



Ex Signal Devices Overview



Ex (LED) Signal Towers

Ex Signal Tower 740



Zone 1, 2, 21, 22
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Ex LED
Signal Tower 741



Zone 1 + 2
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Optical Ex Signal Devices

770 Ex LED
Installation Beacon
(M 20)



Zone 2 + 22
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771 Ex LED
Installation Beacon
(M 22)



Zone 2 + 22
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NEW

782 Ex LED
Permanent Beacon



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783 Ex Rotating
Mirror Beacon



Zone 1, 2, 21, 22
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NEW

782 Ex LED
Rotating Beacon



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784 Ex Revolving
Signal Beacon



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738 Ex Double Flash
Beacon



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720 Ex Flashing
Beacon



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Audible Ex Signal Devices



718 Ex Electronic
Installation Buzzer



Zone 1 + 2
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714 Ex Multi-Tone
Sounder



Zone 0, 1, 2
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750 Ex Signal Horn



Zone 1 + 2
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761 Ex Signal Horn



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Bulbs

LED Bulbs
Bulb Overview

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Regulations and Requirements

Page 243 onwards



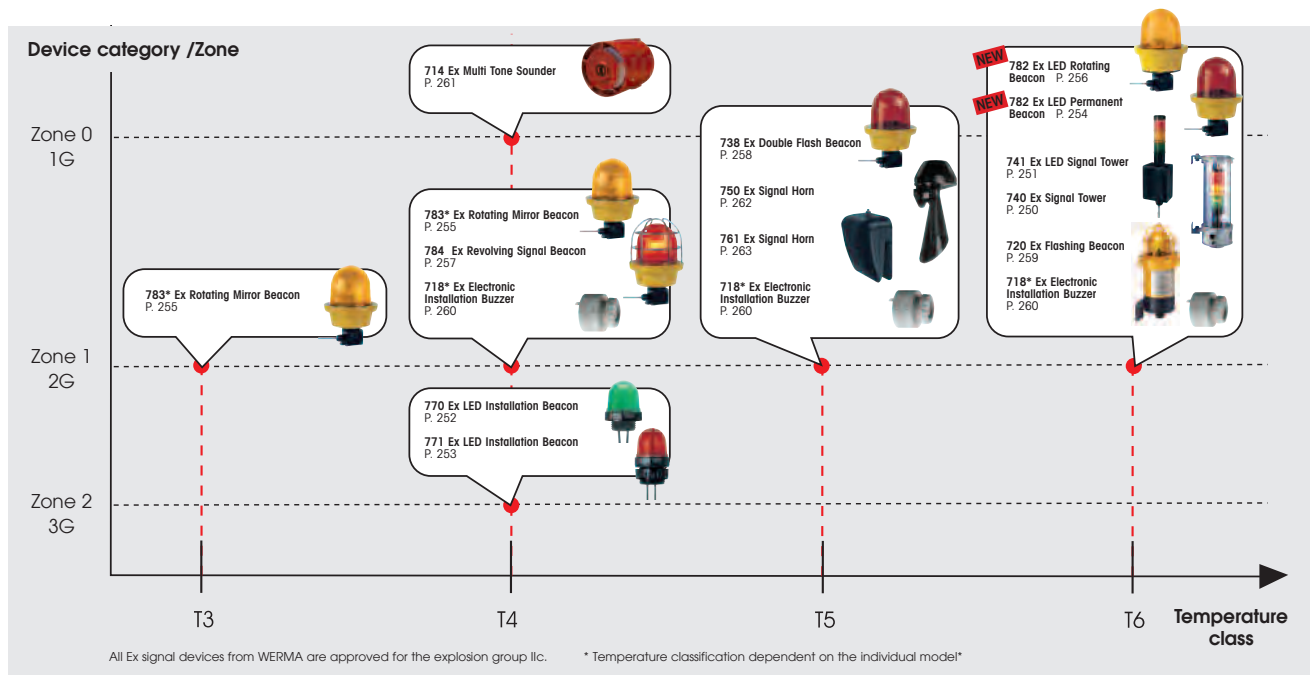
Quick-Finder

Quick-Finder – the fastest way to find the right signal device for your application!

