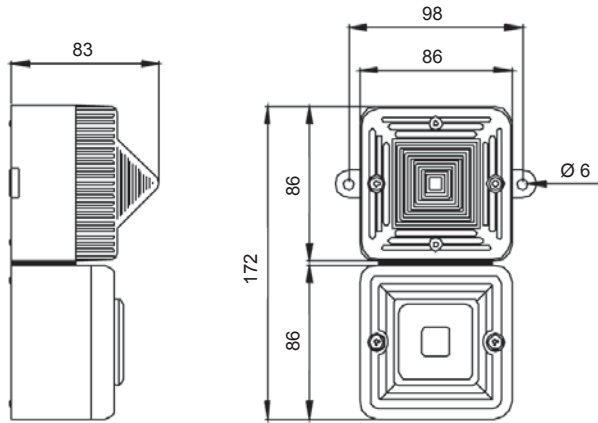


Standard

Electrical data	SON FL1		SON FL1L
Rated voltage	24 V DC	12 V DC	24 V DC
Operating range	20 – 28 V	10 V – 14 V	20 – 28 V
Nominal 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 J	
Flashing / Blinking rate	1 Hz	2 Hz, can be set to blinking or continuous light
Light source	xenon flash tube	8 high output LEDs
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	RAL 3000 (flame red), optionally grey or white	
Cable entry	4 knock-outs prepared on the side and bottom	
Connecting terminals	0.5 – 2.5 mm <sup>2</sup>	
Weight	260 g	460 g

## Dimensions



## Tone table

Tone	Description - Frequency	Stage 2	Tone	Description - Frequency	Stage 2
1	Alternating tone, UK BS5839-1 (fire alarm, railway crossing) 1000 Hz 0,25 s 800 Hz 0,25 s [EN54-3]	8	6	Sweeping (fast), UK BS5839-1 1000 Hz 70 ms 800 Hz 70 ms	8
2	Slow whoop, evacuation alarm Netherlands NEN 2575 1200 Hz 3,5 s 500 Hz 0,5 s [EN54-3]	1	7	Slow whoop, Australian evacuation alarm AS2220 1200 Hz 3,75 s 500 Hz 0,25 s	10
3	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP 1200 Hz 1 s 500 Hz [EN54-3]	8	8	Continuous tone 1000 Hz	-
4	Alternating tone, France NFS 32-001 (fire alarm) 554 Hz 0,1 s 440 Hz 0,4 s [EN54-3]	9	9	Continuous tone 554 Hz	-
5	Simulated bell 1450 Hz 0,625 s 0,625 s	1	10	Interrupted tone, Australia AS2220, AS1610, AS1670 420 Hz 0,625 s 0,625 s	-

## Ordering details

Article numbers	SON FL1	SON FL1L
Lens colour	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



Protection system



# Flashing Sounders 105 / 110 dB(A) / 13 Joules

## DSF 5 / DSF 10



The powerful flashing sounders

- 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



Acoustic range

DSF 10



Acoustic range



Protection system



Protection system



Operating temperature



Acoustic penetration

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 / 60 Hz	50 / 60 Hz		50 / 60 Hz	50 / 60 Hz	
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	195 – 253 V	95 – 127 V	19 – 29 V
Nominal 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 J					
Lens colour	clear, yellow, amber, red, green, blue					
Operating temperature	- 40 °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 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 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

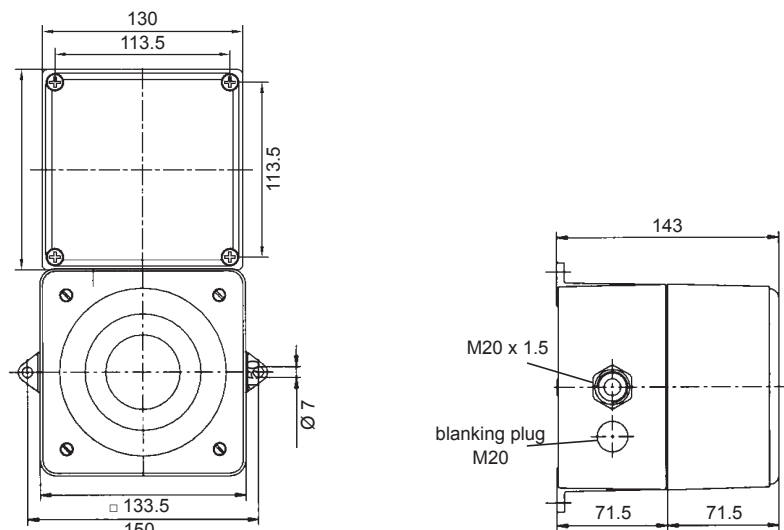
### Options / Accessories



External tone selection  
(4 variants)



## Dimensions



## Tone table

Tone	Description - Basic tone (preset: tone no. 1)		Stage			Tone	Description - Basic tone (preset: tone no. 1)		Stage		
			2	3	4				2	3	4
0	no tone		1	5	4	18	Interrupted tone	800 Hz	19	7	4
1	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s [EN54-3] 500 Hz	3	2	4	19	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s [EN54-3] 800 Hz 0,25 s	27	13	23
2	Interrupted tone, ISO 8201 (emergency evacuation signal)	950 Hz 0,5 s 1,5 s	1	4	3	20	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	825 Hz 2,5 s 7 s	9	21	26
3	Alternating tone	1025 Hz 0,25 s 825 Hz 0,25 s	1	2	4	21	Interrupted tone, IMO (leave ship)	950 Hz 1 s 3 s 1 s	20	9	26
4	Continuous tone, UK BS5839-1	950 Hz	1	3	5	22	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s 0,5 s [EN54-3] 500 Hz	19	14	2
5	Interrupted tone	950 Hz 1 s 1 s	1	4	3	23	Siren	2400 Hz 3 s const. 500 Hz	27	12	2
6	Sweeping	1200 Hz 3 s 500 Hz 3 s	1	4	9	24	Alternating tone	1075 Hz 0,5 s 825 Hz 0,5 s	1	16	12
7	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,1 s [EN54-3] 440 Hz 0,4 s	3	10	4	25	Alternating tone	900 Hz 0,25 s 500 Hz 0,25 s	1	14	5
8	Interrupted tone, Sweden SS031711 (emergency signal)	700 Hz 0,125 s 0,125 s	2	3	4	26	Alternating tone	1400 Hz 20 ms 1200 Hz 20 ms	4	9	27
9	Interrupted tone (fast), horn	800 Hz 4 ms 4 ms	1	3	4	27	Siren	1200 Hz 3 s const. 300 Hz	13	23	19
10	Continuous tone	500 Hz	27	9	26	28	Sweeping	1500 Hz 1,5 s 700 Hz 1,5 s	7	10	4
11	Continuous tone	725 Hz	1	17	9	29	Pulsating tone, industrial alarm Germany	1000 Hz 10 s 40 s 150 Hz	1	30	9
12	Continuous tone	825 Hz [EN54-3]	27	9	26	30	Interrupted tone, industrial alarm (Germany)	680 Hz 0,875 s 0,875 s	1	4	26
13	Continuous tone	1200 Hz	1	5	3	31	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s	3	14	4
14	Continuous tone	1500 Hz	1	4	10	32	selection of available tone combinations in stages 2, 3 and 4				
15	Interrupted tone	500 Hz 0,5 s 0,5 s	1	24	12						
16	Interrupted tone	825 Hz 0,5 s 0,5 s	1	24	15						
17	Interrupted tone	725 Hz 0,7 s 0,3 s	1	11	9						

## Conformity to standards

DIN EN 54-3: 2001 +  
DIN EN 54-3/A1: 2001  
EN 50 130-4: 1996

EN 61 000-6-2  
EN 61 000-6-3

EN 60 947-1: 2003  
EN 60 529: 2000

Fire alarm systems - part 3: fire alarm devices;  
Audible signaling devices and annex A1  
Stability of system components for fire and  
burglar alarm systems  
EMV, stability for industrial areas  
EMV, emission standard for residential commercial,  
and light-industrial environments  
Low voltage switchgear standard  
Protection system by enclosure (IP code)

DIN EN ISO 7731

DIN 33 404/3: 1982  
ISO 8201: 1987  
DIN EN 981: 1997

ISO 11 429: 1996

Ergonomic – alarms for public areas and workplaces –  
acoustic alarms  
Alarms for workplaces, unified emergency signal  
Evacuation alarm  
System of acoustic and visual alarm signals  
and information signals  
System of acoustic and visual alarm signals  
and information signals

# Flashing Sounders PATROL series 100/105 dB(A) / 5/10 J PA X 1-05 / PA X 5-05 / PA X 5-10



PATROL - the new generation of sounder/flashing light combinations.  
Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders
- pre-wired sounder and light ex works
- corresponding light intensity available for every sound pressure level

PA X 1



Acoustic  
range

PA X 5



Acoustic  
range



Protection  
system



Operating  
temperature



Acoustic  
penetration

PA X 1



24 V DC,  
48 V DC

PA X 1



24 V DC,  
48 V DC

PA X 1



24 V DC,  
48 V DC



UL

Electrical data	PA X 1-05					
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption <sup>1</sup>	65 – 70 mA	110 – 130 mA	860 – 920 mA	190 – 150 mA	315 – 365 mA	610 – 625 mA
Electrical data	PA X 5					
Rated voltage	230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption <sup>1</sup>	5 J	65 – 70 mA	110 – 130 mA	860 – 920 mA	190 – 150 mA	315 – 365 mA
	10 J	150 – 155 mA	250 – 260 mA	1 460 – 1 520 mA	320 – 380 mA	565 – 620 mA
					610 – 625 mA	1 200 – 1 220 mA

<sup>1</sup> power consumption dependent on operating voltage

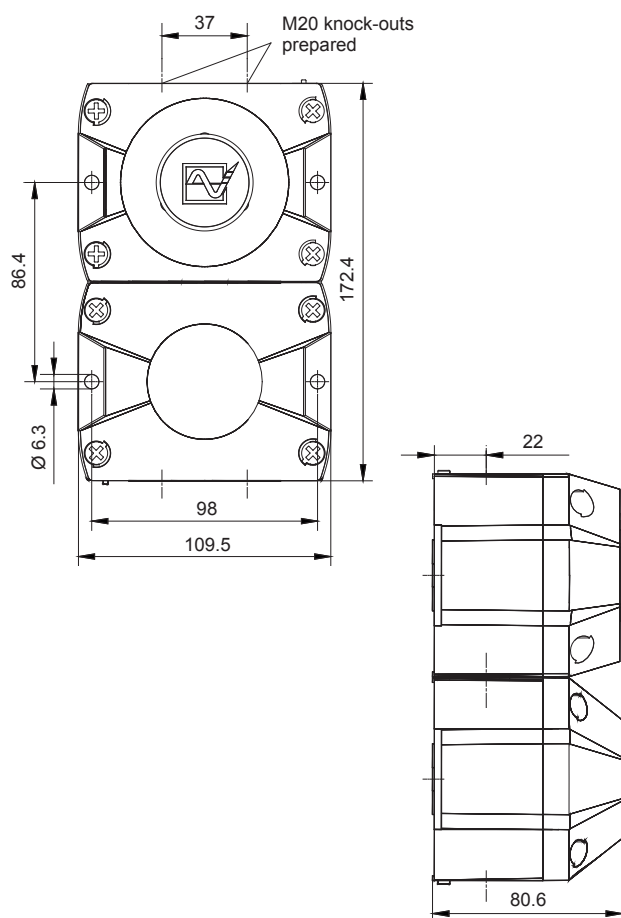
Mechanical data	PA X 1-05	PA X 5-05	PA X 5-10
Sound pressure level	100 dB (A)	105 dB (A)	105 dB (A)
Sound level reduction	max. - 16 dB via potentiometer		
Alarm tones	80 (see tone table page 172/173)		
Flash energy	5 J	5 J	10 J
Flash rate	1 Hz = 60 flashes/min.		
Light intensity (DIN 5037) <sup>1</sup>	44 cd	47 cd	92 cd
Operating temperature	- 40 °C ... + 55 °C		
Storage temperature	- 40 °C ... + 70 °C		
Relative humidity	90%		
Protection system according to EN 60529	IP 66		
Protection class	II		
Duty cycle	100%		
Service life of the flash tube	light emission still 70% after 8 000 000 flashes		
Material	sounder	PC / ABS blend	
	lens flashing light	polycarbonate (PC)	
Colour	housing	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)	
	lens flashing light	clear, white, yellow, amber, red, green, blue	
Cable entry	3 x M20 knock-outs on side, 1 knock-out on back		
Integrated seal with cable entry	6 – 13 mm (feed-through grommet)		
Connecting terminals	2.5 mm² fine wire with cable end sleeve, AWG 16		
Weight	AC	725 g	983 g
	DC	560 g	800 g

<sup>1</sup> with a clear lens

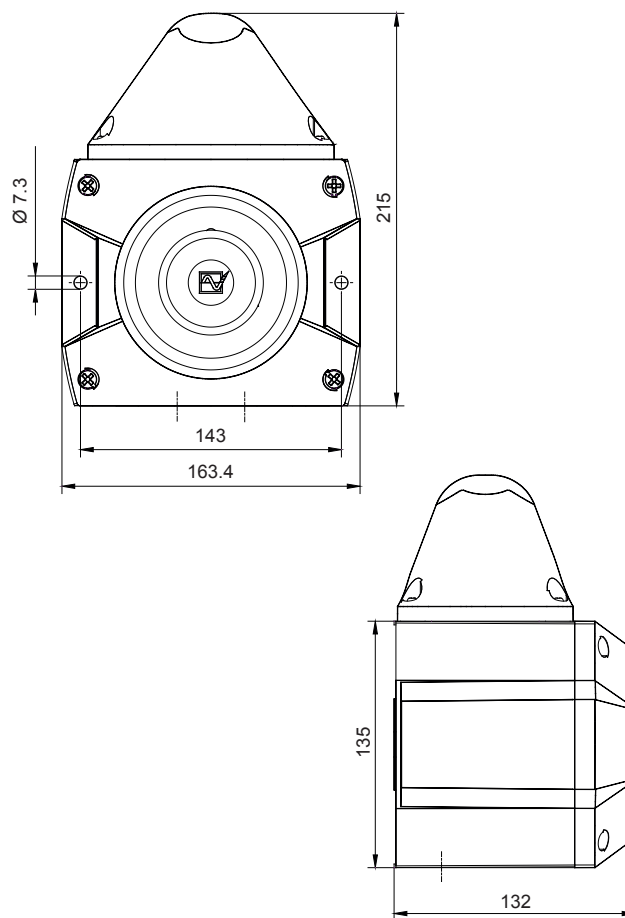


## Dimensions

### PA X 1-05



### PA X 5-05



## Ordering details

Article numbers		PA X 1-05 – housing red			PA X 1-05 – housing grey		
Version	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow lens		233 11 10 3 000	233 11 15 3 000	233 11 80 3 000	233 11 10 3 055	233 11 15 3 055	233 11 80 3 055
amber lens		233 11 10 4 000	233 11 15 4 000	233 11 80 4 000	233 11 10 4 055	233 11 15 4 055	233 11 80 4 055
red lens		233 11 10 5 000	233 11 15 5 000	233 11 80 5 000	233 11 10 5 055	233 11 15 5 055	233 11 80 5 055

Article numbers		PA X 5-05 – housing red			PA X 5-05 – housing grey		
Version	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow lens		233 51 10 3 000	233 51 15 3 000	233 51 80 3 000	233 51 10 3 055	233 51 15 3 055	233 51 80 3 055
amber lens		233 51 10 4 000	233 51 15 4 000	233 51 80 4 000	233 51 10 4 055	233 51 15 4 055	233 51 80 4 055
red lens		233 51 10 5 000	233 51 15 5 000	233 51 80 5 000	233 51 10 5 055	233 51 15 5 055	233 51 80 5 055

Article numbers for other voltages and versions on request

## Options / Accessories



Enclo-  
sure  
fitting

Surface  
gasket

Tamper-  
proof  
sealing

See page 173 for further information

## 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 PATROL series 110/120 dB(A) / 10/15 J

## PA X 10-10 / PA X 10-15 / PA X 20-10 / PA X 20-15



PATROL - the new generation of sounder/flashing light combinations.  
Three dimensional innovation;

- safe; an incorrect installation is virtually impossible
- easy; significantly shorter assembly and installation times
- economical; extremely high efficiency and good penetration of acoustical obstacles significantly reduce the required number of sounders
- pre-wired sounder and light ex works
- corresponding light intensity available for every sound pressure level

PA X 10



Acoustic  
range

PA X 20



Acoustic  
range



Protection  
system



Operating  
temperature



Acoustic  
penetration



UL

Electrical data		PA X 10					
Rated voltage		230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range		187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption <sup>1</sup>	10 J	160 – 215 mA	260 – 345 mA	1 650 – 2 300 mA	360 – 490 mA	665 – 935 mA	1 335 – 1 685 mA
	15 J	210 – 265 mA	360 – 445 mA	1 650 – 2 300 mA	420 – 540 mA	765 – 1 035 mA	1 535 – 1 885 mA
Electrical data		PA X 20					
Rated voltage		230 V AC	115 V AC	24 V AC	48 V DC	24 V DC	12 V DC
Rated frequency		50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range		187 – 255 V	90 – 135 V	18 – 30 V	40 – 60 V	18 – 30 V	12 – 15 V
Nominal current consumption <sup>1</sup>	10 J	215 – 335 mA	340 – 560 mA	1 900 – 3 200 mA	495 – 800 mA	845 – 1 430 mA	1 220 – 1 690 mA
	15 J	165 – 385 mA	440 – 660 mA	1 900 – 3 200 mA	545 – 850 mA	945 – 1 540 mA	1 520 – 1 890 mA

<sup>1</sup> power consumption dependent on operating voltage

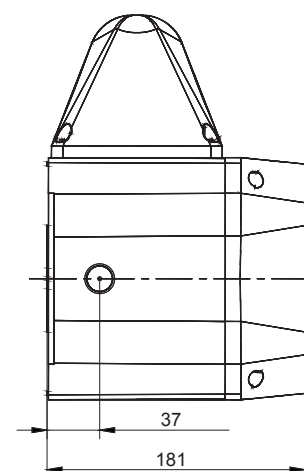
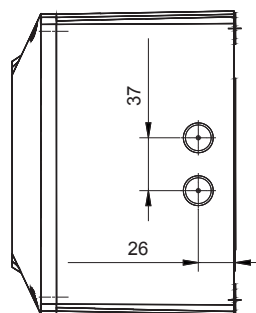
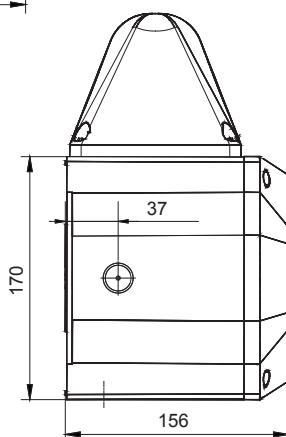
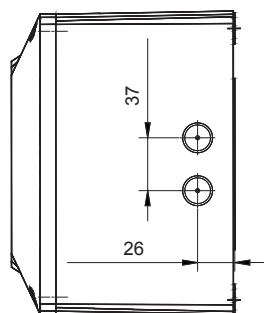
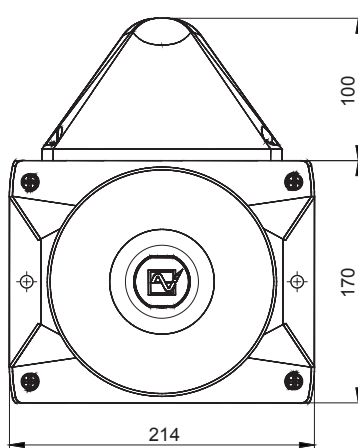
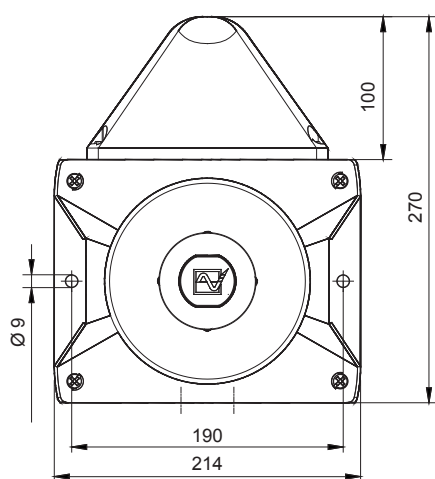
Mechanical data		PA X 10-10	PA X 10-15	PA X 20-10	PA X 20-15
Sound pressure level		110 dB (A)		120 dB (A)	
Sound level reduction		max. - 12 dB via potentiometer			
Alarm tones		80 (see tone table page 172/173)			
Flash energy		10 J	15 J	10 J	15 J
Flash rate		1 Hz = 60 flashes/min.			
Light intensity (DIN 5037) <sup>1</sup>		129 cd	190 cd	129 cd	190 cd
Operating temperature		- 40 °C ... + 55 °C			
Storage temperature		- 40 °C ... + 70 °C			
Relative humidity		90%			
Protection system according to EN 60529		IP 66			
Protection class		II			
Duty cycle		100%			
Service life of the flash tube		light emission still 70% after 8 000 000 flashes			
Material	sounder	PC / ABS blend			
	lens flashing light	polycarbonate (PC)			
Colour	housing	similar to RAL 3000 (flame red) / RAL 7035 (light grey) / RAL 9003 (signal white)			
	lens flashing light	clear, white, yellow, amber, red, green, blue			
Cable entry		4 x M20 knock-outs on side, 1 knock-out on back			
Integrated seal with cable entry		6 – 13 mm (feed-through grommet)			
Connecting terminals		2.5 mm <sup>2</sup> fine wire with cable end sleeve, AWG 16			
Weight	AC	2 133 g	2 163 g	2 268 g	2 298 g
	DC	2 056 g	2 086 g	2 191 g	2 221 g

<sup>1</sup> with a clear lens

## Dimensions

PA X 10-10 / PA X 10-15

PA X 20-10 / PA X 20-15



## Ordering details

Article numbers		PA X 10-10			PA X 20-15		
Version	Rated voltage	230 V AC	115 V AC	24 V DC	230 V AC	115 V AC	24 V DC
yellow lens	housing red	233 61 10 3 000	233 61 15 3 000	233 61 80 3 000	233 72 10 3 000	233 72 15 3 000	233 72 80 3 000
amber lens	housing red	233 61 10 4 000	233 61 15 4 000	233 61 80 4 000	233 72 10 4 000	233 72 15 4 000	233 72 80 4 000
red lens	housing red	233 61 10 5 000	233 61 15 5 000	233 61 80 5 000	233 72 10 5 000	233 72 15 5 000	233 72 80 5 000
yellow lens	housing grey	233 61 10 3 055	233 61 15 3 055	233 61 80 3 055	233 72 10 3 055	233 72 15 3 055	233 72 80 3 055
amber lens	housing grey	233 61 10 4 055	233 61 15 4 055	233 61 80 4 055	233 72 10 4 055	233 72 15 4 055	233 72 80 4 055
red lens	housing grey	233 61 10 5 055	233 61 15 5 055	233 61 80 5 055	233 72 10 5 055	233 72 15 5 055	233 72 80 5 055

Article numbers for other voltages and versions on request

## Options / Accessories



Enclo-  
sure  
fitting

Surface  
gasket

Tamper-  
proof  
sealing



SSM  
(only for 24 V DC)

See page 173 for further information

## 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

**Tone table PA X 1 / PA X 5 / PA X 10 / PA X 20**

Basic tone no.	Description		Basic tone no.	Description	
1	no tone		69	Continuous tone	440 Hz
2	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s  EN54-3	71	Continuous tone	340 Hz
9	Slow whoop, fire alarm, UK BS5839-1	970 Hz 1 s	77	Interrupted tone	2400 Hz
11	Interrupted tone (fast)	970 Hz 20 ms	82	Interrupted tone, PFEER (general alarm), UK BS5839-1 (back-up alarm)	1000 Hz
13	Interrupted tone	900 Hz 0,3 s	83	Interrupted tone, PFEER (general alarm)	1000 Hz
15	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s  EN54-3	88	Interrupted tone	950 Hz
16	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,75 s	90	Interrupted tone	825 Hz
18	Slow whoop, NFPA	775 Hz 0,85 s	91	Interrupted tone	800 Hz
22	Pulsating tone, Australien alert AS1670, ISO8201	1200 Hz 0,5 s	92	Interrupted tone	800 Hz
23	Siren	2400 Hz 3 s	93	Interrupted tone (fast), horn	800 Hz
24	Siren	2400 Hz 3 s	97	Interrupted tone	725 Hz
25	Siren	800 Hz 3 s	98	Interrupted tone, Sweden SS031711 (emergency signal)	700 Hz
26	Pulsating tone, industrial alarm Germany	1000 Hz 10 s	100	Interrupted tone, industrial alarm (Germany)	680 Hz
27	Sweeping	2900 Hz 0,5 s	101	Interrupted tone, Sweden SS031711 (important message (pres-mess))	660 Hz
29	Sweeping (fast)	2900 Hz 10 ms	102	Interrupted tone, Sweden SS031711 (local warning)	660 Hz
30	Sweeping	2900 Hz 70 ms	103	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz
31	Sweeping, France NFC48-265	1600 Hz 1 s	104	Interrupted tone, Sweden SS031711 (emergency signal)	660 Hz  EN54-3
33	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s	107	Interrupted tone, Germany KTA3901 (evacuation alarm)	500 Hz
34	Sweeping (fast)	1000 Hz 10 ms	109	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz
35	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms	110	Interrupted tone, (fast variable), bell	1450 Hz
36	Sweeping	1500 Hz 1,5 s	111	Interrupted tone, ISO8201 (emergency evacuation signal), USA (evacuation alarm)	470 Hz
43	Sweeping	1200 Hz 1,5 s	112	Interrupted tone, ISO8201 (emergency evacuation signal)	950 Hz
44	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s	113	Interrupted tone, ISO8201 (emergency evacuation signal), Sweeping	2850 Hz
45	Sweeping	1200 Hz 3 s	115	Interrupted tone, IMO (telephone call)	950 Hz
46	Sweeping, general alarm Finland	1500 Hz 7 s	116	Interrupted tone, IMO (leave ship)	950 Hz
52	Continuous tone	2400 Hz	117	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	825 Hz
53	Continuous tone	2000 Hz	122	Alternating tone	2900 Hz
54	Continuous tone, Finland (all-clear signal)	1500 Hz	123	Alternating tone	2900 Hz
55	Continuous tone, PFEER gasalarm	1200 Hz	124	Alternating tone, Singapore	2000 Hz
56	Continuous tone	1000 Hz	125	Alternating tone	1400 Hz
57	Continuous tone, UK BS5839-1	950 Hz	128	Alternating tone	1025 Hz
59	Continuous tone	880 Hz	130	Alternating tone, UK BS5839-1 (fire alarm)	1000 Hz
60	Continuous tone	825 Hz  EN54-3	131	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz
61	Continuous tone	800 Hz	135	Alternating tone, UK BS5839-1 (fire alarm, increased urgency - railway crossing)	1000 Hz
63	Continuous tone	725 Hz	142	Alternating tone	900 Hz
65	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz			500 Hz
66	Continuous tone	554 Hz			
67	Continuous tone, Germany KTA3901 (all-clear signal)	500 Hz			
68	Continuous tone	470 Hz			

## Tone table PA X 1 / PA X 5 / PA X 10 / PA X 20

Basic tone no.	Description		Basic tone no.	Description	
143	Alternating tone, industrial alarm (Germany)	660 Hz 0,125 s 440 Hz 0,125 s	147	Alternating tone, Sweden SS031711	554 Hz 1 s 440 Hz 1 s
144	Alternating tone	650 Hz 1 s 440 Hz 1 s	148	Alternating tone, Sweden SS031711	554 Hz 0,5 s 440 Hz 0,5 s
146	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,25 s 440 Hz 0,4 s	152	Alternating tone (two tone chime)	800 Hz 0,25 s 650 Hz 0,25 s

## Control of the tones

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
1	2	3	4	5	6	Basic tone no.	C1	C2	C1+C2
						1	2	88	57
ON						2 *	128	112	57
	ON					2	26	100	93
ON	ON					2	61	131	112
		ON				9	57	11	82
ON		ON				15	131	52	112
	ON	ON				16	109	52	56
ON	ON	ON				18	111	57	68
			ON			22	16	109	68
ON			ON			23	131	52	112
	ON		ON			24	131	52	131
ON	ON		ON			25	131	52	92
		ON	ON			26	2	100	93
ON		ON	ON			27	123	52	92
	ON	ON				29	35	52	61
ON	ON	ON				30	27	52	77
				ON		31	131	52	57
ON				ON		33	30	52	35
	ON			ON		34	35	52	93
ON	ON			ON		35	27	52	110
		ON		ON		36	146	67	57
ON		ON		ON		43	131	52	91
	ON	ON		ON		45	2	57	93
ON	ON	ON		ON		52	15	65	82
			ON	ON		54	46	54	131
ON			ON	ON		55	131	52	128
	ON		ON	ON		56	82	35	33
ON	ON		ON	ON		59	143	59	101
			ON	ON		60	131	52	125
ON		ON	ON	ON		65	131	52	93
	ON	ON	ON	ON		66	110	52	107
ON	ON	ON	ON	ON		69	131	52	110

Tone selection switch/DIP-Switch (setting of basic tone)							External tone selection		
1	2	3	4	5	6	Basic tone no.	C1	C2	C1+C2
					ON	71	131	52	93
ON					ON	77	61	52	122
	ON				ON	82	131	52	83
ON	ON				ON	83	56	2	82
		ON			ON	88	2	57	128
ON		ON			ON	90	131	52	125
	ON	ON			ON	91	30	52	110
ON	ON	ON			ON	92	33	52	57
			ON		ON	93	2	128	57
ON			ON		ON	97	2	63	93
	ON		ON		ON	100	131	52	125
ON	ON		ON		ON	101	98	102	65
		ON	ON		ON	103	131	65	147
ON		ON	ON		ON	104	103	65	101
	ON	ON	ON		ON	109	16	52	22
ON	ON	ON	ON		ON	110	131	61	91
				ON	ON	112	2	57	128
ON				ON	ON	113	52	123	104
	ON			ON	ON	115	117	116	44
ON	ON			ON	ON	116	117	93	125
		ON		ON	ON	117	93	116	125
ON		ON		ON	ON	123	27	52	77
	ON	ON		ON	ON	124	53	83	2
ON	ON	ON		ON	ON	130	2	107	67
			ON	ON	ON	131	2	112	57
ON			ON	ON	ON	135	16	56	109
	ON		ON	ON	ON	142	2	54	88
ON	ON		ON	ON	ON	143	59	93	33
		ON	ON	ON	ON	144	110	61	2
ON		ON	ON	ON	ON	146	31	67	57
		ON	ON	ON	ON	148	131	52	92
ON	ON	ON	ON	ON	ON	152	110	61	13

\* factory setting

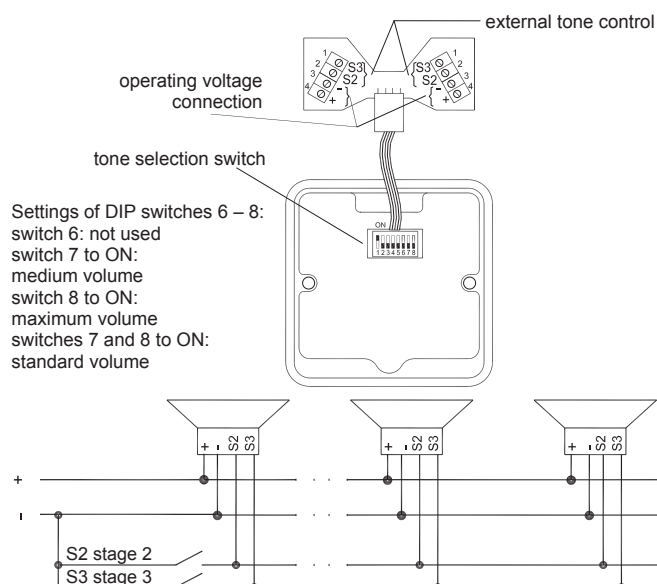
## Accessories

### Ordering details

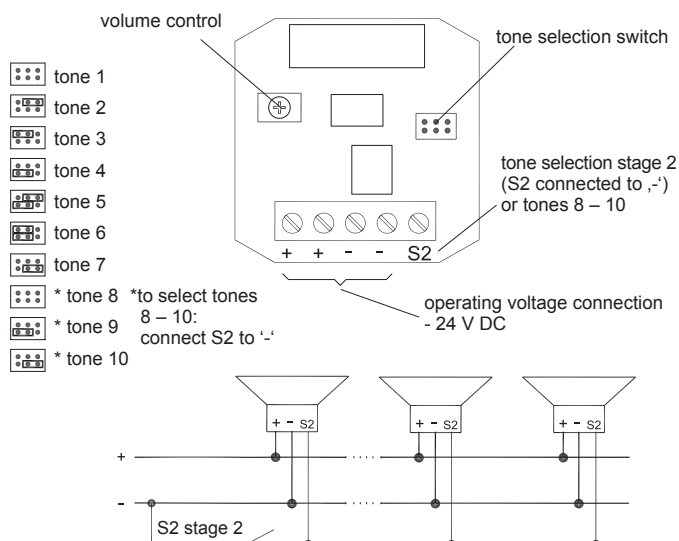
Article numbers		PA X 1-05	PA X 5-05	PA 10 X / PA 20 X
Enclosure fitting	For connection (daisy-chaining) of several sounders of the PATROL series	283 00 00 0 003		
Surface gasket	Sealing of the sounder installation surface when, e.g. cable entry is executed from the back.	283 00 00 0 004	283 00 00 0 005	283 00 00 0 006
Tamper-proof sealing (pack of 4)	Anti-tamper sealing for fasteners of the PATROL devices after installation in order to prevent manipulation of the devices.	283 00 00 0 002		

# Connection diagrams

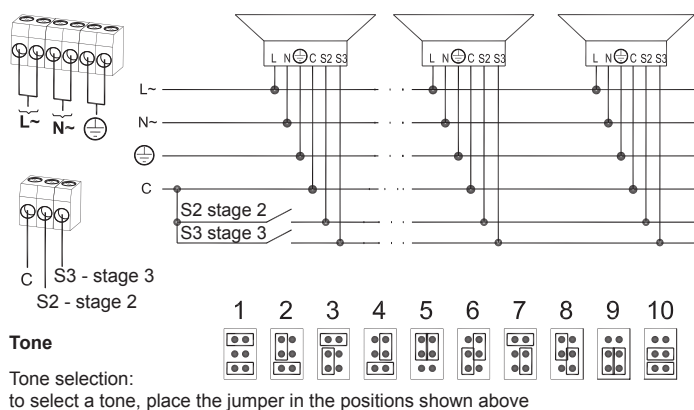
## SON 4



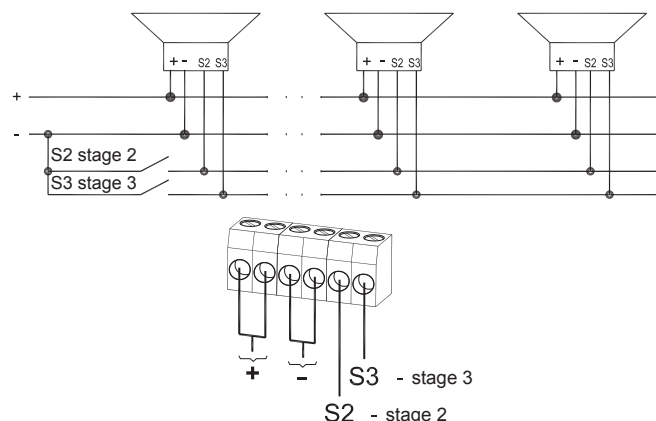
## SON FL1



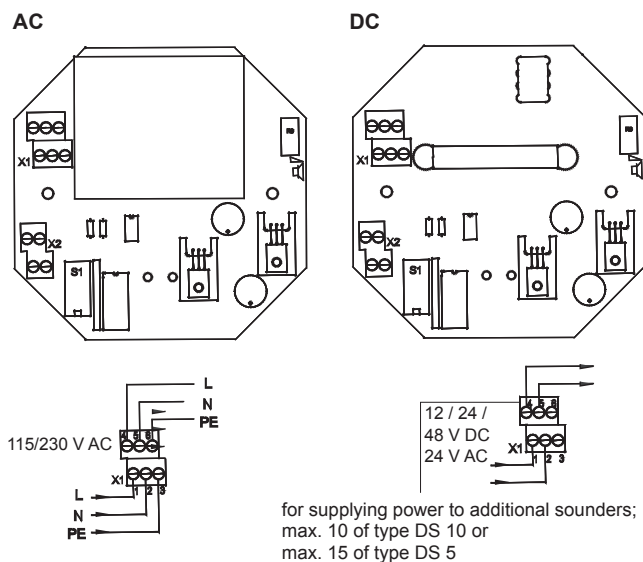
## SON 4L – AC



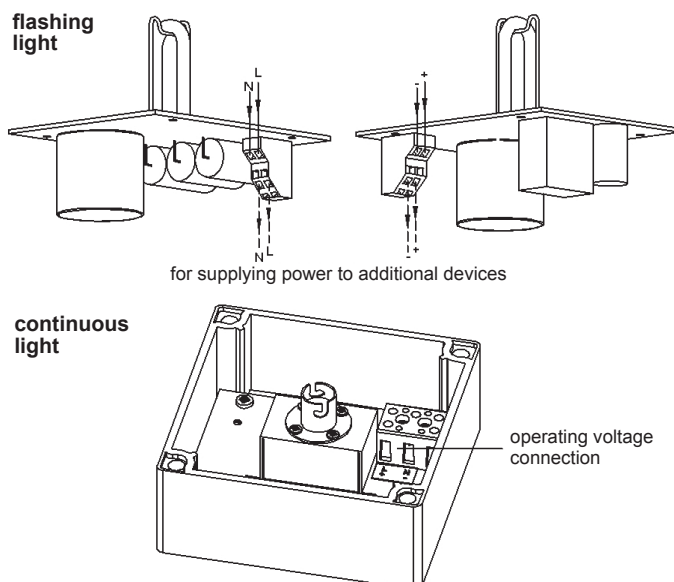
## SON 4L – DC



## DSF 5 / DSF 10 sounder



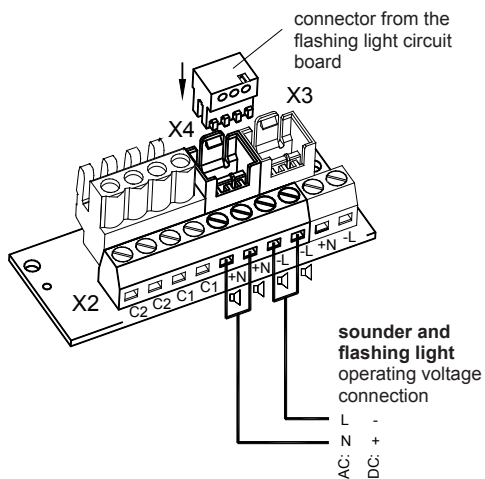
## DSF 5 / DSF 10 flashing/continuous light



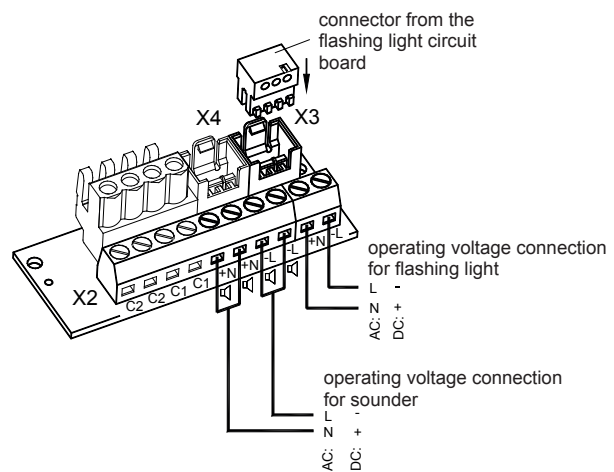


PA X 1-05 / PA X 5-05 / PA X 10-05 / PA X 10-10 / PA X 20-10 / PA X 20-15

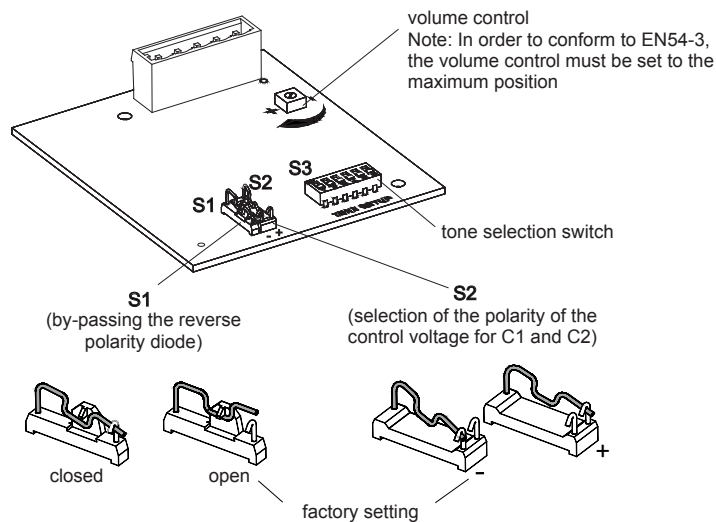
Common connection of flashing lights and sounders (delivery condition)



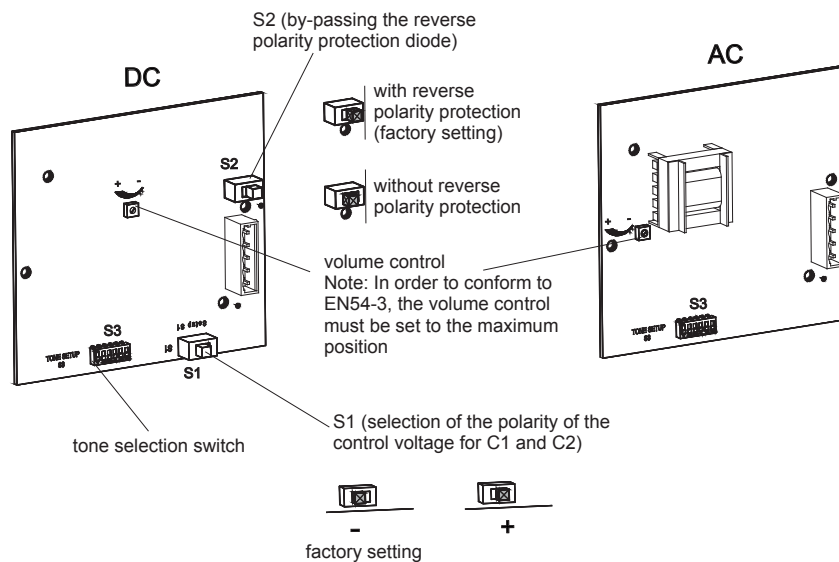
Separated connection of flashing light and sounder



PA X 1-05 / PA X 5-05



PA X 10-05 / PA X 10-10 / PA X 20-10 / PA X 20-15







# 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 Ø 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)					
Dispersion		360°					
Light source <sup>1</sup>		bulb BA15d	LED	bulb BA15d	LED		
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 J	
	24 V AC/DC					24 V: 1 J	
Flash frequency						approx. 1 Hz	
Sound pressure level							85 dB (A)
Alarm tones							7
Nominal 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%
Nominal 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 source		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					

<sup>1</sup> please order light source separately

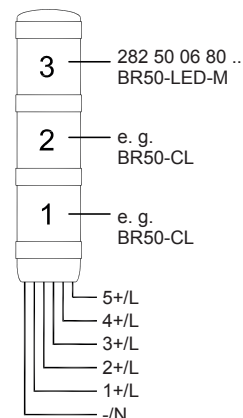
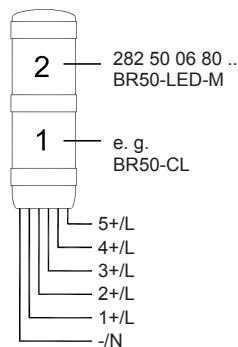
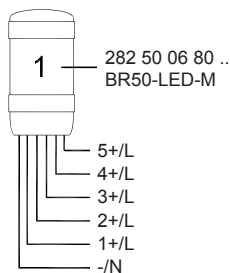
Technical data	monitored continuous light module	BR 50 AS-i Bus slave	
Modules		AS-i	AS-i-AB
Module types	monitored continuous light	LED module, sounder module, continuous light module, blinking light module	
Colours	yellow, red		
Segment stages (total)	max. 3	max. 4	max. 3
Dispersion	360°		
Light source	2 x 8 LED (not exchangeable)		
AS-i profile		S-8.F.E	S-8.A.E
AS-i specification		AS-i 3.0 / EN 50295	
Programming		DC-Jack, Ø 1.3 mm	
max. slave/master		31	62
Alarm output	max. 230 V / 80 mA, R <sub>ONmax</sub> = 35 Ω (closed at error-free operation)		
Rated power	24 V DC		
Nominal 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%		
Service life of light source	50 000 hrs @ 24 °C, 40% R.H.		
Material	base	acrylonitrile butadiene styrene (ABS)	
	lens	polycarbonate (PC)	
Mounting	vertical or horizontal		
Mounting information		the AS-i / AS-i-AB module is always used as the lowest module	
Weight	90 g	90 g	

## Connection and configuration options for monitored modules

- Use of one monitored module per signal tower:
  - configuration as „top“ module (top module is monitored)
  - configuration as „bottom“ module (bottom module is monitored)
- Use of 2 monitored modules per signal tower

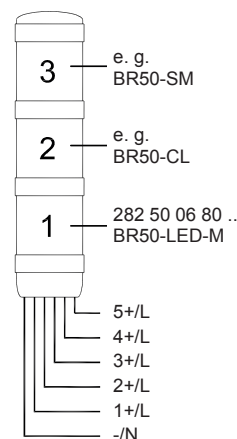
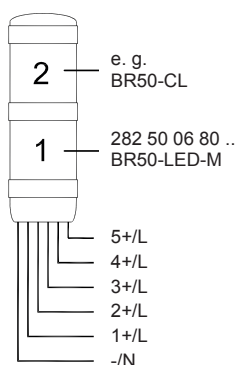
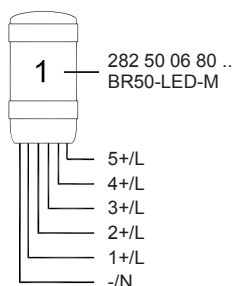
### Configuration as „top“ module (top module is monitored)

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



## Configuration as „bottom“ module (bottom module is monitored)

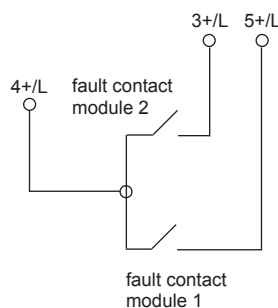
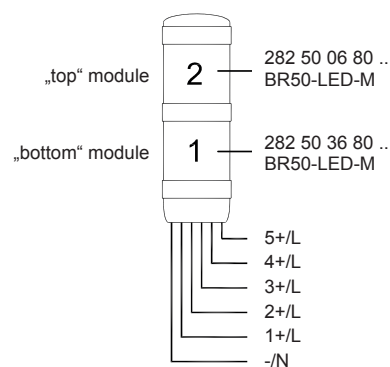
Base module + 1 <sup>st</sup> stage monitored		Base module + 1 <sup>st</sup> stage monitored, 2 <sup>nd</sup> stage not monitored		Base module + 1 <sup>st</sup> stage monitored, 2 <sup>nd</sup> /3 <sup>rd</sup> stage not monitored	
-/N	supply voltage (-), common connection for all stages	-/N	supply voltage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



## Use of 2 monitored modules per signal tower

### Base module + 1<sup>st</sup>/2<sup>nd</sup> stage monitored

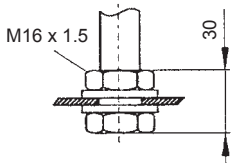
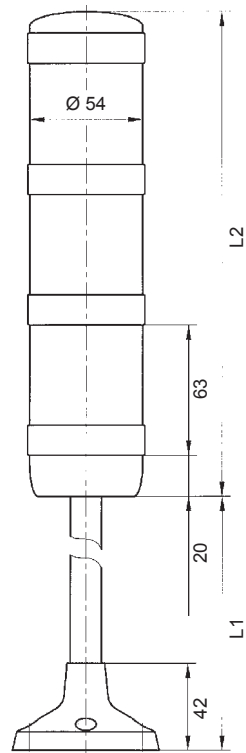
-/N	supply voltage (-), common connection for all stages
1+/L	supply voltage (+), activation of 1 <sup>st</sup> stage (monitored)
2+/L	supply voltage (+), activation of 2 <sup>nd</sup> stage (monitored)
3+/L	alarm output module 2
4+/L	common connection alarm outputs
5+/L	alarm output module 1



The alarm outputs of both levels have a shared contact!