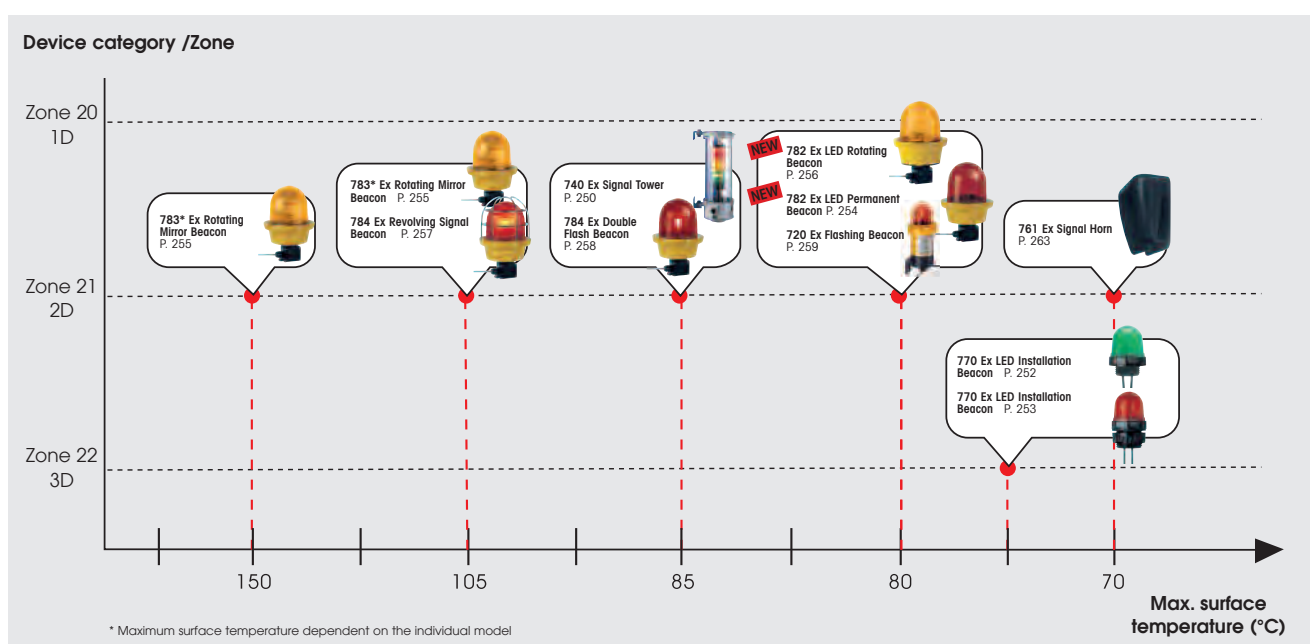
WERMA offers a comprehensive range of explosion protected signal devices. These are suitable for deployment in gas, vapour and dust atmospheres.

With our Quick-Finder you can quickly and easily locate the correct signal device for your application. If you require additional support in selecting a suitable Ex signal device, simply give us a call!

Signal Devices for Gas or Vapour Atmospheres



Signal Devices for Dust Atmospheres



Signal devices in areas with explosive hazard

Avoidance of explosions – explosion protection

Three types of explosion protection can be defined:

EXPLOSION PROTECTION

Primary explosion protection

Primary explosion protection entails preventing the formation of an explosive atmosphere by, for example, adequate ventilation.

Secondary explosion protection

Secondary explosion protection measures come into effect when an explosive atmosphere still arises despite primary explosion protection: they entail the elimination of ignition source.

Tertiary explosion protection methods:

Tertiary explosion protection methods minimise the effects of an explosion by a pressure-resistant construction or the controlled transference of the explosion pressure.

Legal basis

The member states of the European Community have set forth new EU directives in order to harmonise different European rulings. This means that national regulations come into line with the regulations within the European Community. The basis of this new legal system is the European Directive 94/9/EG dated 23.03.04. This directive defines the obligations of the manufacturer in the form of the demands made upon products manufactured encompassing electrical, and non-electrical devices as well as protection systems.

This directive is also known as the ATEX Directive in reference to its original working title "Atmosphère explosible". As it is anchored in Article 95 of the EU Agreement, its usual title is ATEX 95.

All new production devices used in areas with explosion hazard must conform to the ATEX directive as from 01.07.03. All devices and machines installed before this date may still be used. The basic standards for the construction of electrical devices are set forth in the EU Standards of the European Norm Organisation.



Manufacturers' obligations

Safety in areas with explosive hazard can only be guaranteed through close co-operation between all those involved. Co-operation between manufacturer, installer, operator, tester and the relevant controlling body is essential.

The **essential obligations** for the manufacturer of explosion – protected components are:

- The devices must be marked according to their field of use.
- The Conformity Assessment Procedure demands that all requirements for the awarding of the CE mark be fulfilled.
- Devices in category 1 and 2 are to be tested by a third-party testing authority to ensure that all regulations are observed. This is to be confirmed by the Type Examination Certificate.
- The manufacturer must prove that they have an appropriate quality management system.



Signal devices in areas with explosive hazard

Areas liable to explosion: Zone definitions

Areas liable to explosion as defined by §2 of the ElexV are areas in which a dangerous explosive atmosphere could arise due to site and production-induced conditions. In order to judge the degree of protective measures required, the areas liable to explosion are classified by the operator into zones according to the probability of an explosive atmosphere arising.



Definitions of the zones acc. to §2 Para 4 of ELEXV (96)

AREAS LIABLE TO EXPLOSION CAUSED BY FLAMMABLE GASES:

Zone 0:	Zone 1:	Zone 2:
Areas in which a dangerous explosive atmosphere consisting of a mixture of air and gas, vapours or mist is present continually, over a longer period or on a frequent basis.	Areas in which a dangerous explosive atmosphere consisting of gases, vapours or mist is to be expected from time to time.	Areas in which a dangerous explosive atmosphere consisting of gases, vapours or mist is not to be expected and where it does arise then in all probability only rarely and for a short period of time.

AREAS LIABLE TO EXPLOSION CAUSED BY FLAMMABLE DUST:

Zone 20	Zone 21	Zone 22
Sectors in which a dangerous explosive atmosphere consisting of a mixture of dust and air exists and is present continually, over a longer period or on a frequent basis.	Sectors in which a dangerous explosive atmosphere consisting of a mixture of dust and air is to be expected from time to time.	Sectors in which a dangerous explosive atmosphere caused by clouds of dust is not to be expected and where it does actually arise then in all probability only rarely and for a short period of time.

Device groups, categories and EPL protection level

The requirements for electrical components for use in areas liable to explosion are governed in the ATEX Directive (RL 94/9/EC) and in the standards EN 60079 and EN 61241, which are based on the two standards IEC 60079 and IEC 61241. The ATEX directive divides the electrical components into two device groups and 8 device categories. The IEC standards and the EN standards divide the devices into 8 protection levels or EPLs (Equipment Protection Levels). The device category and EPL are equivalent and indicate the zones in which the device may be used.

- **Device Group I:** Electrical components in pit-gas endangered mining areas.
- **Device Group II:** Electrical components in other areas liable to explosion from gas and dust.