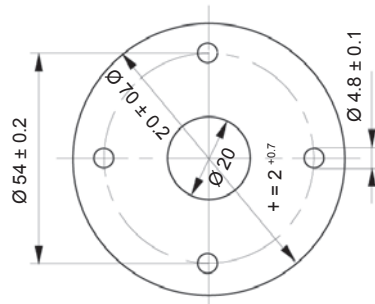
**Caution:** Max. 2 modules can be utilized

## 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 and safe 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 (top module)	yellow	BR50-LED-M-YE	–	–	282 50 06 8 030	
	red	BR50-LED-M-RE	–	–	282 50 06 8 050	
LED module, monitored (bottom module)	yellow	BR50-LED-M-YE	–	–	282 50 36 8 030	
	red	BR50-LED-M-RE	–	–	282 50 36 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



Article number:  
282 50 25 0 000



for mounting stand  
Article number:  
282 50 20 0 000



for direct mounting  
Article number:  
282 50 21 0 000



Article number:  
282 50 22 0 000  
282 50 23 0 000



Light source



See pages 188/189 for further information

## Ordering example

Signal tower 5-stage, IP 65		Article numbers		
		Version	230 V AC	24 V DC
	Sounder module	BR50-SM	282 50 08 1 000	282 50 08 8 000
+				
	Flashing light module	BR50-MG	282 50 22 0 000	
		+		
		BR50-FL	282 50 07 1 050	282 50 07 8 050
+				
	Continuous light module with bulb or LED	BR50-MG + BR50-CL + bulb or LED BA 15d	282 50 22 0 000	
			282 50 04 0 060	
			282 13 00 0 004	282 13 00 0 000
			282 13 00 0 018	282 13 00 0 011
+				
	Blinking light module with bulb or LED	BR50-MG + BR50-BL + bulb or LED BA 15d	282 50 22 0 000	
			282 50 05 1 030	282 50 05 8 030
			282 13 00 0 004	282 13 00 0 000
			282 13 00 0 030	282 13 00 0 007
+				
 	Continuous light module with bulb or LED	BR50-MG + BR50-CL + bulb or LED BA 15d + BR50-MG + BR50-BC	282 50 22 0 000	
			282 50 04 0 010	
			282 13 00 0 004	282 13 00 0 000
			282 13 00 0 014	282 13 00 0 006
			282 50 22 0 000	
			282 50 01 0 000	
+				
	Mounting stand (100 mm) and seal	BR50-TG	282 50 23 0 000	
		BR50-S100	282 50 15 0 010	

# Signal tower Ø 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**

Protection system

**+ 55 °C**  
**- 35 °C**

LED

**+ 45 °C**  
**- 35 °C**

Filament lamp

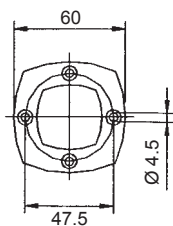
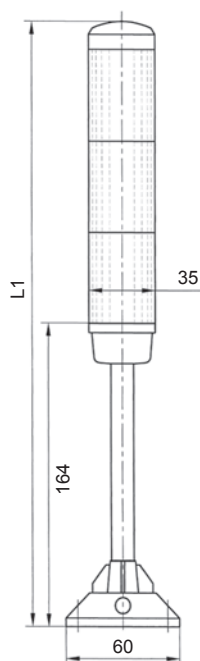
Electrical data	BR 35			
Rated voltage	230 V AC	115 V AC	24 V DC	12 V DC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz		
Operating range	- 15% / + 10%	- 15% / + 10%	- 15% / + 20%	- 15% / + 20%
Capacity of light source	3 W	3 W	4 W	4 W

Mechanical data	BR 35	
Light source	AC	BA9s, 3 W (previously installed)
	DC	BA9s, max. 4 W (previously installed)
Number of modules	max. 4	
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
Lagertemperatur	- 45 °C ... + 70 °C	
Relative humidity	90%	
Protection system according to EN 60529	IP 54	
Duty cycle	100%	
Service life of light source	approx. 1 000 hrs	
Material	housing	acrylonitrile butadiene styrene (ABS)
	lens	polycarbonate (PC)
	tube	Edelstahl
Type of connection	cable length 0.5 m tube mounting; 0.65 panel mounting	
Terminal cross-section	single wire: 1.5 mm <sup>2</sup> , fine wire: 0.14 – 1.5 mm <sup>2</sup>	
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 186)	

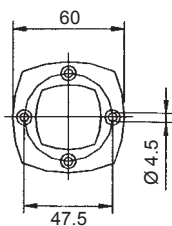
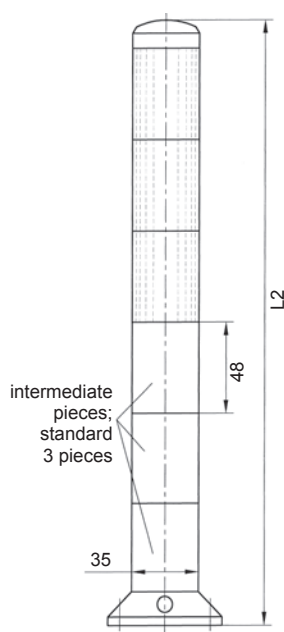


## Dimensions

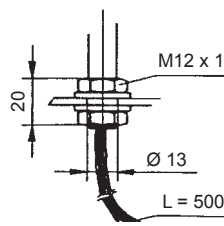
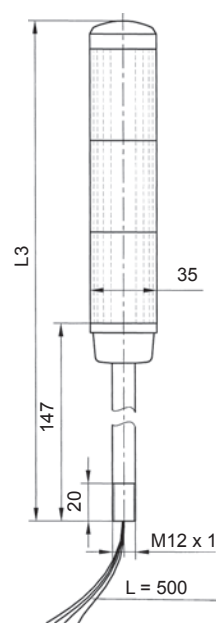
### Stand mounting



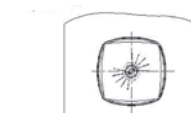
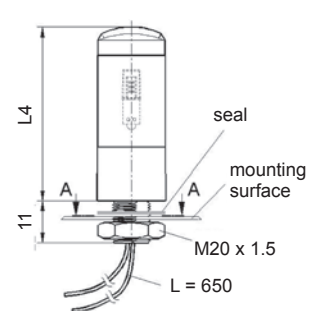
### Plinth mounting



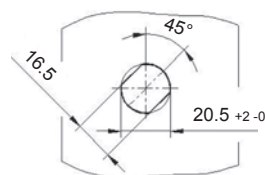
### Tube mounting



### Panel mounting



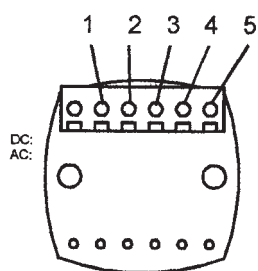
### Panel cut-out



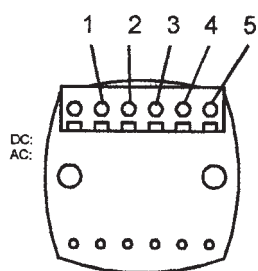
	L1	L2	L3	L4
1-stage	228	228	210	91
2-stage	276	276	258	142
3-stage	324	324	306	190
4-stage	372	372	354	238
5-stage	420	420	402	286

## Connection diagrams

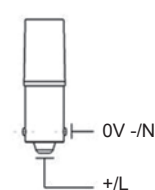
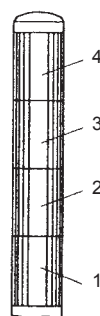
### Stand mounting



### 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

## Options / Accessories



for stand-  
or plinth  
mounting  
(plastic)

Article number:  
282 35 20 0 020



for tube  
mounting  
(metal)

Article number:  
282 35 20 0 010



sounder  
module

Article number:  
282 35 80 8 000



plinth-moun-  
ted device  
with short foot

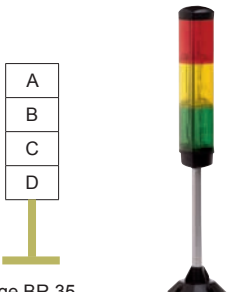
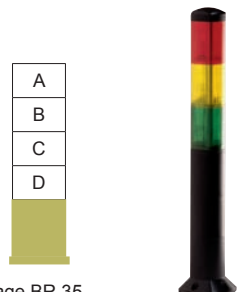
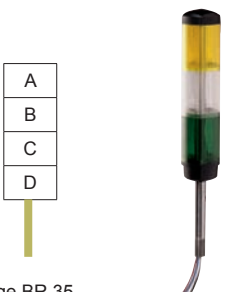



Light source



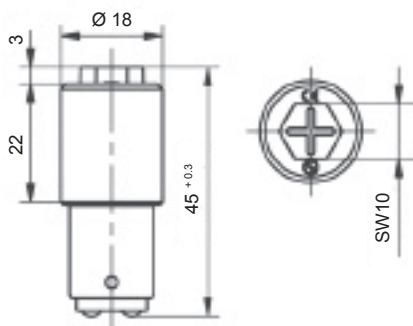
See page 189 for further information

## Ordering examples

Stand mounting	Plinth mounting	Tube mounting	Panel mounting
 <p>3-stage BR 35 with mounting stand 24 V DC, colour order: A = red B = yellow C = green</p> <p>Article number: 220 80 80 3 000</p>	 <p>3-stage BR 35 with plinth mounting 230 V AC, colour order: A = red B = yellow C = green</p> <p>Article number: 220 81 10 3 000</p>	 <p>3-stage BR 35 with tube mounting 24 V DC, colour order: A = yellow B = clear C = green</p> <p>Article number: 220 82 80 3 000</p>	 <p>1-stage BR 35 for panel mounting 230 V AC, colour order: A = red</p> <p>Article number: 220 83 10 1 000</p>

Please indicate color sequence (A/B/C/D) in your order as depicted above.

## 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 <sup>1</sup>	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

<sup>1</sup> not for flashing light module BR 50-FL, article numbers upon request

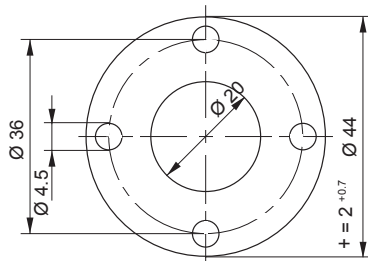
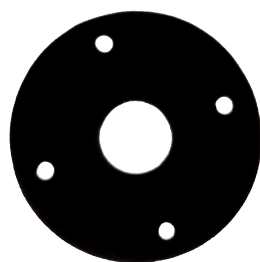


### Lamp remover

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



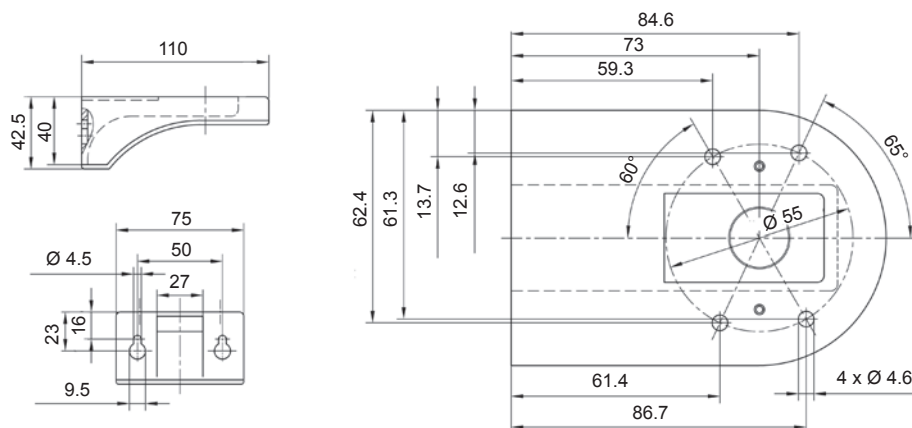


## Wall bracket with hood

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"  
DECKEL SCHRAUBEN KLASSE A4-80  
NICHT ÖFFNEN, WENN EXPLOSIVE  
ATMOSPÄREN VORHANDEN SIND  
NUR HITZEBESTÄNDIGE KABEL UND  
KABEL VERSCHRAUBUNGEN (ZUGELASSEN BIS +110°C) BEI  
UMGEBUNGSTEMPERATUREN ÜBER +40°C VERWENDEN

**Pfannenberg**  
ELECTRO-TECHNOLOGY FOR INDUSTRY 

D-21035 Hamburg, Germany  
[www.pfannenberg.com](http://www.pfannenberg.com)



# 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.



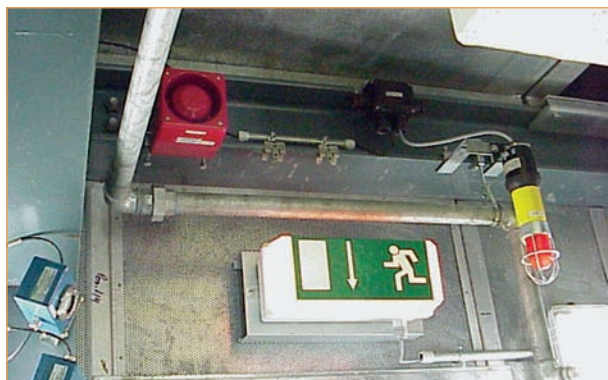
## Your safety – worldwide – is safe in our hands



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.

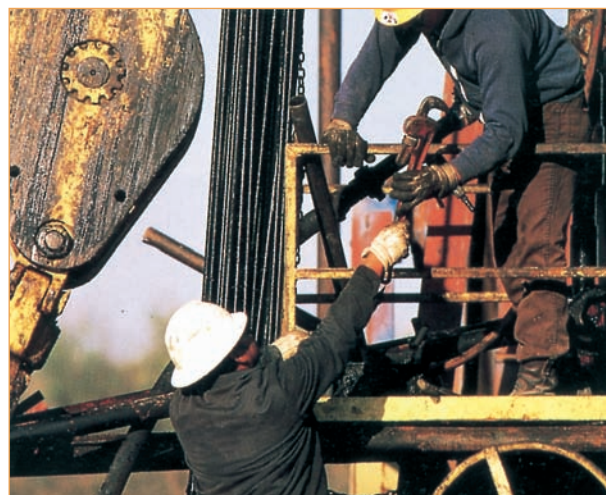
On the following pages we have gathered together numerous new products, applications and references, intended to provide you with ideas for the tasks that you need to solve in the Ex area.



*Gas detection with visual and acoustic alarms:  
DS 10 ATEX  sounder and CWB-ATEX  
 flashing light*



*Acoustic alarm in a gas-fired power station:  
BExS 120 ATEX  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  flashing light



The CWB-ATEX  flashing light and the BExS 120 ATEX  sounder signal danger here without becoming a danger themselves – highly visible and highly audible





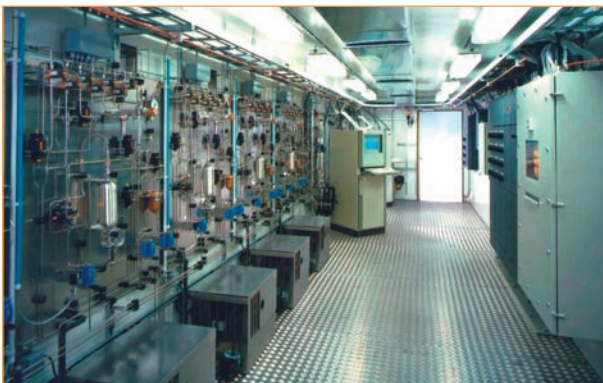
## Safety for man, machine and the environment

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  flashing light




Oil and gas drilling in the sea. Man and technology in the most confined space. BExS 120 ATEX  sounder



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 <sub>2</sub>

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 ExV (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.

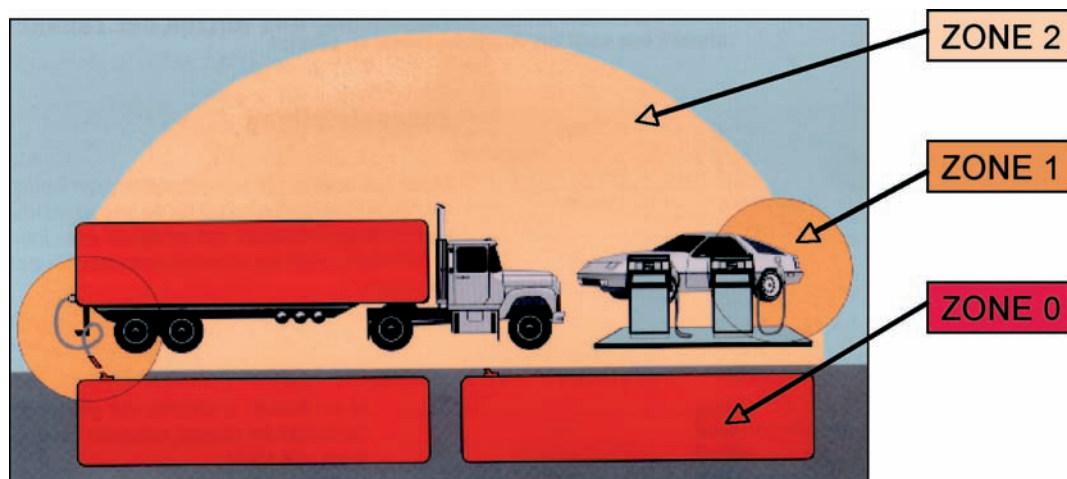
### Definition of the zones according to section 2 para. 4 ELX (96)

#### 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.

### 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: © Kruse/PIXELIO



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	I	M1
	–	Mining	–	–	I	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 Pfannenber 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 <sup>3</sup>	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 <sup>4</sup>	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

<sup>1</sup> devices, <sup>2</sup> systems

<sup>3</sup> ia use in Zones 0, 1, 2 / ib use in Zones 1, 2

<sup>4</sup> 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

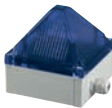



















AEx d  
Ex de  
Ex de

IIC  
IIC  
IIC

T6  
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) <sup>1</sup>					Light intensity/ Sound pressure level	Pro-tection 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 J	IP 66 IK 08		●					202	
	Quadro-LED Flex-3G/3D			●			●						9 cd	IP 66 IK 08		●					204	
	BR 50-LED 3G/3D			●			●							IP 65		●					206	
	CWB-ATEX		●	●		●	●						5 J	IP 66	●	●					208	
	BExBG 15		●	●		●	●						15 J	IP 66 IP 67		●					210	
	BExBG 10		●	●		●	●						10 J			●						
	BExBG 05		●	●		●	●						5 J			●						
	BExBG L1		●	●		●	●						9 cd			●				212		
	IS-mB1	●	●	●									6 cd	IP 65		●					214	
Audible signaling devices																						
Sounders																						
	DS 10 3G/3D			●			●						110 dB (A)	IP 66 IP 67	●	●		●	●		216	
	DS 5 3G/3D			●			●						105 dB (A)		●	●		●	●			
	BExS 120 d/e		●	●									117 dB (A)	IP 66 IP 67		●		● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>	218	
	BExDS 120 d/e		●	●		●	●															
	BExS 110 d/e		●	●											110 dB (A)		●		● <sup>2</sup>	● <sup>2</sup>	● <sup>2</sup>	220
	BExDS 110 d/e		●	●		●	●															
	IS-A105N	●	●	●									105 dB (A)	IP 66		●					222	
	IS-mA1	●	●	●									100 dB (A)	IP 65		●					224	

● available  
○ in preparation

<sup>2</sup> only d version



Type	Suitable for use in zones						Maximum signal reception range for a 65 dB ambient noise level in metres (m) <sup>1</sup>					Sound pressure level / Light intensity	Pro-tection 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																			Loudspeakers					
BExL 25 d/e		●	●									117 dB (A)	IP 66 IP 67		●						226			
BExL 15 d/e		●	●									113 dB (A)			●									
Combined visual-audible signaling devices																								
BExCS 110-05D		●	●									110 dB (A) 5 J	IP 67		●						228			
BExDCS 110-05D		●	●		●	●									●									
BExCL 15-05D		●	●									113 dB (A) 5 J			●						230			
IS-mC1	●	●	●									100 dB (A) / 6 cd	IP 65		●						232			
Accessories																								
Zener barriers																					234			

<sup>1</sup> 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  $\geq 120$  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](http://www.pfannenberg.com) · [www.pfannenberg-spareparts.com](http://www.pfannenberg-spareparts.com)  
Keep up to date. Subscribe to our newsletter now:  
[newsletter.pfannenberg.com](http://newsletter.pfannenberg.com)

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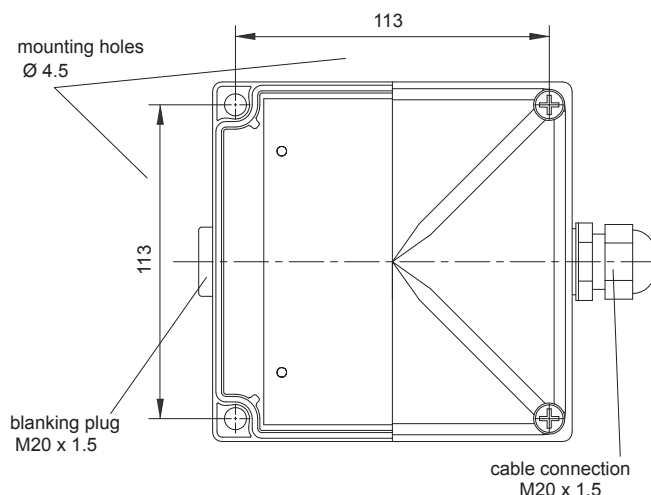
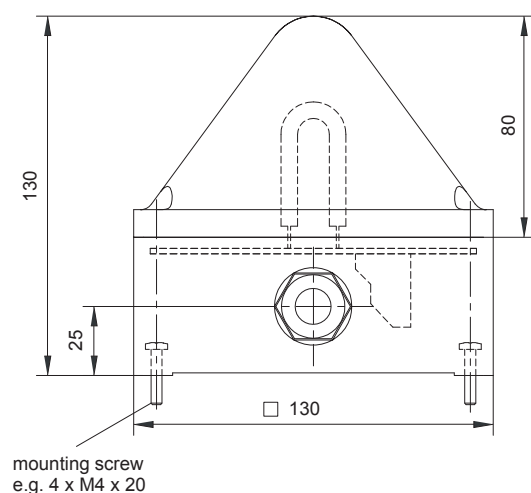
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## Dimensions



## 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



## Manufacturer's declaration

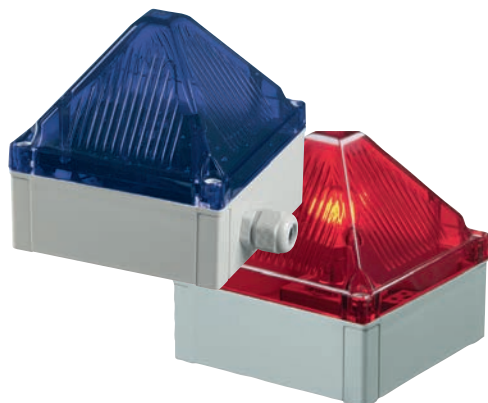
We hereby declare that the explosion-protected means of alarm with the type designation **Quadro F12 3G/3D** has been developed and manufactured in accordance with the requirements as per EN 50014.

**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 Multi-function 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 directly via 24 V transistor PLC output, no additional relay control necessary
- inexpensive and flexible; wide range power supplies as standard



Range as  
per EN 54



Protection  
system



Impact-proof  
housing

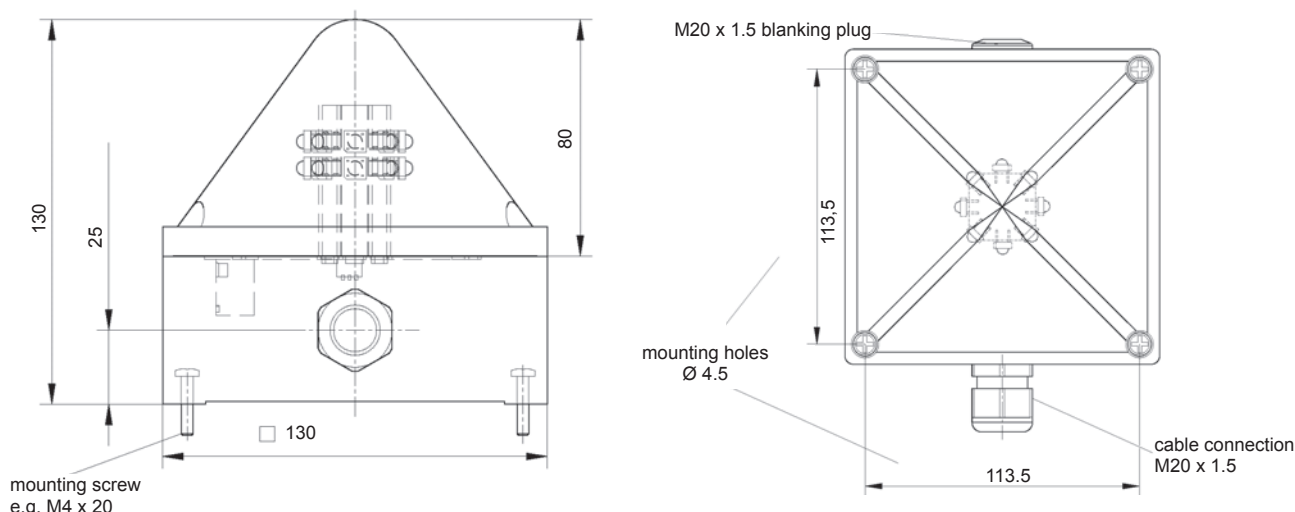


Operating  
temperature

Electrical data	Quadro-LED Flex 3G/3D ATEX	
Rated voltage	115 V / 230 V AC	24 V AC/DC
Rated frequency	50 / 60 Hz	50 / 60 Hz
Operating range	AC 95 – 253 V	15 – 40 V
	DC	10 – 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	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	> 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 connection)			
Weight	500 g			

## Dimensions



## Operating modes

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

## Options / Accessories



## 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.**

# **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**

Protection  
system

**+ 50 °C**
**- 20 °C**

Operating  
temperature

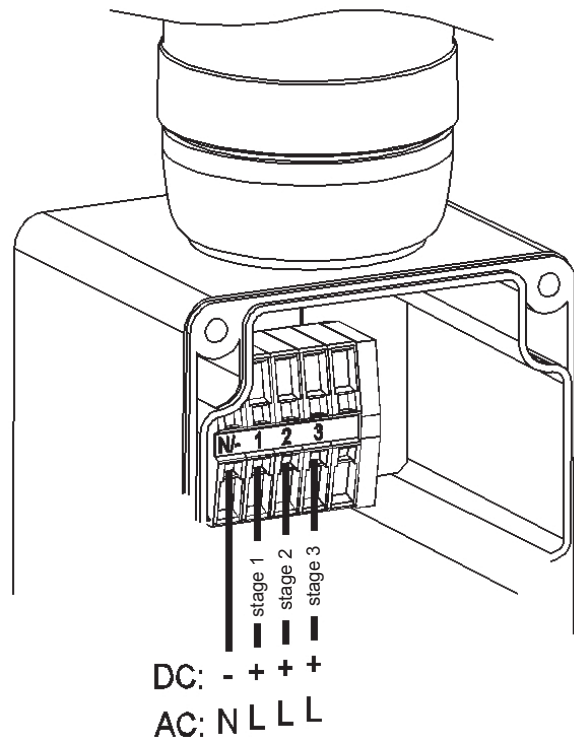
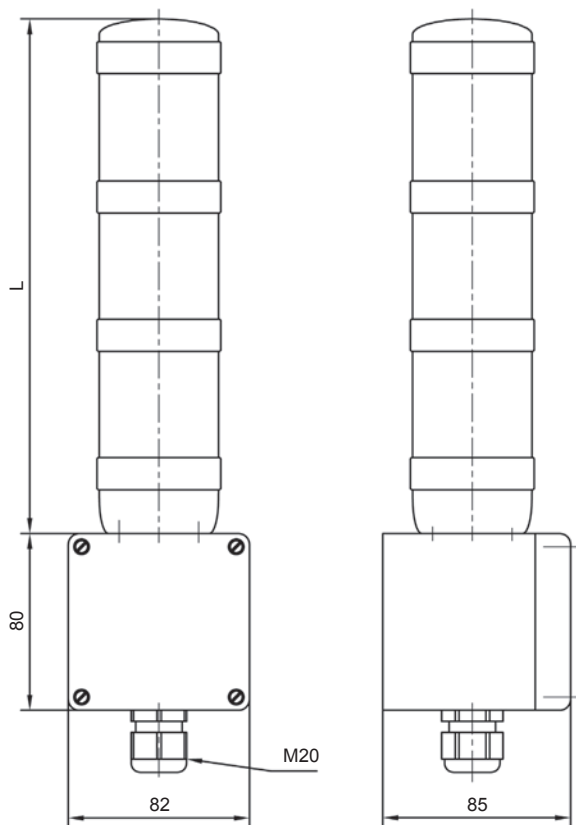
Electrical data		BR 50-LED 3G/3D			
Version		1-stage	2-stage		3-stage
Colour order		red	red / green	yellow / green	red / yellow / green
Nominal current consumption	230 V AC 50/60 Hz	9 mA	16 mA	16 mA	24 mA
	24 V AC 50/60 Hz	60 mA	90 mA	80 mA	130 mA
	24 V DC	50 mA	80 mA	70 mA	120 mA
Operating range	230 V AC 50/60 Hz	195 – 253 V			
	24 V AC 50/60 Hz	18 – 28 V			
	24 V DC	18 – 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 hrs	
Material	lens	polycarbonate (PC)	
	housing	acrylonitrile butadiene styrene (ABS)	
	connector housing	polycarbonate (PC), light grey RAL 7035	
Mounting		arbitrary	
Connecting terminals		cage clamp terminal 0.08 – 2.5 mm <sup>2</sup>	
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

## Options / Accessories



## 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



Range as  
per EN 54



Protection  
system



Operating  
temperature

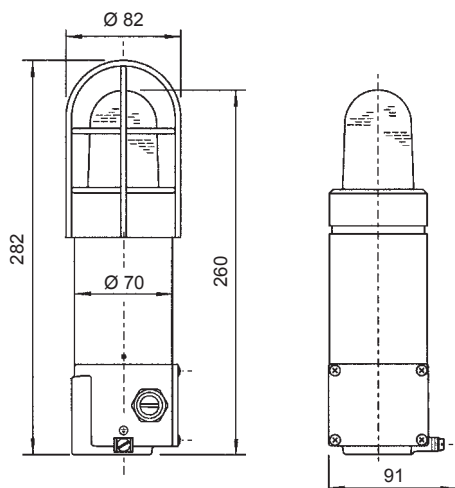


GL Approval

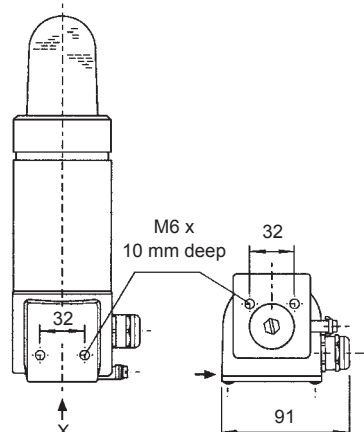
Electrical data	CWB-ATEX					
Rated voltage	230 V AC	110–127 V AC	24–42 V AC	60–80 V DC	12–48 V DC	24 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	± 10%	± 10%	± 10%	± 10%
Nominal current consumption	0.08 A	0.11 A	0.5 – 0.3 A	0.11 A – 0.13 A	0.5 – 0.3 A	0.4 A

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 J	
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 mm <sup>2</sup> (single wire) 2 x 2.5 mm <sup>2</sup> (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	

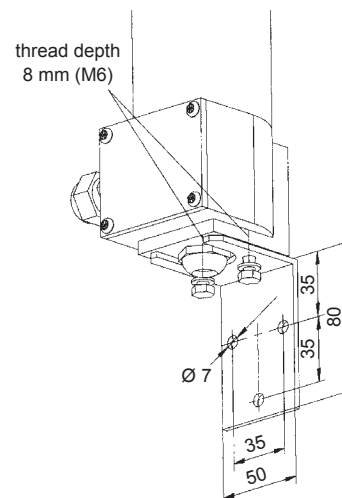
## Dimensions



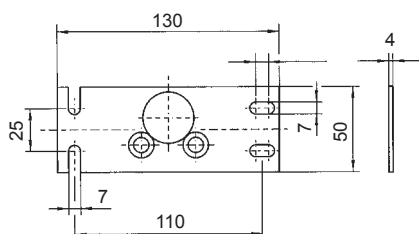
### Direct mounting to wall/floor



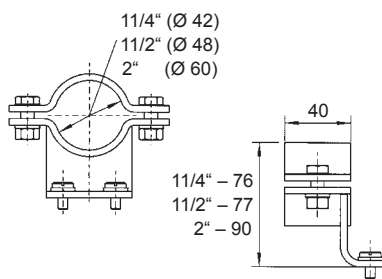
### Standard bracket



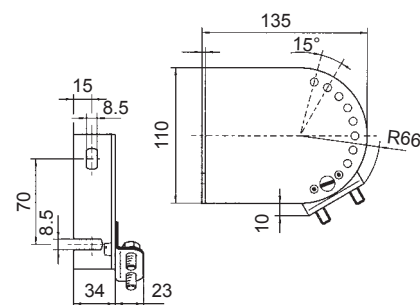
### Mounting plate



### 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



**Mounting bracket**  
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 / 10 / 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
- BExBG05 can be mounted in all operating positions

5 Joules



Range as  
per EN 54

10 Joules



Range as  
per EN 54

15 Joules



Range as  
per EN 54



Protection  
system



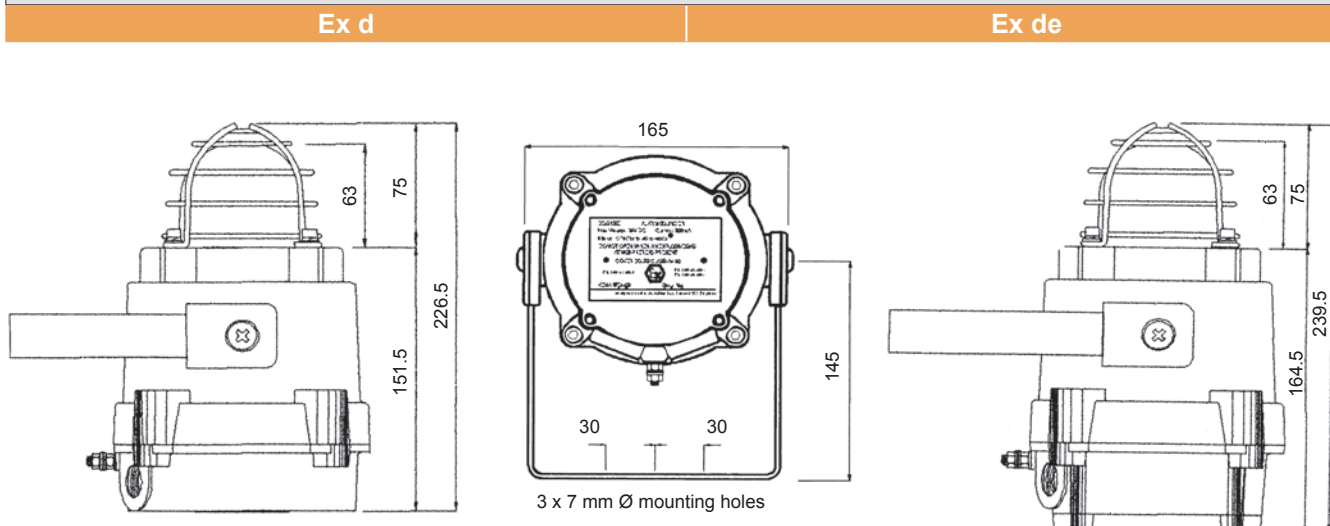
Operating  
temperature

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 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 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
Operating range		± 25%	± 25%	± 25%	± 25%	± 25%	± 25%	± 25%
Nominal current consumption		180 mA	300 mA	750 mA	340 mA	660 mA	1450 mA	860 mA

Mechanical data	BExBG05D/BExBG05E	BExBG10D/BExBG10E	BExBG15D/BExBG15E
Type of protection	Ex d IP 67 / Ex de IP 66		
Explosion protection <sup>1</sup>	II2G Ex d IIC T4, T5 or T6 II2G Ex de IIC T4, T5 or T6 II2D Ex tD A21 IP67 T85, T100 or T115	II2G Ex d IIC T4 or T5 II2G Ex de IIC T4 or T5 II2D Ex tD A21 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 J	10 J	15 J
Flash rate	60 flashes/min., stabilised		
Lens colours	clear, yellow, amber, red, green, blue		
Temperature class T	T4 / T115°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 <sup>1</sup>	2 x M20, of which one open, optionally PG13.5 or 1/2" NPT		
Weight	Exd	2.45 kg	
	Exde	2.75 kg	

<sup>1</sup> Ex cable gland not included

## Dimensions



## 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



## 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 / 60 Hz
Operating range	± 10%
Nominal current consumption	70 mA

Mechanical data	BExBG L1D	
Type of protection	Ex d IP 67	
Explosion protection <sup>1</sup>	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 2006 X	
Testing body	KEMA	
Light source	32 LEDs	
Lens colours	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 hrs	
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 <sup>1</sup>	2 x M20, of which one open, optionally PG13.5 or 1/2" NPT	
Weight	2.75 kg	

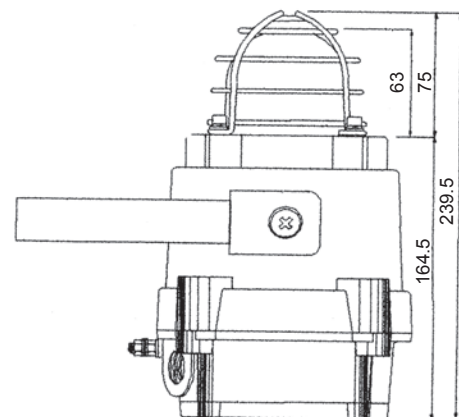
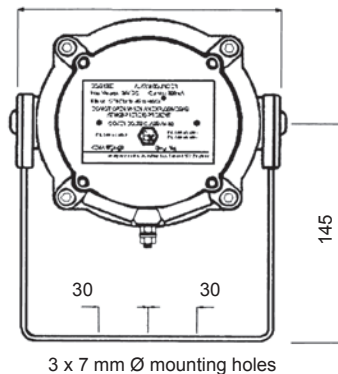
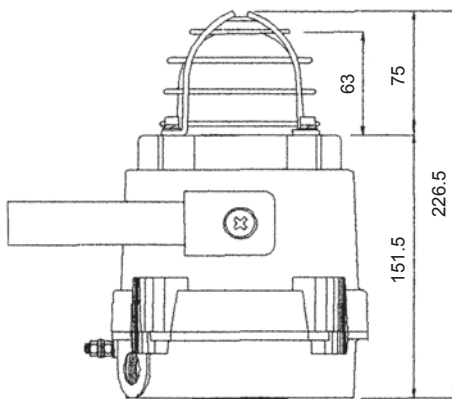
<sup>1</sup> Ex cable gland not included



## Dimensions

EEx d

EEx de



## Operating modes

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



## 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/EEG	'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 234 and 235 for suitable zener barriers**



Range as  
per EN 54



Protection  
system



Operating  
temperature

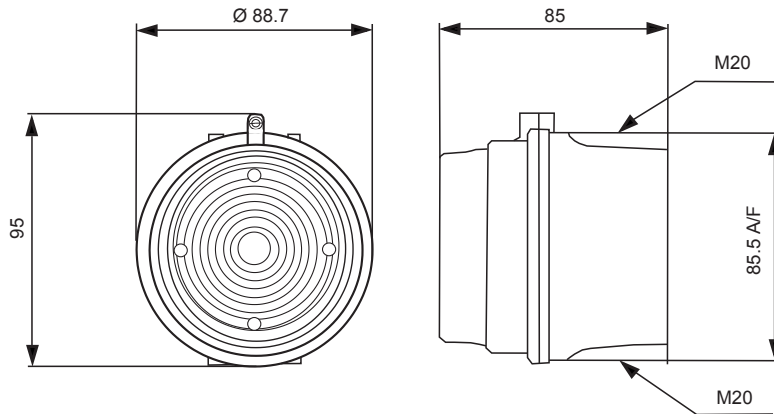
Electrical data	IS-mB1
Rated voltage	24 V DC
Operating range	16 – 28 V
Nominal current consumption	25 mA <sup>1</sup>

<sup>1</sup> typical for connection to 24 V DC via 28 V / 300 Ω zener barrier.