DEVICE CLASSIFICATION ACCORDING TO GROUPS, CATEGORIES AND EPL:

Device group	Group I		Group II					
Device category	Category M		Category 1		Category 2		Category 3	
	M1	M2	1G	1D	2G	2D	3G	3D
EPL protection level	Ma	Mb	Ga	Da	Gb	Db	Gc	Dc
Zone	Continuous use	Switch-off in Ex atmosphere	0, 1, 2 (Gas)	20, 21, 22 (Dust)	1, 2 (Gas)	21, 22 (Dust)	2 (Gas)	22 (Dust)

Exception: If electrically conductive dust occurs in zone 22, then devices of Category 1D or 2D must be used.

Signal devices in gaseous and dust atmospheres

The basic requirements for installing explosion-protected electrical components are governed in the ATEX Directive (94/9/EC). Specific construction regulations must be observed to prevent an electrical component from becoming an ignition source. The so-called ignition protection types guarantee safe operation - depending on the Ex zone, even in the event of a malfunction.

Originally, the standards EN 50014 ff governed **gases and dusts**. These formed the basis for the series of standards IEC 60079. The series of standards EN 60079 with the same content replace the standards 50014 ff. The standard EN 60079-0 is the basic standard, as it describes the general requirements. The different ignition protection types are listed in the other series of standards EN 60079.

The only ignition protection type for **dust** was the standard EN 50281 "Protection by enclosure". Additional ignition protection types were added with the introduction of the series of standards IEC 61241 and EN 61241. The old dust standard EN 50281 served as the basis for EN 61241-1 "Protection by enclosure tD". The standard EN 61241-0 is in turn the basic standard here.

As the series of standards IEC 60079 and IEC 61241 have the same structure and many points in both series are identical, IEC 61241 is currently being integrated into IEC 60079. As a result, in future there will then only be one **series of standards for gas and dust**. In accordance with this, there will also then only be one series of standards EN 60079.

The structure remains identical, and as a result the standard EN 60079-0 contains the General Requirements for both gaseous and for dust atmospheres and the ignition protection types are described in the other standards. The individual standards or ignition protection types are then designed either only for gaseous atmospheres, only for dust atmospheres or for both atmospheres.



Signal devices in areas with explosive hazard

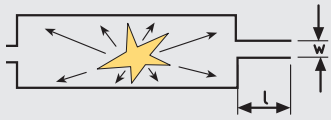
The following ignition protection types are used for WERMA products:

FLAME-PROOF ENCLOSURES “d”

GAS

EN 60079-1

Electrical apparatus for explosive gas atmospheres – Part 1: Flameproof enclosures “d”.



If an explosion occurs inside a pressure resistant encapsulated housing it cannot break through this boundary.

INCREASED SAFETY “e”

GAS

EN 60079-7

Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety “e”.



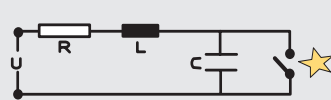
Sparks and high temperatures are made impossible by increased safety measures.

INTRINSIC SAFETY “i”

GAS

EN 60079-11

Electrical apparatus for explosive gas atmospheres – Part 11: Intrinsic safety “i”.



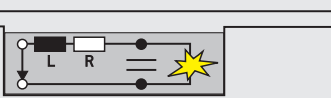
The electric current and voltage in the circuit is kept so low that fiery sparks, arcing or temperatures cannot occur.

INTRINSIC SAFETY “iD”

DUST

IEC 61241-11, EN 61241-11

Electrical apparatus for use in the presence of combustible dust – Part 11: Protection by intrinsic safety “iD”



The energy in the electric circuit is kept so low that sparks, electric arcs and high temperatures that could serve as ignition sources cannot occur.

NON-SPARKING “nA”

GAS

EN 60079-15

Electrical apparatus for explosive gas atmospheres – Part 15: Construction, test and marking of type of protection “n” electrical apparatus.



Sparks, arcing and hot surfaces are reliably prevented.

ENCAPSULATION “m”

GAS & DUST

IEC 60079-18, EN 60079-18 (prev.: EN 50028)

Electrical apparatus for use in explosive atmospheres – Part 18: Encapsulation “m”



Parts that could ignite an explosive atmosphere as a result of sparks are embedded in a potting compound so that the explosive atmosphere cannot be ignited.