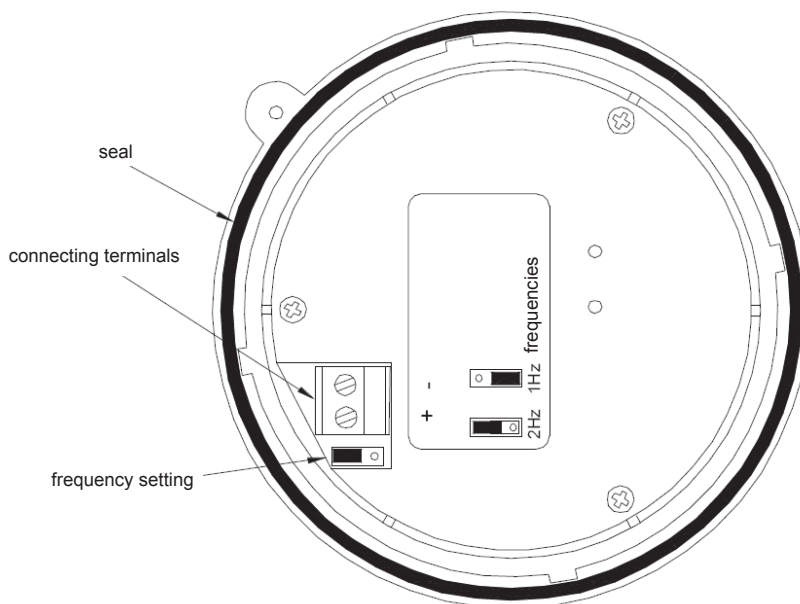
Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 235)

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 ATEX2084 X
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 to RAL 3000 (flame red)
Connecting terminals	0.5 – 2.5 mm <sup>2</sup>
Cable entry	2 x M20 (knock-outs 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



See pages 234/235 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

# **Sounders 105 / 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

max. signal  
reception range

DS 10 3G/3D

max. signal  
reception rangeProtection  
system

Standard



Standard

Operating  
temperature

Electrical data	DS 5 3G/3D				
Rated voltage	230 V AC	115 V AC	24 V AC <sup>1</sup>	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	19 – 29 V	10 – 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 <sup>1</sup>	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz		
Operating range	195 – 253 V	95 – 127 V	19 – 29 V	19 – 29 V	10 – 15 V
Nominal current consumption	0.06 A	0.12 A	0.42 A	0.42 A	0.3 A

<sup>1</sup> Temperature class T3

Mechanical data	DS 5 3G/3D	DS 10 3G/3D
Explosion protection	II 3G Ex nA II T4 (all voltages except 24 V AC) II 3G Ex nA II T3 (only 24 V AC) 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 bushing	2 x M20 x 1.5 (1 x plastic cable gland, 1 x plug)	
Clamping range of the cable fitting	6 – 13 mm	
Connecting terminal cross-section	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



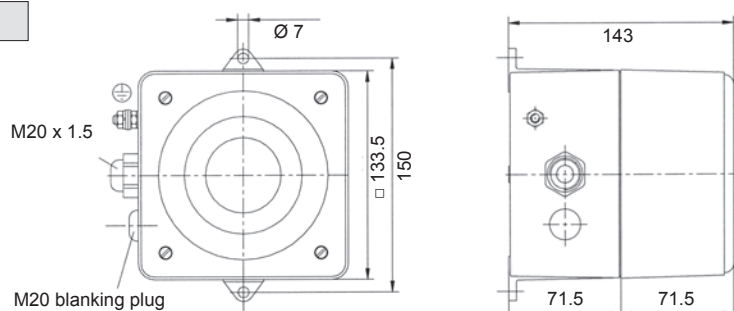
External tone selection control /  
 4-stage external tone selection  
 TAV: control by means of external voltage input  
 (12 V and 24 V DC only)  
 TAS: control by means of control voltage



GOST

GL  
30457-83-HH

## Dimensions



## Tone table

Tone	Description - Basic tone (preset: tone no. 1)		Stage			Tone	Description - Basic tone (preset: tone no. 1)		Stage		
			2	3	4				2	3	4
0	no tone		1	5	4	18	Interrupted tone	800 Hz	19	7	4
1	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 500 Hz	3	2	4	19	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 800 Hz	27	13	23
2	Interrupted tone, ISO 8201 (emergency evacuation signal)	950 Hz	1	4	3	20	Interrupted tone, IMO SOLAS III/50 + SOLAS III/6.4 (general alarm)	825 Hz	9	21	26
3	Alternating tone	1025 Hz 825 Hz	1	2	4	21	Interrupted tone, IMO (leave ship)	950 Hz	20	9	26
4	Continuous tone, UK BS5839-1	950 Hz	1	3	5	22	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 500 Hz	19	14	2
5	Interrupted tone	950 Hz	1	4	3	23	Siren	2400 Hz 500 Hz	27	12	2
6	Sweeping	1200 Hz 500 Hz	1	4	9	24	Alternating tone	1075 Hz 825 Hz	1	16	12
7	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 440 Hz	3	10	4	25	Alternating tone	900 Hz 500 Hz	1	14	5
8	Interrupted tone, Sweden SS031711 (emergency signal)	700 Hz	2	3	4	26	Alternating tone	1400 Hz 1200 Hz	4	9	27
9	Interrupted tone (fast), horn	800 Hz	1	3	4	27	Siren	1200 Hz 300 Hz	13	23	19
10	Continuous tone	500 Hz	27	9	26	28	Sweeping	1500 Hz 700 Hz	7	10	4
11	Continuous tone	725 Hz	1	17	9	29	Pulsating tone, industrial alarm Germany	1000 Hz 150 Hz	1	30	9
12	Continuous tone	825 Hz	27	9	26	30	Interrupted tone, industrial alarm (Germany)	680 Hz	1	4	26
13	Continuous tone	1200 Hz	1	5	3	31	Sweeping, France NFC48-265	1600 Hz 1400 Hz	3	14	4
14	Continuous tone	1500 Hz	1	4	10	32	selection of available tone combinations in stages 2, 3 and 4				
15	Interrupted tone	500 Hz	1	24	12						
16	Interrupted tone	825 Hz	1	24	15						
17	Interrupted tone	725 Hz	1	11	9						

## 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** fulfils 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	UVV-BGV A3 (VBG4)	Electrical plants and equipment
DIN EN 60079-15	Electrical equipment for areas at risk of gas explosions - Type of protection "n"	DIN EN 54-3	Fire alarm systems – Part 3: fire alarm devices; Acoustic alarms
DIN EN 61241-0	Electrical equipment for use in areas with combustible dust - General requirements	DIN EN 981	Machine safety – System of acoustic and visual alarm signals and information signals
DIN EN 61241-1	Electrical equipment for use in areas with combustible dust brennbarem Staub - part 1: protection by enclosure 'tD'	DIN EN 50262	Metric cable glands for electrical installations
DIN EN 61000-6-2	Generic standard, interference immunity for industrial areas	DIN IEC 60038	IEC standard voltages
DIN EN 61000-6-3	Generic standard, interference emission for residential areas	DIN 33404/3	Alarm signals for workplaces; acoustic alarm signals; uniform emergency signal; technical safety requirements, tests
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 60947-1	Low-voltage switchgear – Part 1: General specifications
DIN EN ISO 7731	Ergonomic – alarms for public areas and workplaces – acoustic alarms	DIN EN 60529	Safety of information technology equipment
		9. GPSG	Types of protection by enclosure (IP code)
		Guideline 94/9/EG (ATEX 100a)	Appliance and product safety act
		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.

# **Sounders 117 dB(A)** **BExS 120 d/e, BExDS 120 d/e**



- 32 different tones can be set; UKOOA/PFEER conform
- 117 dB (A)  $\pm$  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



max. signal  
reception range



Protection  
system



Operating  
temperature



Standard



Exd  
24 V DC



Standard



Exd  
24 V DC

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 / 60 Hz	50 / 60 Hz			
Operating range	$\pm$ 10%	$\pm$ 10%	$\pm$ 25%	$\pm$ 25%	$\pm$ 25%
Nominal current consumption	90 mA	180 mA	420 mA	800 mA	850 mA

Mechanical data	BExS 120 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	117 dB (A) $\pm$ 3 dB (A)	117 dB (A) $\pm$ 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 to RAL 3000 (flame red)
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black
Connecting terminals	Exd	1 x 4 mm <sup>2</sup> or 2 x 2.5 mm <sup>2</sup>
	Exde	2 x 2.5 mm <sup>2</sup>
Cable entry	2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2" NPT	
Weight	Exd	AC: 3.88 kg / DC: 3.42 kg
	Exde	AC: 4.14 kg / DC: 3.38 kg

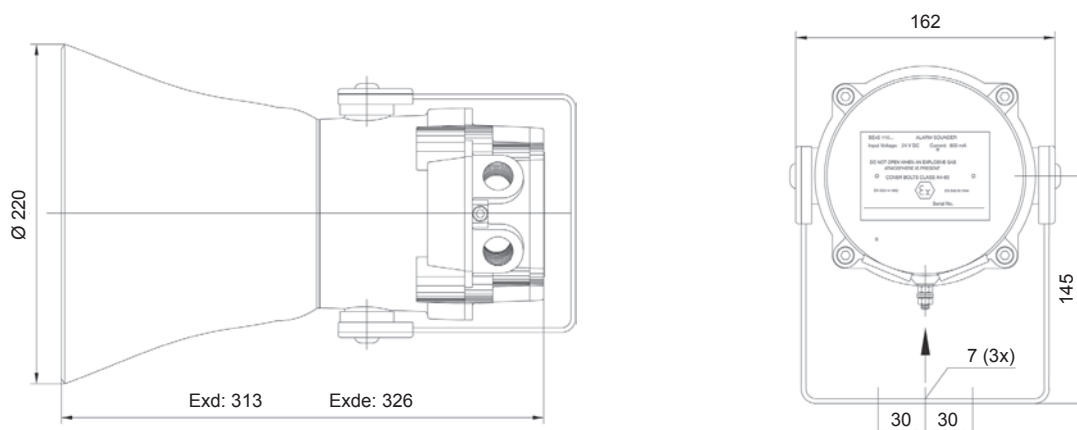
## Options / Accessories



Exd  
BExDS



## Dimensions



## Tone table

Tone	Description - Basic tone		Stage		Tone	Description - Basic tone		Stage	
			2	3				2	3
1	Continuous tone	1000 Hz	31	11	18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	17	5	19	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s	2	5
3	Slow whoop	1200 Hz 3,0 s 500 Hz 0,5 s	2	5	20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5
4	Sweeping (fast)	1000 Hz 10 ms 800 Hz 10 ms	6	5	21	Alternating tone	554 Hz 10 ms 440 Hz 10 ms	2	5
5	Continuous tone	2400 Hz	3	27	22	Interrupted tone	544 Hz 0,875 s 0,875 s	2	5
6	Sweeping	2900 Hz 70 ms 2400 Hz 70 ms	7	5	23	Interrupted tone	800 Hz 20 ms 20 ms	6	5
7	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms	10	5	24	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s 800 Hz 0,5 s	29	5
8	Sweeping	1200 Hz 3 s 500 Hz 3 s	2	5	25	Sweeping	2900 Hz 0,5 s 2400 Hz 0,5 s	29	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	15	2	26	Simulated bell	1450 Hz 0,69 ms 0,69 ms	2	1
10	Alternating tone	2900 Hz 20 ms 2400 Hz 20 ms	7	5	27	Continuous tone	554 Hz	26	5
11	Interrupted tone	1000 Hz 10 ms 10 ms	31	1	28	Continuous tone	440 Hz	2	5
12	Alternating tone	1000 Hz 0,875 s 800 Hz 0,875 s	4	5	29	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms	7	5
13	Interrupted tone	2400 Hz 10 ms 10 ms	15	5	30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s	32	5
14	Interrupted tone	800 Hz 0,25 s 1 s	4	5	31	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s 500 Hz 1 s	11	1
15	Continuous tone	800 Hz	2	5	32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,75 s 500 Hz 0,25 s	26	1
16	Interrupted tone	554 Hz 0,1 s 440 Hz 0,4 s	18	5	The sounder can be set externally to the respective tones of stage 2 & 3. Tone 2 is preset.				
17	Alternating tone, France NFS 32-001 (fire alarm)	660 Hz 150 ms 150 ms	2	27					

## Ordering details

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

# **Sounders 110 dB(A)** **BExS 110 d/e, BExDS 110 d/e**



- 32 different tones can be set; UKOOA/PFEER conform
- 110/117 dB (A)  $\pm$  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



max. signal  
reception range



Protection  
system



Operating  
temperature



Standard



Exd  
24 V DC



Standard



Exd  
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 / 60 Hz	50 / 60 Hz			
Operating range	$\pm$ 10%	$\pm$ 10%	$\pm$ 25%	$\pm$ 25%	$\pm$ 25%
Nominal current consumption	56 mA	110 mA	130 mA	250 mA	195 mA

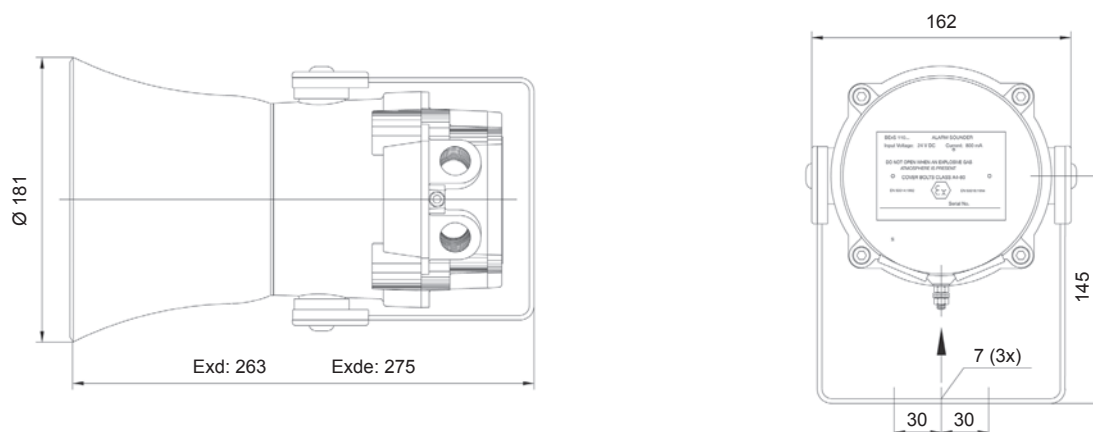
Mechanical data	BExS 110 d/e	BExDS 110 d/e
Protection system	"d" = IP 67; or "e" = IP 66	
Explosion protection	II 2G Ex d IIC T4 / II 2G Ex de IIC T4 II 2G Ex d IIB T4 / II 2G Ex de IIB T4	II 2G/D Ex d IIC T4 100°C / II 2G/D Ex de IIC T4 100°C II 2G/D Ex d IIB T4 115°C / II 2G/D Ex de IIB T4 115°C
Category (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	110 dB (A) $\pm$ 3 dB (A)	110 dB (A) $\pm$ 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 to RAL 3000 (flame red)
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2D anti-static ABS, black
Connecting terminals	Exd	1 x 4 mm <sup>2</sup> or 2 x 2.5 mm <sup>2</sup>
	Exde	2 x 2.5 mm <sup>2</sup>
Cable entry	2 / 1 x closed, 1 x open (M20), optionally PG13.5 or 1/2" NPT	
Weight	Exd	AC: 3.42 kg / DC: 3.16 kg
	Exde	AC: 3.68 kg / DC: 3.42 kg

## Options / Accessories



Exd  
BExDS

## Dimensions



## Tone table

Tone	Description - Basic tone		Stage		Tone	Description - Basic tone		Stage	
			2	3				2	3
1	Continuous tone	1000 Hz	31	11	18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz	2	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	17	5	19	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s	2	5
3	Slow whoop	1200 Hz 3,0 s 500 Hz 0,5 s	2	5	20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5
4	Sweeping (fast)	1000 Hz 10 ms 800 Hz 10 ms	6	5	21	Alternating tone	554 Hz 10 ms 440 Hz 10 ms	2	5
5	Continuous tone	2400 Hz	3	27	22	Interrupted tone	544 Hz 0,875 s 0,875 s	2	5
6	Sweeping	2900 Hz 70 ms 2400 Hz 70 ms	7	5	23	Interrupted tone	800 Hz 20 ms 20 ms	6	5
7	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms	10	5	24	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s 800 Hz 0,5 s	29	5
8	Sweeping	1200 Hz 3 s 500 Hz 3 s	2	5	25	Sweeping	2900 Hz 0,5 s 2400 Hz 0,5 s	29	5
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	15	2	26	Simulated bell	1450 Hz 0,69 ms 0,69 ms	2	1
10	Alternating tone	2900 Hz 20 ms 2400 Hz 20 ms	7	5	27	Continuous tone	554 Hz	26	5
11	Interrupted tone	1000 Hz 10 ms 10 ms	31	1	28	Continuous tone	440 Hz	2	5
12	Alternating tone	1000 Hz 0,875 s 800 Hz 0,875 s	4	5	29	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms	7	5
13	Interrupted tone	2400 Hz 10 ms 10 ms	15	5	30	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s	32	5
14	Interrupted tone	800 Hz 0,25 s 1 s	4	5	31	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s 500 Hz 1 s	11	1
15	Continuous tone	800 Hz	2	5	32	Slow whoop, Australian evacuation alarm AS2220	1200 Hz 3,75 s 500 Hz 0,25 s	26	1
16	Interrupted tone	554 Hz 0,1 s 440 Hz 0,4 s	18	5	The sounder can be set externally to the respective tones of stage 2 & 3. Tone 2 is preset.				
17	Alternating tone, France NFS 32-001 (fire alarm)	660 Hz 150 ms 150 ms	2	27					

## 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 for other voltages on request

# **Sounder 105 dB(A)** **IS-A105N**



These sounders are used in workplaces where dangerous, explosive atmospheres are to be expected

- free selection of 49 different tones UKOOA/PFEER conform
- 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 V 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 234 and 235 for suitable zener barriers**



max. signal  
reception range



Protection  
system



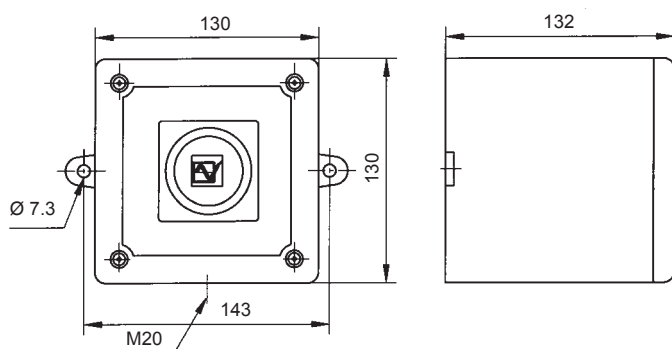
Operating  
temperature

Electrical data	IS-A105N
Rated voltage	24 V DC
Operating range	10 – 28 V
Nominal current consumption	25 mA (typical for connection to 24 V DC via 28 V / 300 Ω zener barrier)


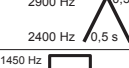
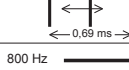
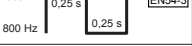

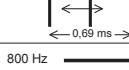
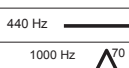
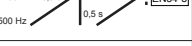
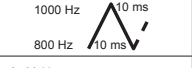


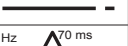

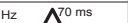
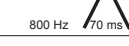
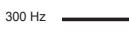
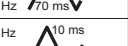


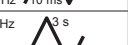

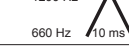



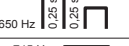
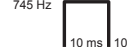


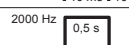
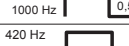


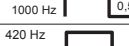



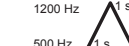
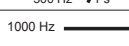


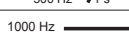
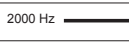
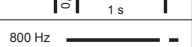



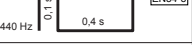
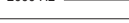





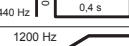


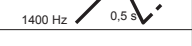

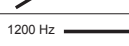
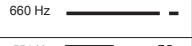

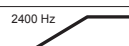
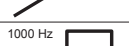




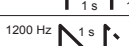




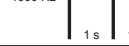

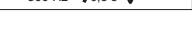
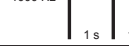



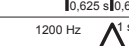
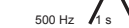
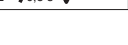


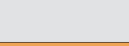


Power must be connected via a zener barrier (max. 28 V DC, 93 mA DC, 0.66 W) or a galvanic isolator, specified by the system certificate (see page 235)

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 2301 X
Testing body	SIRA
Sound pressure level	up to 105 dB (A) ± 3 dB (A) can be reduced by up to 15 dB (A) via an internal potentiometer
Alarm 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 UL 94 VO
Colour	similar to RAL 3000 (flame red), optionally grey RAL 7038 or white RAL 9010
Connecting terminals	0.5 – 2.5 mm <sup>2</sup>
Cable entry	20 mm
Weight	0.75 kg

## Dimensions



## Tone table

Tone	Description - Frequency		Stage		Tone	Description - Frequency		Stage	
			2	3				2	3
1	Continuous tone	340 Hz 	2	5	25	Sweeping	2900 Hz  2400 Hz 	29	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz  800 Hz 	17	5	26	Simulated bell	1450 Hz  1450 Hz 	2	15
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz  500 Hz 	2	5	27	Continuous tone	800 Hz 	26	5
4	Sweeping (fast)	1000 Hz  800 Hz 	6	5	28	Continuous tone	440 Hz 	2	5
5	Continuous tone	2400 Hz 	3	20	29	Sweeping (fast), UK BS5839-1	1000 Hz  800 Hz 	7	5
6	Sweeping	2900 Hz  2400 Hz 	7	5	30	Continuous tone	300 Hz 	2	5
7	Sweeping (fast)	2900 Hz  2400 Hz 	10	5	31	Sweeping	1200 Hz  660 Hz 	26	5
8	Sweeping	1200 Hz  500 Hz 	2	5	32	2-tone bell sound	800 Hz  650 Hz 	26	15
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz  500 Hz 	15	2	33	Interrupted tone	745 Hz  10 ms 	2	5
10	Alternating tone	2900 Hz  2400 Hz 	7	5	34	Alternating tone, Singapore	2000 Hz  1000 Hz 	38	45
11	Interrupted tone	1000 Hz  10 ms 	2	5	35	Interrupted tone, Australian alert	420 Hz  0,625 s 	36	5
12	Alternating tone	1000 Hz  800 Hz 	4	5	36	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz  500 Hz 	35	5
13	Interrupted tone	2400 Hz  10 ms 	15	5	37	Continuous tone	1000 Hz 	9	45
14	Interrupted tone	800 Hz  0,25 s 	4	5	38	Continuous tone	2000 Hz 	34	45
15	Continuous tone	800 Hz 	2	5	39	Interrupted tone	800 Hz  0,25 s 	23	17
16	Interrupted tone	660 Hz  150 ms 	18	5	40	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz  440 Hz 	31	27
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz  440 Hz 	2	27	41	Motor siren	1200 Hz  const. 	2	5
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz  1,8 s 	2	5	42	Motor siren	800 Hz  const. 	2	5
19	Sweeping, France NFC48-265	1600 Hz  1400 Hz 	2	5	43	Continuous tone, PFEER gasalarm	1200 Hz 	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz 	2	5	44	Motor siren	2400 Hz  const. 	2	5
21	Alternating tone	554 Hz  440 Hz 	2	5	45	Interrupted tone, PFEER (general alarm)	1000 Hz  1 s 	38	34
22	Interrupted tone	544 Hz  0,875 s 	2	5	46	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz  500 Hz 	47	37
23	Interrupted tone	800 Hz  20 ms 	6	5	47	Interrupted tone, PFEER (general alarm)	1000 Hz  1 s 	46	37
24	Sweeping (medium), UK BS5839-1	1000 Hz  800 Hz 	29	5	48	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz  0,625 s 	49	5
					49	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz  500 Hz 	26	37

## Ordering details

Article number	IS-A105N
24 V DC	320 33 80 0 000

## Options / Accessories



## 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 234 and 235 for suitable zener barriers**



max. signal  
reception range



Protection  
system



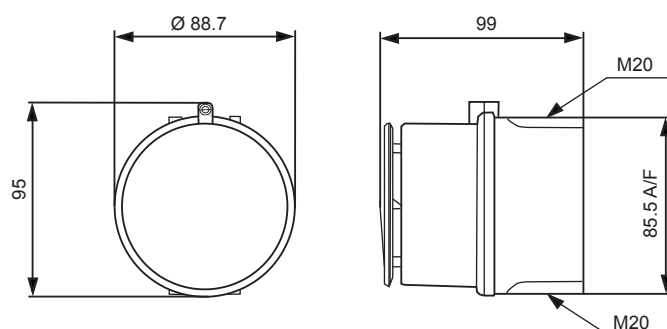
Operating  
temperature

Electrical data	IS-mA1
Rated voltage	24 V DC
Operating range	16 – 28 V
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 235)

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 ATEX2084 X
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 to RAL 3000 (flame red)
Connecting terminals	0.5 – 2.5 mm <sup>2</sup>
Cable entry	2 x M20 (knock-outs prepared)
Weight	230 g

## Dimensions







## Tone table

Tone	Description - Frequency		Stage		Tone	Description - Frequency		Stage	
			2	3				2	3
1	Continuous tone	340 Hz	2	5	25	Sweeping	2900 Hz 0,5 s 2400 Hz 0,5 s	29	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	17	5	26	Simulated bell	1450 Hz 0,69 ms 1450 Hz 0,69 ms	2	15
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s 500 Hz 0,5 s	2	5	27	Continuous tone	800 Hz	26	5
4	Sweeping (fast)	1000 Hz 10 ms 800 Hz 10 ms	6	5	28	Continuous tone	440 Hz	2	5
5	Continuous tone	2400 Hz	3	20	29	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms	7	5
6	Sweeping	2900 Hz 70 ms 2400 Hz 70 ms	7	5	30	Continuous tone	300 Hz	2	5
7	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms	10	5	31	Sweeping	1200 Hz 10 ms 660 Hz 10 ms	26	5
8	Sweeping	1200 Hz 3 s 500 Hz 3 s	2	5	32	2-tone bell sound	800 Hz 0,25 s 650 Hz 0,25 s	26	15
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	15	2	33	Interrupted tone	745 Hz 10 ms 10 ms	2	5
10	Alternating tone	2900 Hz 20 ms 2400 Hz 20 ms	7	5	34	Alternating tone, Singapore	2000 Hz 0,5 s 1000 Hz 0,5 s	38	45
11	Interrupted tone	1000 Hz 10 ms 10 ms	2	5	35	Interrupted tone – Australian alert	420 Hz 0,625 s 0,625 s	36	5
12	Alternating tone	1000 Hz 0,875 s 800 Hz 0,875 s	4	5	36	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s 500 Hz 1 s	35	5
13	Interrupted tone	2400 Hz 10 ms 10 ms	15	5	37	Continuous tone	1000 Hz	9	45
14	Interrupted tone	800 Hz 0,25 s 1 s	4	5	38	Continuous tone	2000 Hz	34	45
15	Continuous tone	800 Hz	2	5	39	Interrupted tone	800 Hz 0,25 s 1 s	23	17
16	Interrupted tone	660 Hz 150 ms 150 ms	18	5	40	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,1 s 440 Hz 0,4 s	31	27
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,1 s 440 Hz 0,4 s	2	27	41	Motor siren	1200 Hz const.	2	5
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz 1,8 s 1,8 s	2	5	42	Motor siren	800 Hz const.	2	5
19	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s	2	5	43	Continuous tone, PFEER gasalarm	1200 Hz	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5	44	Motor siren	2400 Hz const.	2	5
21	Alternating tone	554 Hz 10 ms 440 Hz 10 ms	2	5	45	Interrupted tone, PFEER (general alarm)	1000 Hz 1 s 1 s	38	34
22	Interrupted tone	544 Hz 0,875 s 0,875 s	2	5	46	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	47	37
23	Interrupted tone	800 Hz 20 ms 20 ms	6	5	47	Interrupted tone, PFEER (general alarm)	1000 Hz 1 s 1 s	46	37
24	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s 800 Hz 0,5 s	29	5	48	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s	49	5
					49	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s 500 Hz 1 s	26	37

## Ordering details

Article numbers	IS-mA1
Rated voltage	24 V DC
	320 34 80 0 000

## Options / Accessories



# Loudspeakers 117 / 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 made of 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



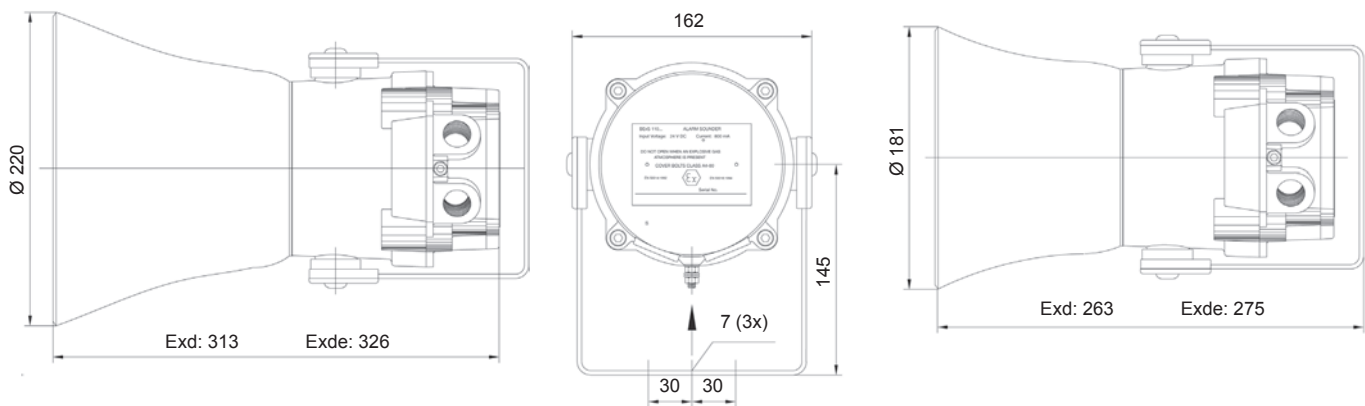
Operating  
temperature

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		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 to RAL 3000 (flame red)	
	horn	ABS self-extinguishing, similar UL 94 VO & 5VA FR ABS, Ex II 2GD anti-static ABS, black	
Connecting terminals		1 x 4 mm <sup>2</sup> or 2 x 2.5 mm <sup>2</sup>	
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

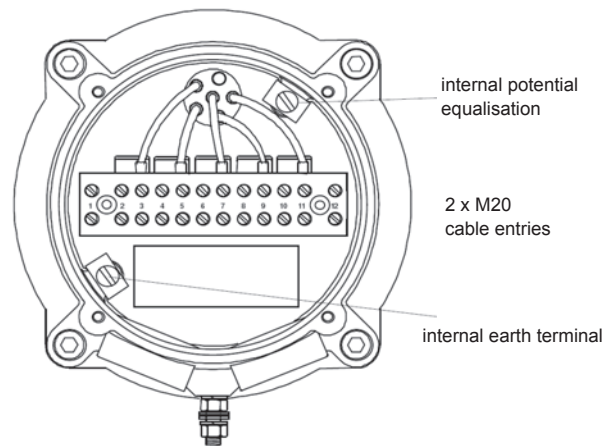
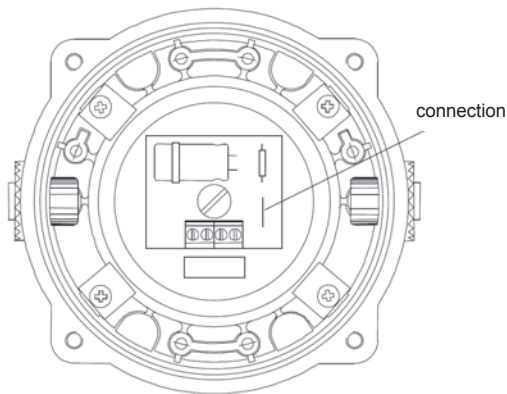
BExL 15 d/e



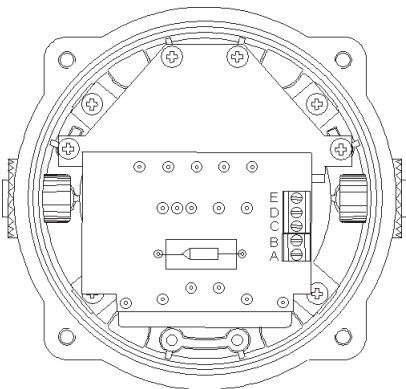
## Connection diagram

EEx d, 8 Ω and 16 Ω

EEx e, 8 Ω and 16 Ω



100 V



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



# **Sounder/Flashing Light Combination** **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 219 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



max. signal  
reception range



Protection  
system

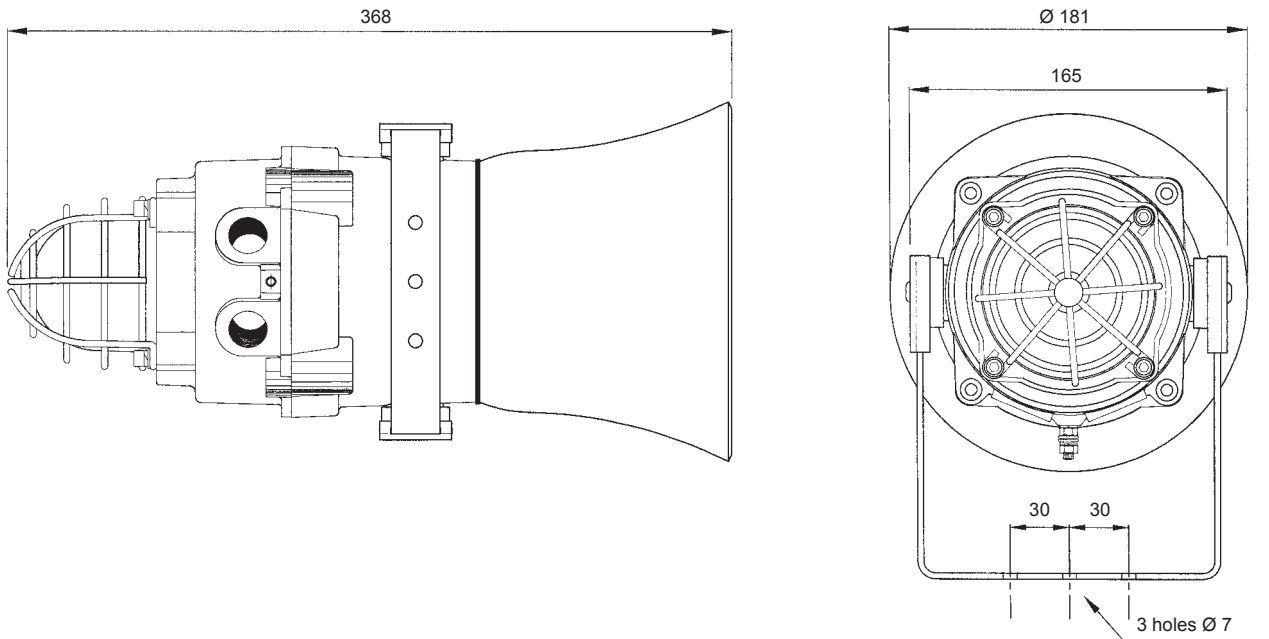


Operating  
temperature

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 / 60 Hz	50 / 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 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	42 – 54 V	20 – 28 V	10 – 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 ... + 70 °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 X	KEMA 01 ATEX 2223 X
Testing body	KEMA	KEMA
Sound pressure level	110 dB (A)	
Volume control	- 9 dB	
Flash energy	5 J	
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	glass
	housing	die-cast aluminium LM6, similar to RAL 3000 (flame red)
	horn	ABS self-extinguishing, similar 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 closed, 1 x open (M20), optionally PG13.5 or 1/2" NPT	
Weight	AC	5.0 kg
	DC	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

# Ex Loudspeaker/Flash Light Combination

## BExCL 15-05D



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



max. signal  
reception range



Protection  
system



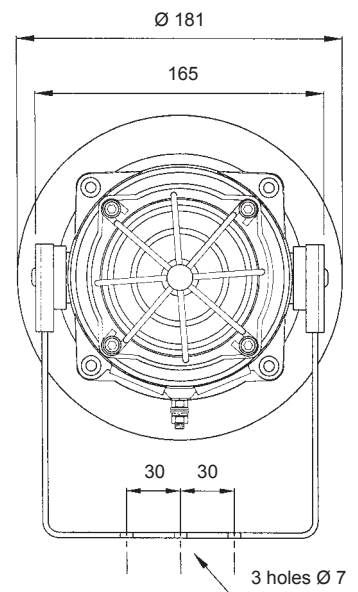
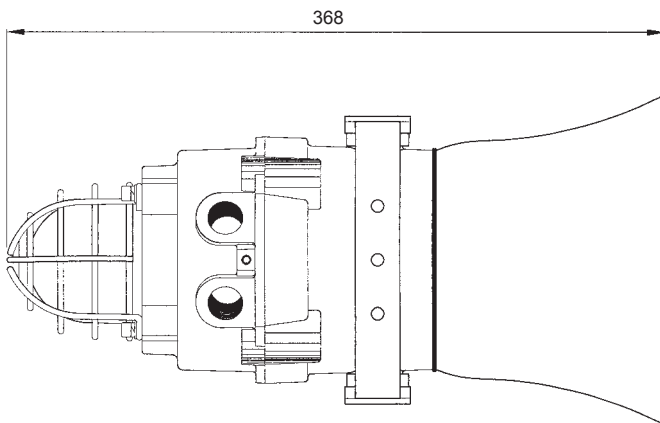
Operating  
temperature

Electrical data	BExCL 15-05D				
Rated voltage	230 V AC	115 V AC	48 V DC	24 V DC	12 V DC
Rated frequency	50 / 60 Hz	50 / 60 Hz			
Operating range	± 10%	± 10%	42 – 54 V	20 – 28 V	10 – 14 V
Nominal current consumption	55 mA	140 mA	180 mA	270 mA	750 mA

Mechanical data	BExCL 15-05D	
Explosion protection	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	
Sound pressure level	113 dB (A) ± 3 dB (A) @ 15 W	
Rated power	sine wave	15 W
Transformer	type	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	
Flash energy	5 J	
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 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), optional PG13.5 or 1/2" NPT	
Weight	5 kg	



## Dimensions



## Ordering details

Article numbers		BExCL 15-05D	
Lens colour	Version	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 for other colours and voltages on request

## Options / Accessories



## Manufacturer's declaration

We hereby declare that the explosion-protected means of alarm with the type designation **BExCL 150-05 D** 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 Serie 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 234 and 235 for suitable zener barriers**



max. signal  
reception range



Protection  
system



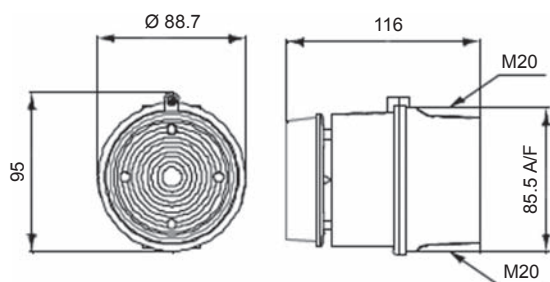
Operating  
temperature

Electrical data	IS-mC1
Rated voltage	24 V DC
Operating range	16 – 28 V
Nominal current consumption	48 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 235)

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 ATEX2084 X / 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	housing
	ABS, self-extinguishing UL94VO & 5VA, similar to RAL 3000 (flame red)
Material	lens
	polycarbonate (PC)
Connecting terminals	0.5 – 2.5 mm <sup>2</sup>
Cable entry	2 x M20 (knock-outs prepared)
Weight	280 g

## Dimensions





## Tone table

Tone	Description - Frequency		Stage		Tone	Description - Frequency		Stage	
			2	3				2	3
1	Continuous tone	340 Hz	2	5	25	Sweeping	2900 Hz 0,5 s 2400 Hz 0,5 s	29	5
2	Alternating tone, UK BS5839-1 (fire alarm, railway crossing)	1000 Hz 0,25 s 800 Hz 0,25 s	17	5	26	Simulated bell	1450 Hz 0,69 ms	2	15
3	Slow whoop, evacuation alarm Netherlands NEN 2575	1200 Hz 3,5 s 500 Hz 0,5 s	2	5	27	Continuous tone	800 Hz	26	5
4	Sweeping (fast)	1000 Hz 10 ms 800 Hz 10 ms	6	5	28	Continuous tone	440 Hz	2	5
5	Continuous tone	2400 Hz	3	20	29	Sweeping (fast), UK BS5839-1	1000 Hz 70 ms 800 Hz 70 ms	7	5
6	Sweeping	2900 Hz 70 ms 2400 Hz 70 ms	7	5	30	Continuous tone	300 Hz	2	5
7	Sweeping (fast)	2900 Hz 10 ms 2400 Hz 10 ms	10	5	31	Sweeping	1200 Hz 10 ms 660 Hz 10 ms	26	5
8	Sweeping	1200 Hz 3 s 500 Hz 3 s	2	5	32	2-tone bell sound		26	15
9	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	15	2	33	Interrupted tone	745 Hz 10 ms 10 ms	2	5
10	Alternating tone	2900 Hz 20 ms 2400 Hz 20 ms	7	5	34	Alternating tone, Singapore	2000 Hz 0,5 s 1000 Hz 0,5 s	38	45
11	Interrupted tone	1000 Hz 10 ms 10 ms	2	5	35	Interrupted tone – Australian alert	420 Hz 0,625 s 0,625 s	36	5
12	Alternating tone	1000 Hz 0,875 s 800 Hz 0,875 s	4	5	36	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s 500 Hz 1 s	35	5
13	Interrupted tone	2400 Hz 10 ms 10 ms	15	5	37	Continuous tone	1000 Hz	9	45
14	Interrupted tone	800 Hz 0,25 s 1 s	4	5	38	Continuous tone	2000 Hz	34	45
15	Continuous tone	800 Hz	2	5	39	Interrupted tone	800 Hz 0,25 s 1 s	23	17
16	Interrupted tone	660 Hz 150 ms 150 ms	18	5	40	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,1 s 440 Hz 0,4 s	31	27
17	Alternating tone, France NFS 32-001 (fire alarm)	554 Hz 0,1 s 440 Hz 0,4 s	2	27	41	Motor siren	1200 Hz const.	2	5
18	Interrupted tone, Sweden SS031711 (air raid warning)	660 Hz 1,8 s 1,8 s	2	5	42	Motor siren	800 Hz const.	2	5
19	Sweeping, France NFC48-265	1600 Hz 1 s 1400 Hz 0,5 s	2	5	43	Continuous tone, PFEER gasalarm	1200 Hz	2	5
20	Continuous tone, Sweden SS031711 (all-clear signal)	660 Hz	2	5	44	Motor siren	2400 Hz const.	2	5
21	Alternating tone	554 Hz 10 ms 440 Hz 10 ms	2	5	45	Interrupted tone, PFEER (general alarm)	1000 Hz 1 s 1 s	38	34
22	Interrupted tone	544 Hz 0,875 s 0,875 s	2	5	46	Sawtooth, DIN tone 33404-3 Germany (emergency signal), PFEER PTAP	1200 Hz 1 s 500 Hz	47	37
23	Interrupted tone	800 Hz 20 ms 20 ms	6	5	47	Interrupted tone, PFEER (general alarm)	1000 Hz 1 s 1 s	46	37
24	Sweeping (medium), UK BS5839-1	1000 Hz 0,5 s 800 Hz 0,5 s	29	5	48	Interrupted tone, Australia AS2220, AS1610, AS1670	420 Hz 0,625 s 0,625 s	49	5
					49	Sweeping, IMO 3d, Germany KTA3901 evacuation alarm	1200 Hz 1 s 500 Hz 1 s	26	37

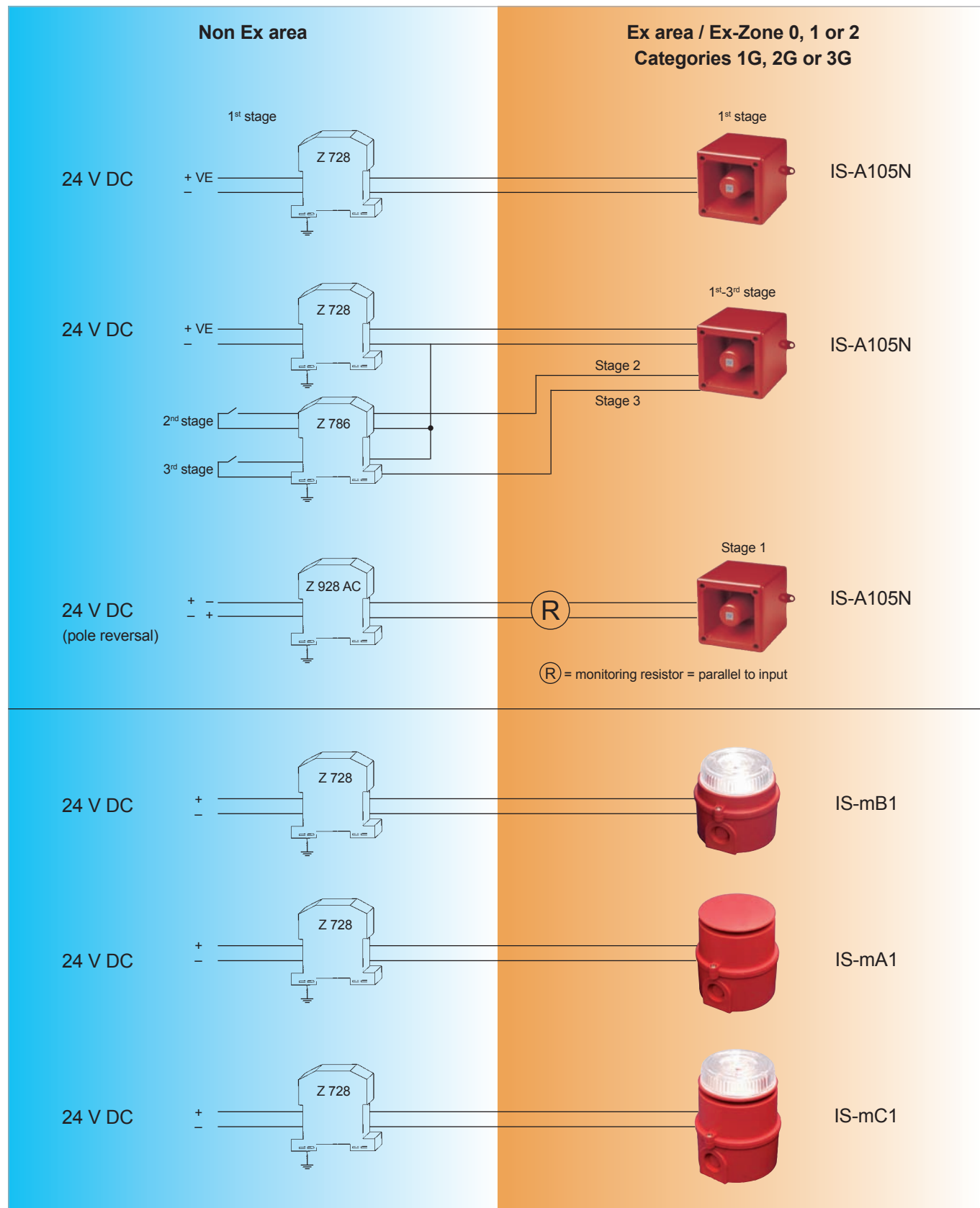
## Ordering details

Article numbers		IS-mC1
Colour LED	Rated voltage	24 V DC
yellow/amber		320 35 80 4 000
red		320 35 80 5 000
green		320 35 80 6 000
blue		320 35 80 7 000

## 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							Technical data			
		V	$\Omega$	$U_z$ (V)	$R_{min}$ ( $\Omega$ )	$I_k (I_0)$ (mA)	$P_{max}$ (W)	$C_{max}$ ( $\mu$ F)	$L_{max}$ (mH)	L/R Ratio	max. longitudinal resistance ( $\Omega$ )	U in at 10 $\mu$ A (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	28	—	—	—	0.083	—	—	36 + 0.9 V	26.5	28.0	50
			A2	28	—	—	—	0.083	—	—	36 + 0.9 V	26.5	28.0	50
			B	28	—	—	—	0.083	—	—	—	—	—	—