PROTECTION BY ENCLOSURE “t”

DUST

EN 60079-31 (prev.: EN 61241-1)

Explosive atmospheres – Part 31: Equipment-Protection by enclosure “t”



The housing is dustproof. The Ex atmosphere is kept away from the ignition source, the surface temperature of the housing is restricted.

The integration of the standard EN 61241-11 intrinsic safety “iD” into the standard EN 60079-11 intrinsic safety “i” is in preparation.

Explosion groups for gases, vapours and dusts

For gases, the flammability and the ignition penetration power of an explosive mix are substance-typical properties. Explosive mixtures of air with flammable gases or vapours are divided into explosion groups I and II.

Explosion group I applies to pit gas and coal dust. It is only relevant in mining.

In **Explosion group II** the flammability of the gas increases from IIA to IIB and IIc. These define different criteria, e.g. with the ignition protection type "d-pressure-resistant encapsulation (EN 60079-1)" the requisite slit types and dimensions or, as in the protection type "i-Intrinsic safety (EN 60079-11)", the maximum permissible electricity and current ratings.

No further sub-division of explosion group II is made for other protection types.

Now the new **Explosion group III** has been added for areas with flammable dust outside of mining. The electrical components are classified in three groups, i.e. IIIA, IIIB and IIIC, depending on the type of dust concerned.

The most demanding requirements for the electrical components are placed by groups IIc and IIIC. They may also be used in the areas IIA and IIB or IIIA and IIIC. In the same way, electrical components of the groups IIB and IIIB may be used in the areas IIA and IIIA.

AREA	EXPLOSION GROUP	FLAMMABLE SUBSTANCES	FLAMMABILITY
Mining	I	Pit gas (Methane), coal dust	
Gas	IIA	Acetone, Petrol, Methanol, Propane, Toluene	relatively low
	IIB	Ethylene, City Gas	high
	IIC	Hydrogen, Acetylene, Carbon Sulphide	very high
Dust	IIIA	Flammable Lint	relatively low
	IIIB	Non-Conductive Dusts	high
	IIIC	Conductive Dusts	very high



Temperature classification of gases and vapours

The ignition temperature of explosive gaseous and vaporous atmospheres is influenced by several different factors. These include size, type and consistency of the heated surface. The **IEC 60079-4** contains a "**Method of determining ignition temperature**" with which it is possible to calculate the lowest practically possible temperature with relative accuracy.

Gases and vapours are classified herein in temperature classes. Explosion-protected components are laid out in their surface temperature so that ignition cannot occur on the surface.

IGNITION TEMPERATURES AND TEMPERATURE CLASSES OF EXPLOSION-ENDANGERED GAS AND VAPOUR ATMOSPHERES

Temperature classes	Ignition temperature of the explosion-labile gas/ vapour atmosphere	Permissible surface temperature of the component
T1	$\geq 450^{\circ}\text{C}$	$\leq 450^{\circ}\text{C}$
T2	$\geq 300 \dots \leq 450^{\circ}\text{C}$	$\leq 300^{\circ}\text{C}$
T3	$\geq 200 \dots \leq 300^{\circ}\text{C}$	$\leq 200^{\circ}\text{C}$
T4	$\geq 135 \dots \leq 200^{\circ}\text{C}$	$\leq 135^{\circ}\text{C}$
T5	$\geq 100 \dots \leq 135^{\circ}\text{C}$	$\leq 100^{\circ}\text{C}$
T6	$\geq 85 \dots \leq 100^{\circ}\text{C}$	$\leq 85^{\circ}\text{C}$

Signal devices in areas with explosive hazard

The explosion group and the temperature class define which gas and vapour atmospheres the explosion protected equipment may be deployed in. The following table indicates the temperature class and explosion group for a series of flammable gases and vapours:

EXPLOSION GROUP AND TEMPERATURE CLASSIFICATION OF GASES AND VAPOURS

Temperature class	T1	T2	T3	T4	T5	T6
Explosion group						
I	Methane	-	-	-	-	-
IIA	Ammonia Methane Ethane Propane	Ethyl alcohol Cyclohexane n-Butane n-Hexane	Petrol Diesel	Ethanal Ethyl aether	-	-
IIB	Town gas	Ethylene	Hydrosulphide Ethylene glycol	-	-	-
IIC	Hydrogen	Acetylene	-	-	-	Coal sulphide

Permissible surface temperature of electrical components in dust atmospheres



EN 50281-2-1 – Electrical apparatus for use in the presence of combustible dust – Part 2: Test methods – Section I: **Methods for determining the minimum ignition temperature of dust.**

Different values are to be expected depending on whether the dust is in the form of a gathered layer (Value A) or as an active cloud (Value B). The permissible surface temperature for component parts exposed to dust is calculated as such: 75K is deducted from value A and 2/3 of value B calculated. The smaller of the two values is the highest **permissible surface temperature**.

EXAMPLES OF IGNITION TEMPERATURES FOR SOME DIFFERENT DUST TYPES

Solid matter	Value A Ignition temp. according to EN 50281-2-1 layer (°C)	Value B Ignition temp. according to EN 50281-2-1 cloud (°C)	Permissible surface temperature (°C) Smallest value of calculation (A-75K) and 2/3*B									
			450..	300..	280..	260..	230..	215..	200..	180..	165..	160..
			<300	<280	<260	<230	<215	<200	<180	<165	<160	<135
Examples of natural products												
Cotton	350	560			275							
Lignite	225	380										150
Grain	290	420						215				
Milk powder	340	440			265							
Examples of chemical-technical products												
Soot	385	620	310									
Polyvinylchloride	380	530	305									
Sulphur	280	280							185			
Examples of metal dust												
Iron	300	310						206				
Magnesium	410	610	335									

Minimum product marking of explosion-protected components

The Directive 94/9/EG (ATEX 95) section II defines an unequivocal marking for components in explosion-protected areas. Furthermore, additional identification was required in the series of standards EN 60079 and EN 61241. This must include the following points:

- Name and address of the manufacturer
- Series number where applicable
- Description of series and type
- Details referring to the explosion protection type (examples):

GAS	CE	0102	Ex	II	2 G	Ex	me			II	T5
DUST	CE	0102	Ex	II	2 D	Ex	td	A 21	IP65		T175°C
	1	2	3	4	5	6	7	8	9	10	11

1	CE conformity marking
2	The number of the named authority monitoring production
3	Ex Hexagon, special identification for the prevention of explosions
4	Device group (I or II)
5	Device category (see page 244)
6	Symbols to show that one or more norms from norm series EN 60079 or IEC/EN 61241) have been used. Previously, EEx was employed to indicate that it was a European standard.
7	Abbreviation of the protection type. All these used in the component must be named e.g. "me": Main ignition protection type "m", secondary type "e". There were previously no protection types for dust atmospheres but rather just "protection via housing". This is today to be found under protection type "tD".
8	The of protection type "tD" is determined by means of the IP test conducted according to the "A" procedure. Procedure "B" is equivalent. The device is designed for zone 21.
9	With dust protected devices the IP degree of protection is also indicated.
10	Explosion group (II, IIA, IIB or IIC)
11	Temperature classes with gases (see page 247). Maximum surface temperature for dusts.

Components for Zones 2 and 22 may not bear the ATEX mark in their device classification or display the number of a monitoring authority.