**Note:** A1 and A2 - separate channels, B - two channels connected in parallel with ground connection

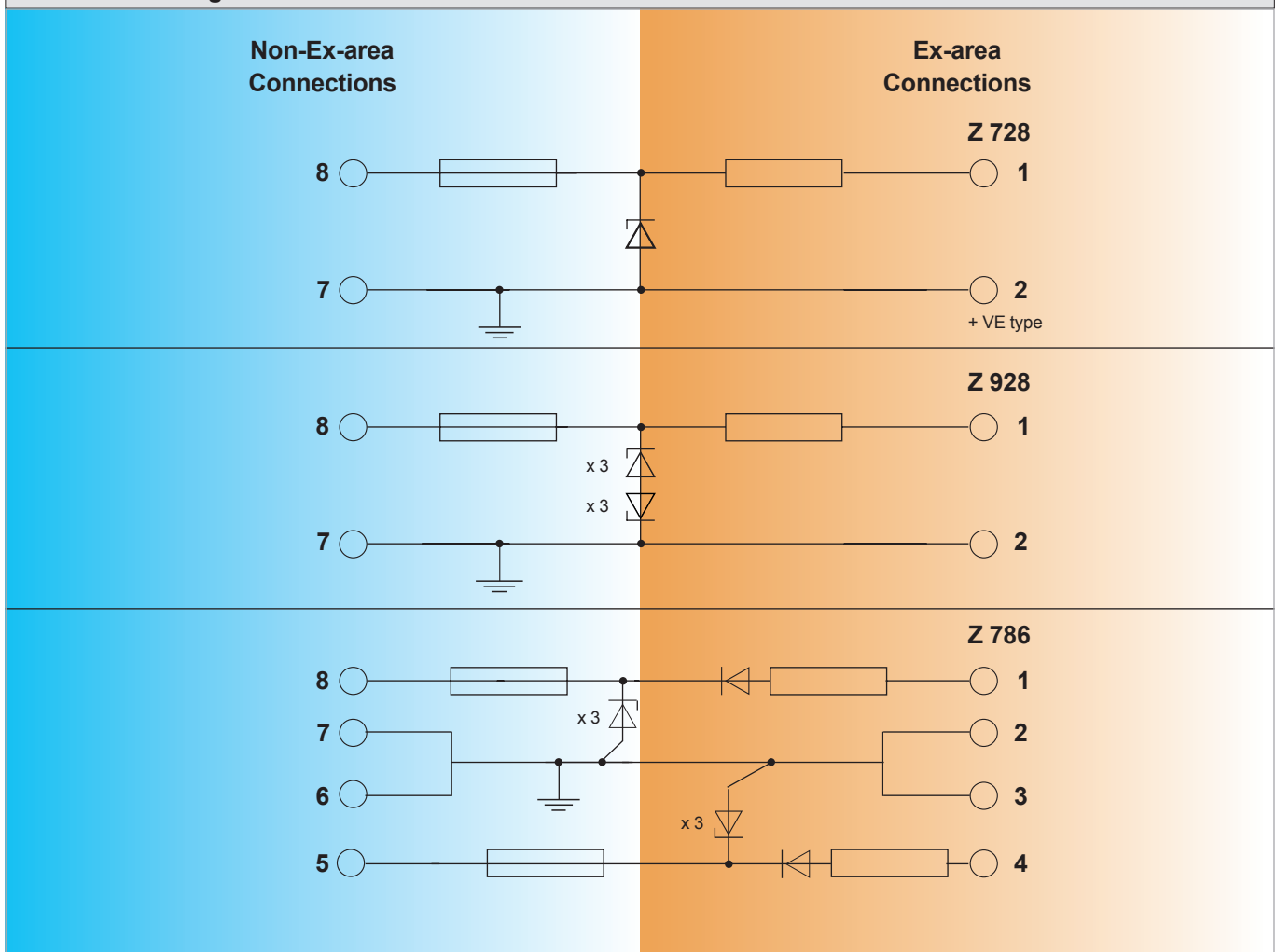
## Mechanical data

<b>Design</b>	terminal housing made of makrolon, flammability class UL 94 V-0
<b>Height x Width x Depth</b> mm	110 x 12.5 x 115
<b>Mounting</b>	snap fitting to 35 mm DIN rail conforming to DIN EN 50022
<b>Connection</b>	self-opening apparatus terminals; max. wire cross-section 2 x 2.5mm <sup>2</sup>
<b>Ambient temperature</b>	- 20 °C ... + 60 °C

## Ordering details

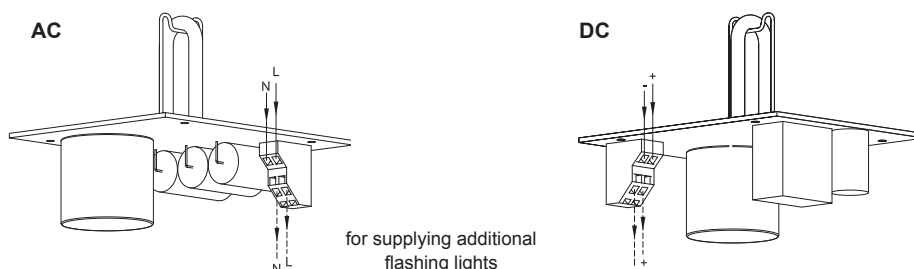
Article numbers	Z 728	Z 928	Z 786
	381 09 80 0 000	381 09 30 0 000	381 09 80 0 001

## Block circuit diagrams



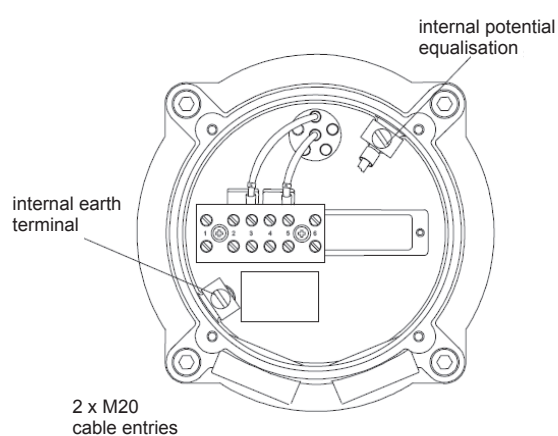
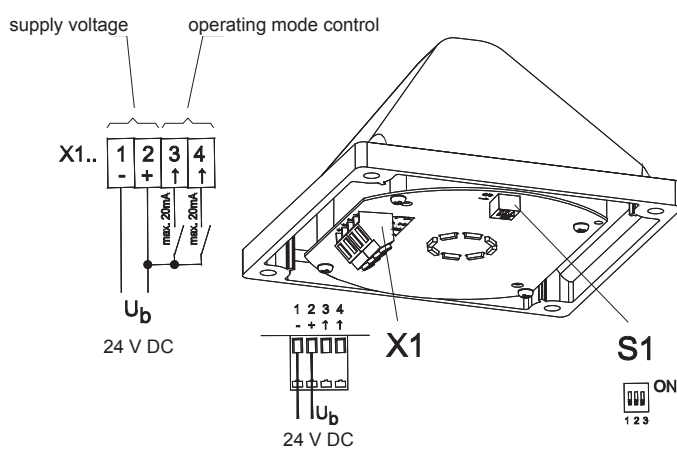
# Connection diagrams

## Quadro F12-3G/3D ATEX



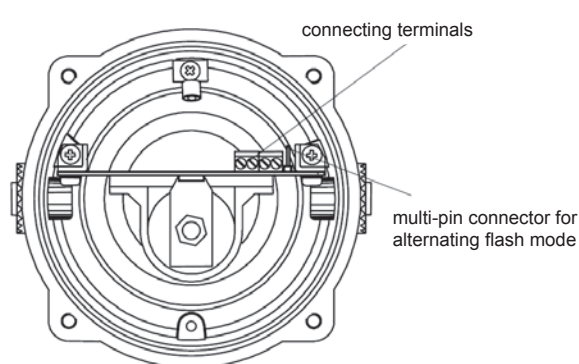
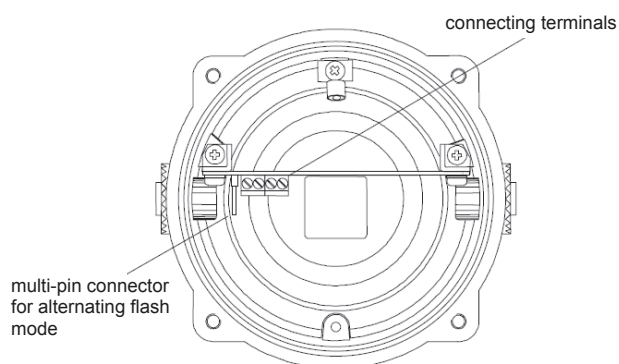
## Quadro-LED Flex-3G/3D

## BExBG 15 / BExBG 10 / BExBG 05 – EEx e



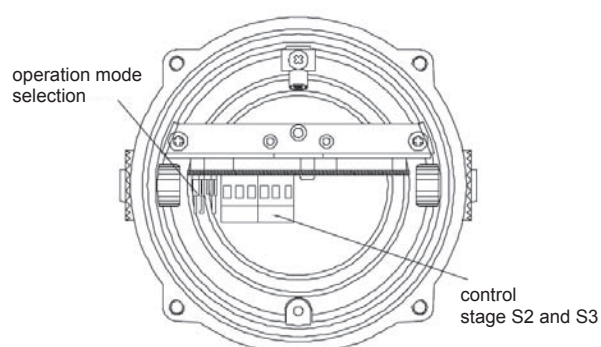
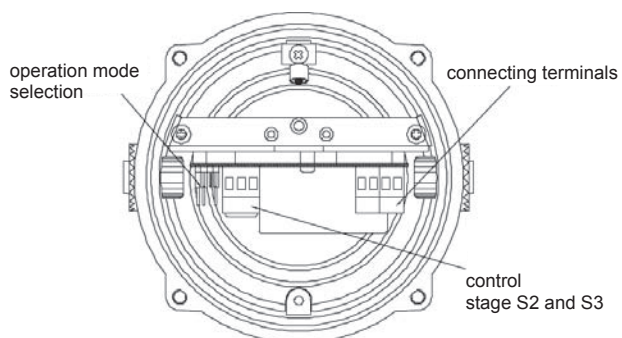
## BExBG 05 – EEx d

## BExBG15 / BExBG 10 – EEx d



## BExBG L1D – AC

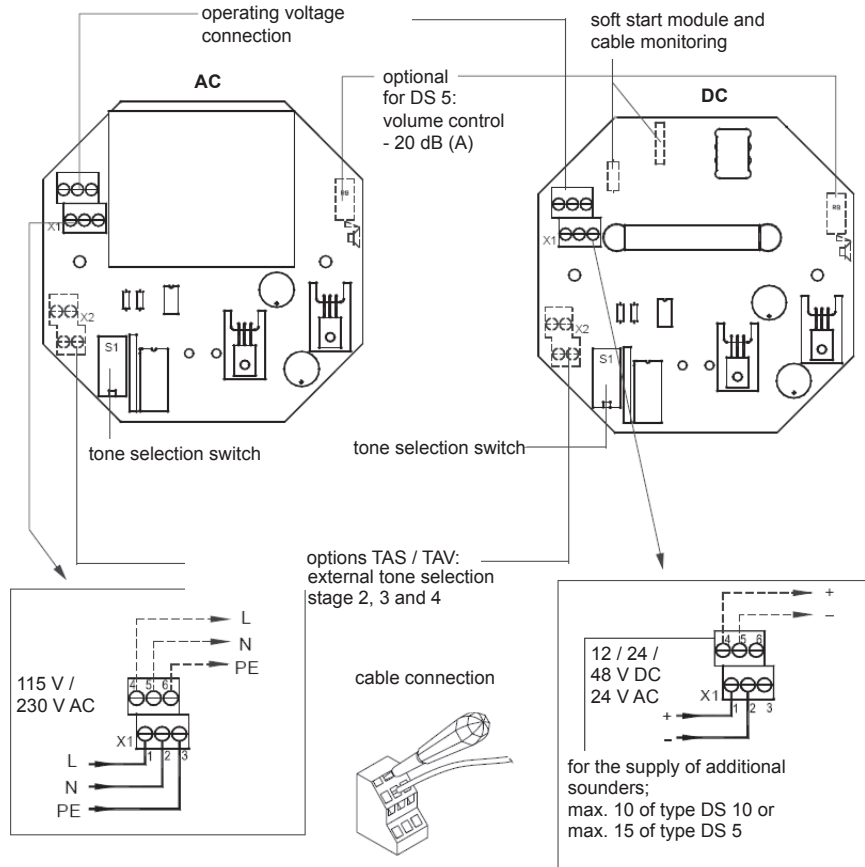
## BExBG L1D – DC



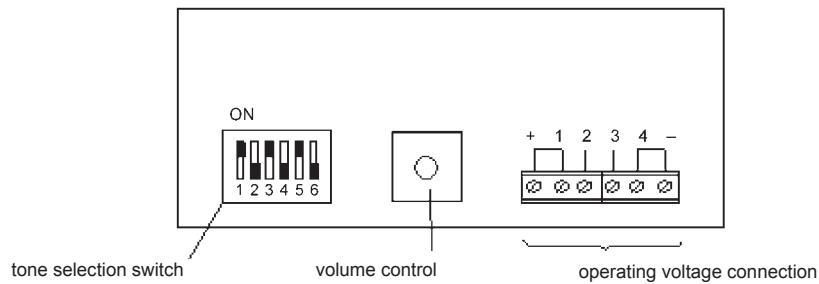


**DS 5 3G/3D / DS 10 3G/3D – AC**

**DS 5 3G/3D / DS 10 3G/3D – DC**

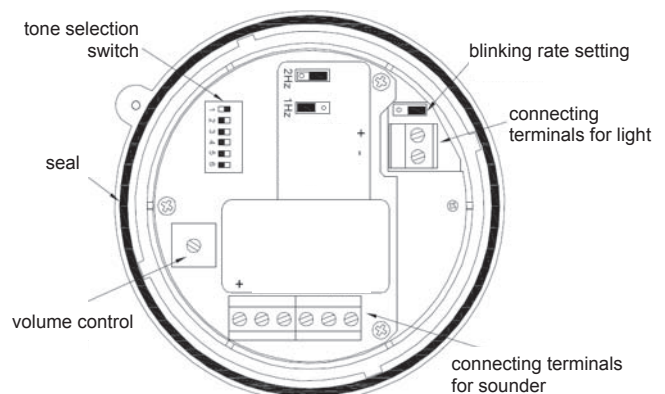
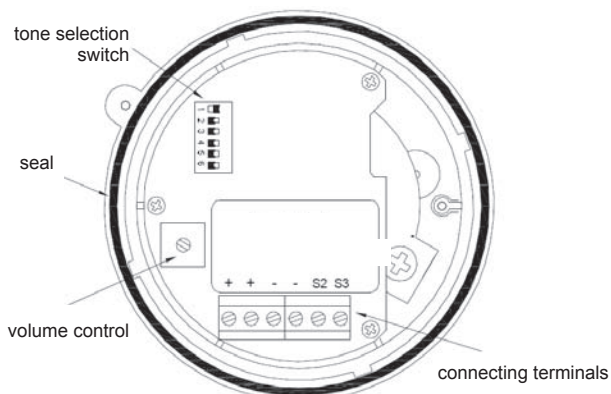


**IS-A105N**

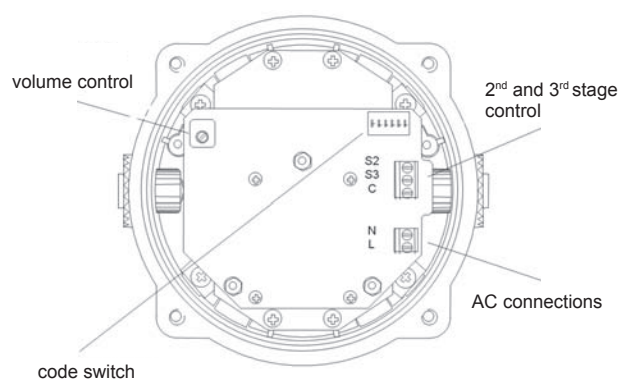


**IS-mA1**

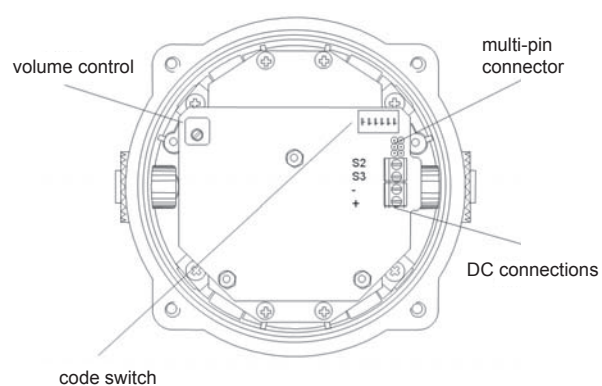
**IS-mC1**



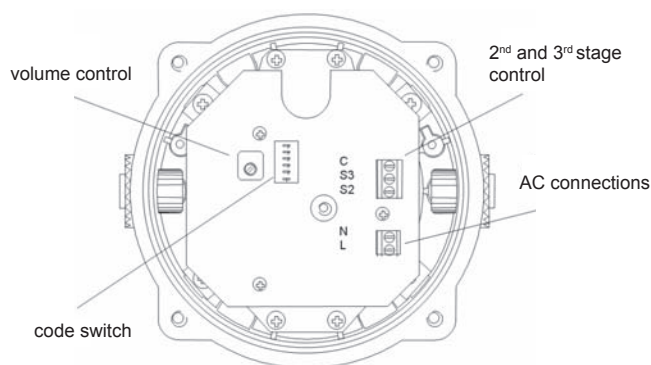
**BExS 110d – AC**



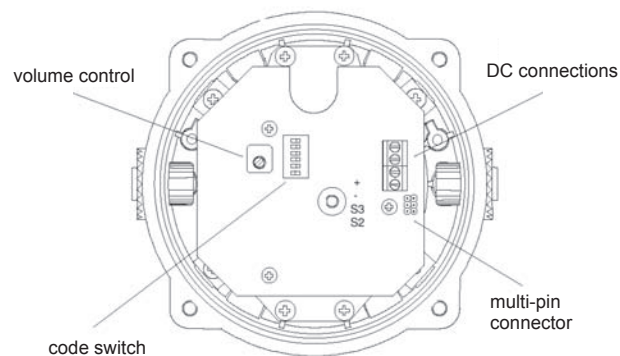
**BExS 110d – DC**



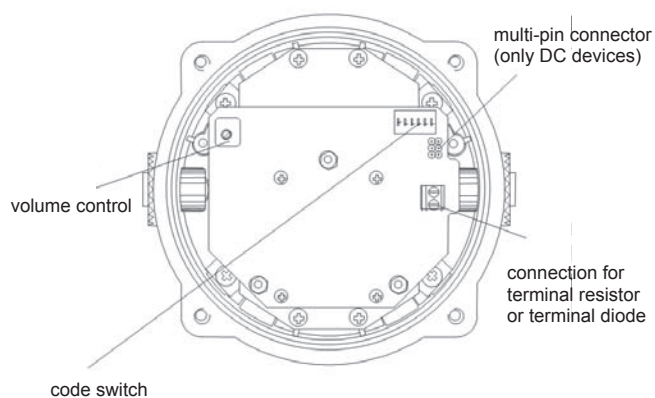
**BExS 120d – AC**



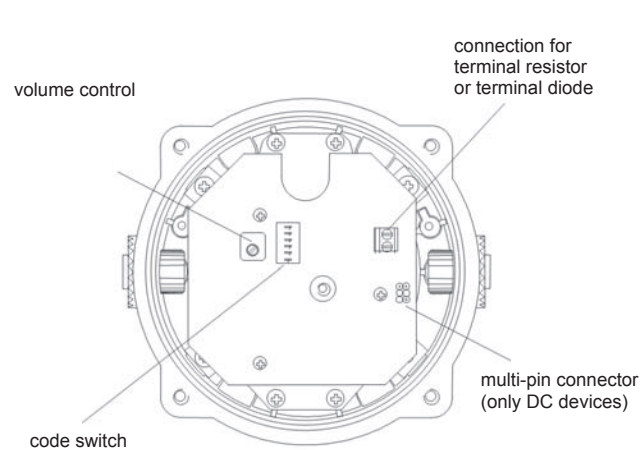
**BExS 120d – DC**



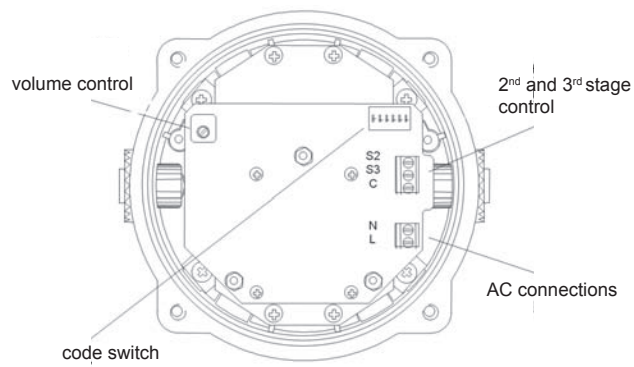
**BExS 110e – DC**



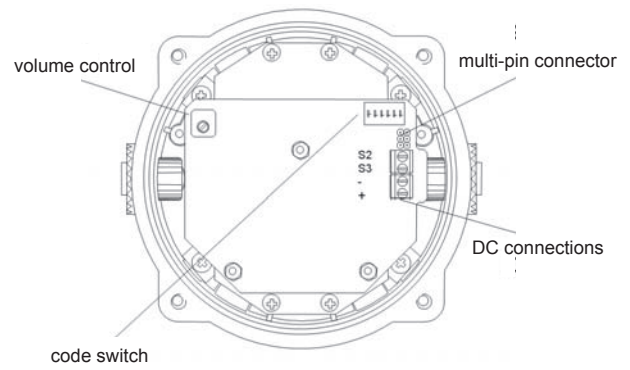
**BExS 120e – DC**



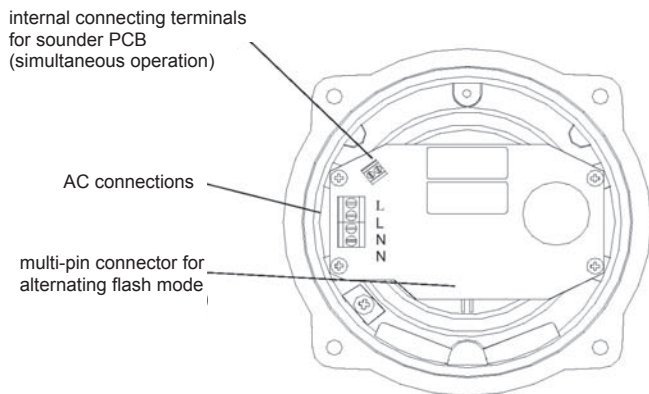
### BExCS 110-05D sounder – AC



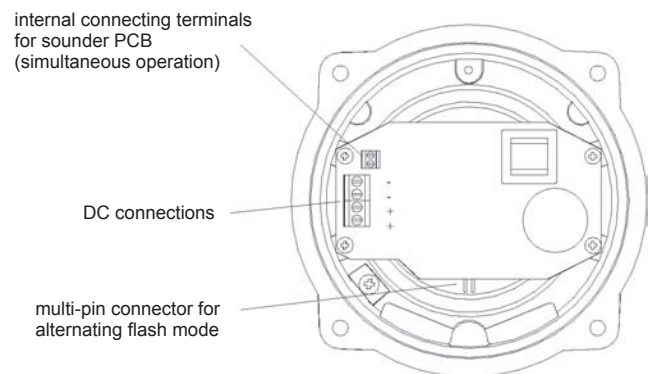
### BExCS 110-05D sounder – DC



### BExCS 110-05D flashing light – AC

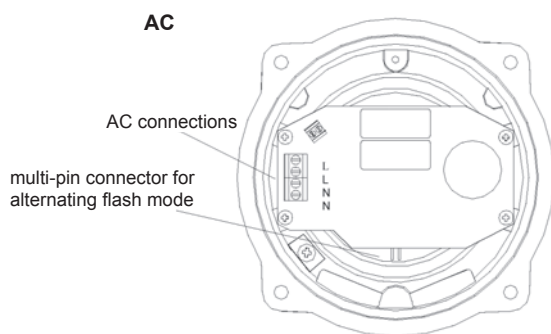


### BExCS 110-05D flashing light – DC

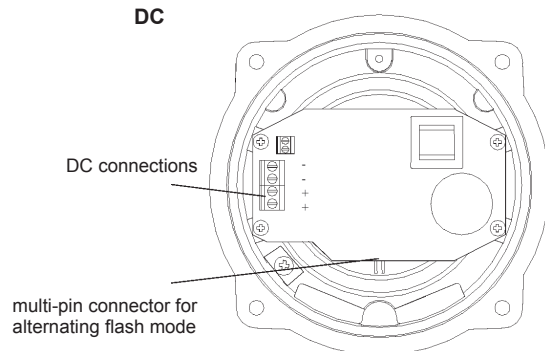


### BExCL 15-05D flashing light

**AC**

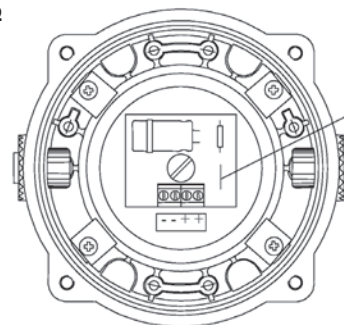


**DC**

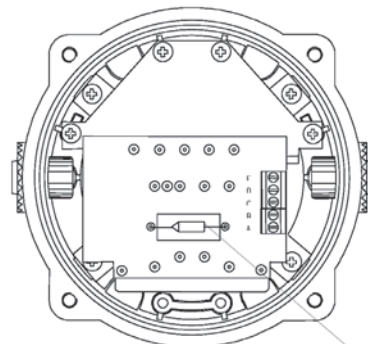


### BExCL 15-05D loudspeaker

**8 Ω / 16 Ω**

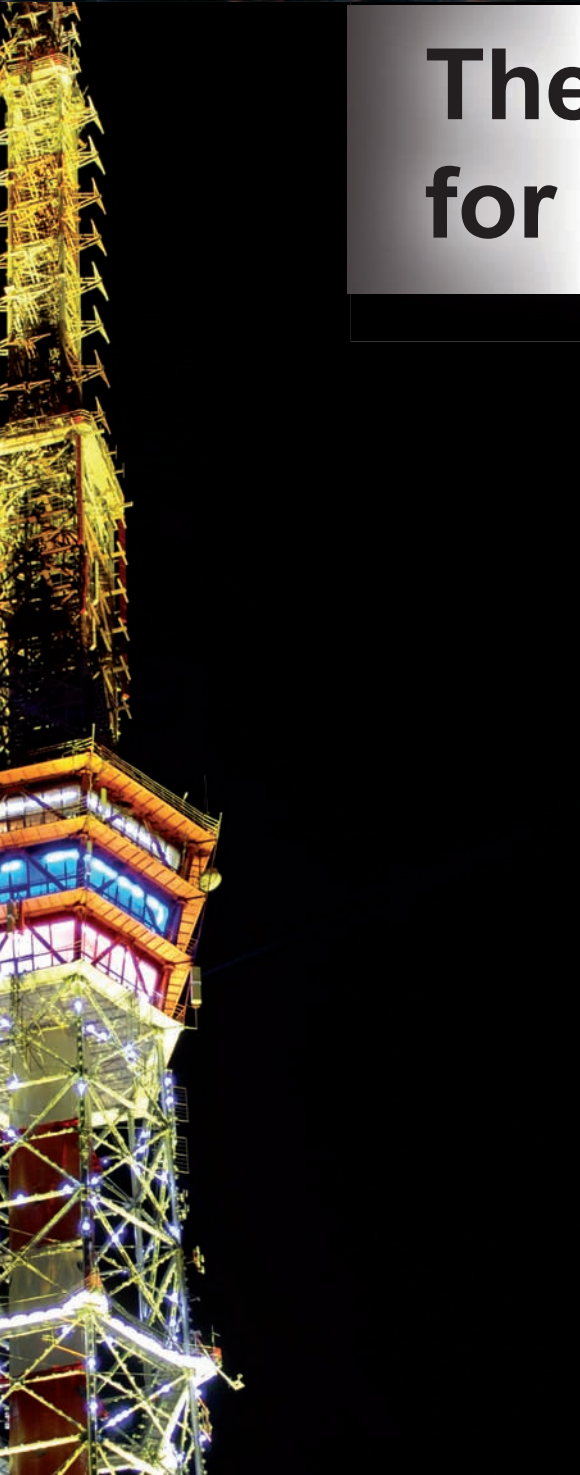


**100 V**









# The fourth dimension for your structure!

## 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.





## 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*

## Do you require further information?

Just call us about any project: your ideas and our experience are sure to lead to great success!

**Global Product Management: +49 40 73412-226 or -223**



## 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.



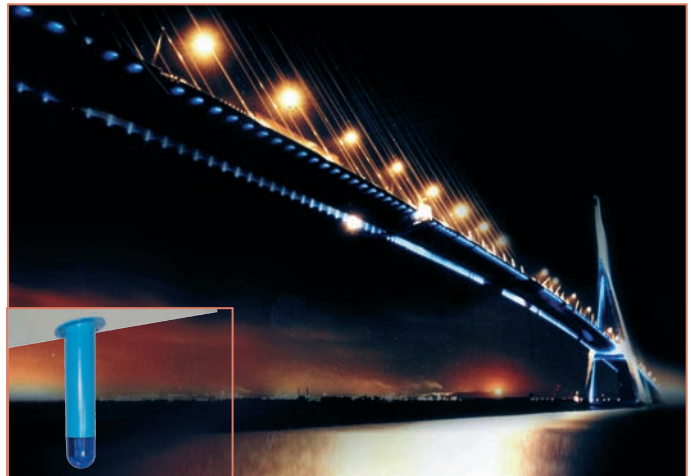
*Hanover, Germany  
Expo 2000*

## 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 Joule

## 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)



Protection system



Protection system



Impact-proof housing



Operating temperature



Operating temperature (Quadro A-DMX)



Quadro A-DMX

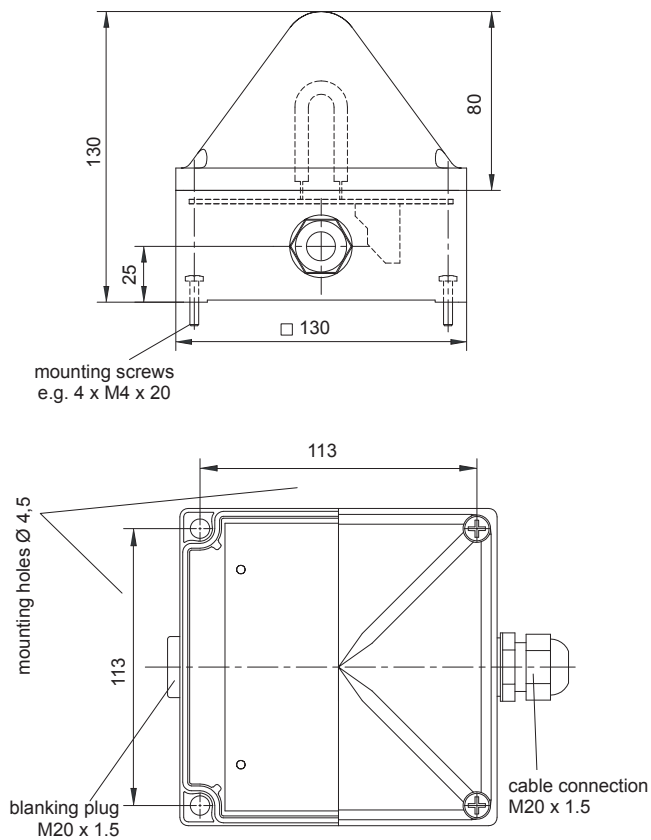
Electrical data	Quadro R	Quadro R-ST	Quadro A-DMX
Rated voltage	230 V AC	230 V AC	230 V AC
Rated frequency	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range	195 V – 253 V	195 V – 253 V	195 V – 253 V
Nominal current consumption	85 mA	85 mA	280 mA @ 1 Hz
Initial current limited to			< 1 A

Mechanical data	Quadro R	Quadro R-ST	Quadro A-DMX
Flash rate	22 – 28 flashes/min.		≤ 2 Hz
Flash energy	10 J		
Light intensity (DIN 5037) <sup>1</sup>	124 cd		
Lens colours	clear, white, yellow, amber, red, green, blue		
Operating temperature	- 40 °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 mm <sup>2</sup>	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		

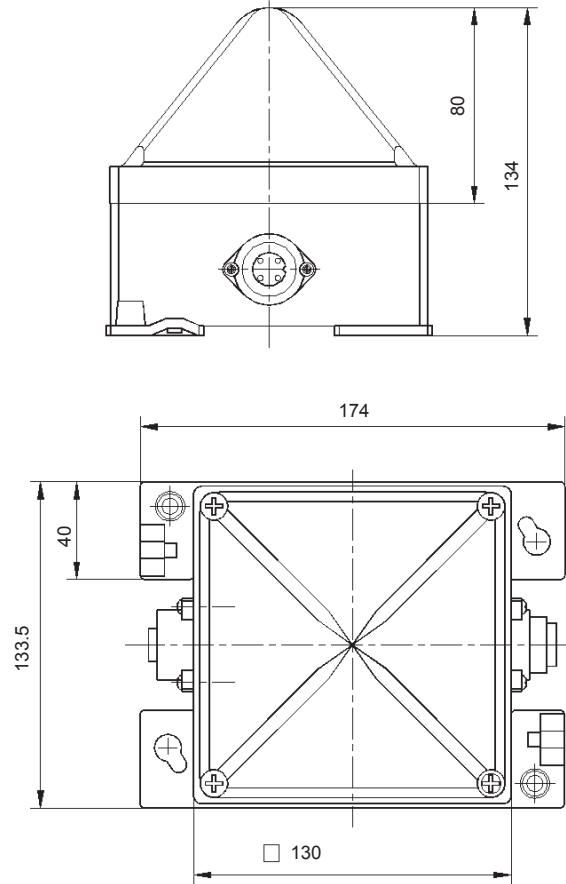
<sup>1</sup> with a clear lens

## Dimensions

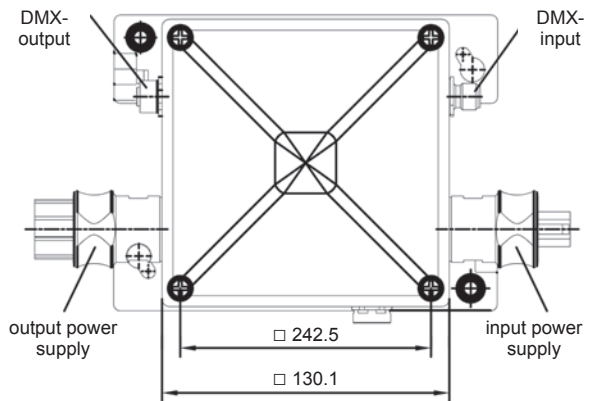
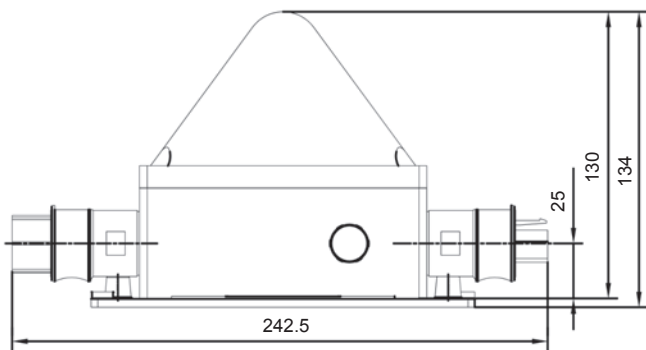
### Quadro R



### Quadro R-ST



### Quadro A-DMX



## Ordering details

Article numbers		Quadro R	Quadro R-ST	Quadro A-DMX
Haubenfarbe	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



## Custom solutions

Customer-specific solutions are another of Pfannenberg's specialties.



### WBQ-SG

Integrated sounder/flushing 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.

## Do you require further information?

Just call us. We look forward to hearing about your requirements!

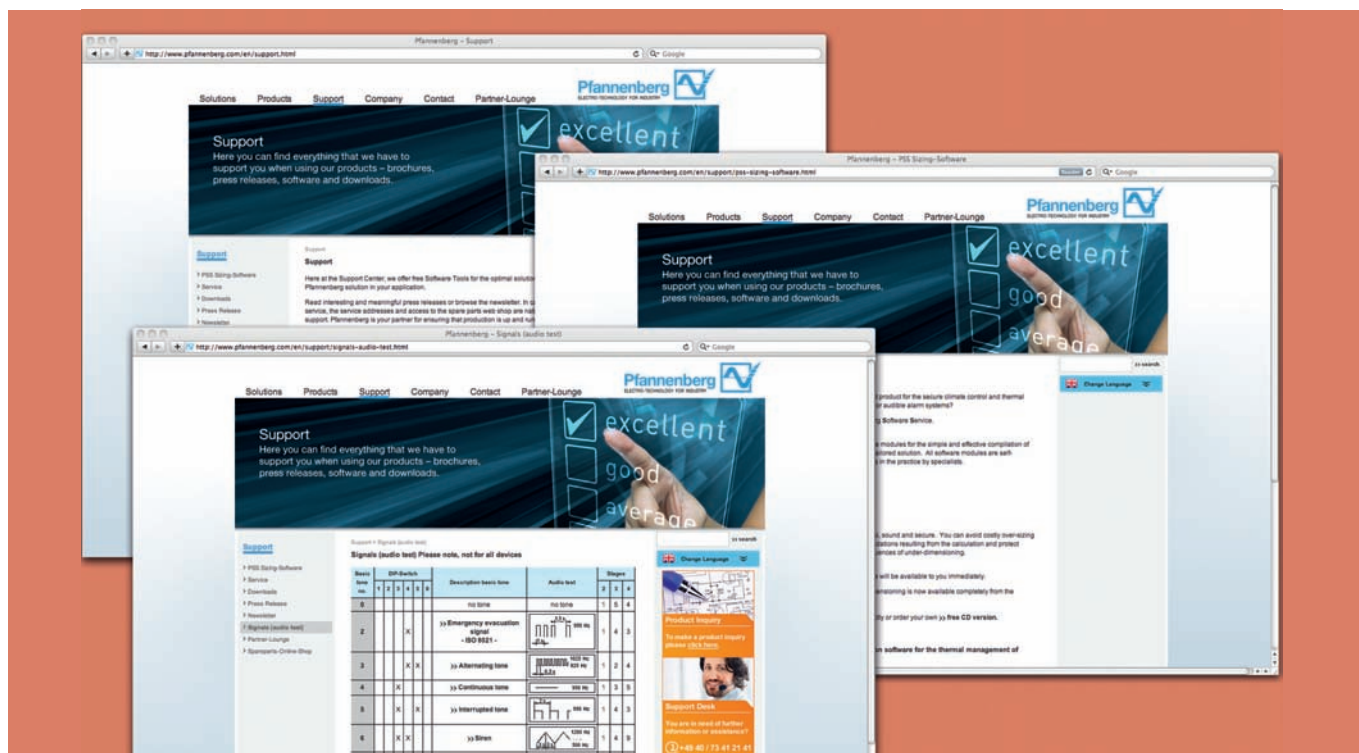
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## Pfannenberg Software Service: PSS Signaling technology

On the Pfannenberg homepage you will find valuable, free software tools that are sure to assist you efficiently in solving your signaling tasks: [www.pfannenberg.com/support](http://www.pfannenberg.com/support)

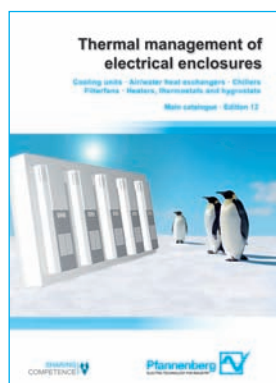
- Sizing of audible signaling devices for required distances (coverage)
- Calculation of audible signaling device coverage
- Calculation of set up requirements (distances) for audible alarms networks
- Audio samples of all standard tones



## Pfannenberg: Signaling technology and thermal management

You can also benefit from Pfannenberg's long-standing competence in the field of control cabinet air conditioning and equipment. You too will be convinced by our economical solutions.

We look forward to your call or just send an email to: [info@pfannenberg.com](mailto:info@pfannenberg.com).  
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# Pfannenberg on the Internet

Make use of our large assortment 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! Click here to conveniently download data sheets or design drawings to your PC and print them out.



**www.pfannenberg.com**

The screenshot displays the Pfannenberg website interface. The top navigation bar includes links for Solutions, Products, Support, Company, Contact, and Partner-Lounge. The main content area features a large banner for 'Reliable obstruction lighting' and a section for 'Safety for man, machine and the environment'. A sidebar on the left lists product categories: Thermal Management, Chillers, Signaling, and Obstacle Lights. The main product page for 'Signal technology' highlights 'Continuous operation, reliability and durability' and lists 'DSF 5 / DSF 10' as available products. A detailed product page for 'DSF 5 / DSF 10' is shown, featuring a red flashing sounder and technical specifications.

**Signal technology**  
Continuous operation, reliability and durability are the best arguments for signal technology from Pfannenberg – and that pertains to all areas of application. >>

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

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

Protection system	Operating temperature	Actual range	Actual range
IP 68 IP 67	+55 °C -25 °C	32 m	95 m

Electrical data	DSF 5		
Rated voltage	230 V AC	115 V AC	24 V DC
Rated frequency	50/60 Hz	50/60 Hz	
Operating range	195 – 253 V	95 – 127 V	19 – 29 V
Rated current consumption	0.19 A	0.40 A	0.88 A

Electrical data	DSF 10		
Rated voltage	230 V AC	115 V AC	24 V DC
Rated frequency	50/60 Hz	50/60 Hz	
Operating range	195 – 253 V	95 – 127 V	19 – 29 V
Rated current consumption	0.22 A	0.48 A	1.12 A

Choose a lens in one of the following colours: clear, yellow, amber, red, green, blue

Further technical information can be found on this page in the product downloads at the right

**Product Downloads**

- Data sheet
- Operating manual
- 3D drawings IOS
- 3D drawings SAT
- 3D drawings STEP
- Declaration of conformity

**Support Desk**

You are in need of further information or assistance?

+49 40 / 73 41 21 41



## Do you require further information?

Do you have any questions about our products and services? Would you like to arrange an appointment with one of our technicians? Do you require further information? Then just call us on **+ 49 40 7 34 12 - 0** or send an email to **info@pfannenberg.com**.

You can also fill out this fax form and send it to the number shown below. Whichever way you choose to contact us, we will respond promptly to your questions, requests and suggestions.



**+ 49 40 7 34 12 - 101**

Company

Contact person

Street/no.

Post code/town

Country

Email

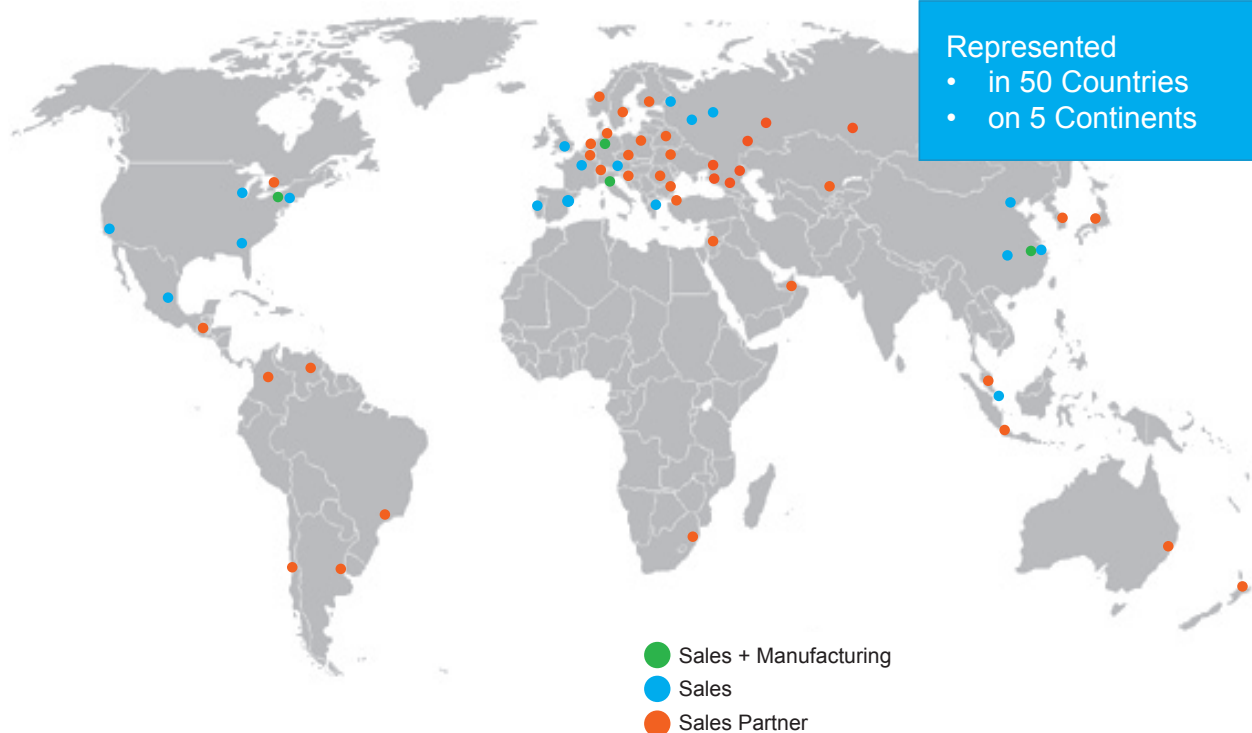
Please call me on

I would like to arrange an appointment with a field service employee.

My suggested date:

My concern is as follows:

# Pfannenberg – worldwide expertise in thermal management and signaling technology



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