The **details of the authority responsible for the testing** of the component for the relevant norms must also be stated, for example:

BVS	03	ATEX	E 118	X
3RD PARTY TESTING AUTHORITY	YEAR OF TESTING	ACC. TO DIRECTIVE 94/4/EG	CONSECUTIVE NO. OF CERTIFICATE	SPECIAL CONDITIONS

An **example** of product marking on an explosion-protected electrical component :



"Zone I : Only to be wiped with a damp cloth". The minimal marking is augmented by recommendations vital for safe use. The certificate of conformity is to be provided with every device as well as the compulsory marking. The manufacturer hereby confirms conformity with the relevant norms and clearly states upon which EU standards the CE mark is based. An instruction and mounting leaflet is to be provided with every device. These documents should be filed safely by the user for future reference.



- Zone 1 and 2, Zone 21 and 22
- Signal tower KombiSIGN in flame-proof enclosure
- Available with up to 3 light elements
- Also available as LED version

**TECHNICAL SPECIFICATIONS:**

Life duration
up to 100,000 hrs

Dimensions (L x H x W):	154 mm x 431 mm x 201 mm
Housing:	Aluminium, glass
Connection:	Screw terminal max. 2.5 mm ² Contact protection according to VDE incl. approved pressure resistant cable gland NPT 3/4"
Explosion protection:	Ex II 2G EEx d II C T6 Ex II 2D Ex IP66 85°C
Approval:	L.C.I.E. 97 EX 6012 Technical specifications of signal tower see 840 series (page 38).

**ORDER SPECIFICATIONS:**

Voltage	12-230 V Bulb	24 V ≈ LED
red / green	740 210 00	740 210 55
red / yellow / green	740 231 00	740 231 55

**ACCESSORIES:**

Bulb BA15d, 5 W, 24 V	955 840 35
Bulb BA15d, 5 W, 230 V	955 840 38

**TECHNICAL DIAGRAMS:**

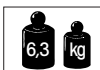
see page 280



The Ex Signal Tower 740 in the perfume and aroma industry



2 G Zone 1 + 2	2 D Zone 21 + 22
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24 V

PLC



- Zone 1 and 2
- Competitively priced
Ex LED Signal Tower
- No additional zener barrier
required

- Combination of encapsulation "m"
and intrinsic safety "ib" with
connection area "e"

**TECHNICAL SPECIFICATIONS:**

Life duration
up to 100,000 hrs

Dimensions of the Zener Barrier (L x H x W):	76 mm x 110 mm x 75 mm
Dimensions total:	2 tier (L x B x H): 76 mm x 229 mm x 75 mm
	3 tier (L x B x H): 76 mm x 263 mm x 75 mm
Housing:	Polyester, PC
Connection:	Screw terminal max. 2.5 mm ² incl. approved cable gland "e"
Explosion protection:	Ex II 2G EEx me [ib] IIC T6
Approval:	PTB 06 ATEX 2005

**ORDER SPECIFICATIONS:**

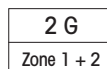
Voltage	24 V =
Current consumption	< 90 mA
red / green	741 110 55
red / yellow	741 120 55
red / yellow / green	741 130 55

**TECHNICAL DIAGRAMS:**

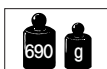
see page 280



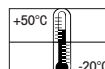
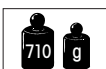
The Ex LED Signal Tower 741
warns of imminent danger in gas
explosion endangered areas, e.g. in
the chemical industry and paint shops



2 tier



3 tier



770

Ex LED Installation Beacon



Mainly sideways illumination

- Ex LED Permanent Beacon with M 20 thread
- Suitable for use in gas and dust explosion endangered areas (Zone 2 and 22)
- Extremely high light intensity
- Ideal for installation in limited space due to short thread

i TECHNICAL SPECIFICATIONS:

Dimensions (Ø x Height):	29 mm x 32 mm (Protrusion from panel)
Housing:	PC, black
Lens:	PC, transparent
Connection:	2 wires, c. 115 mm long
Fixing:	Installation mounting for Ø 20.5 mm (M 20 x 1.5 mm)
Explosion protection:	Ⓔ II 3G Ex nA II (fulfills T4, when temperature at place of operation lies between -20 and +50 °C) Ⓔ II 3D IP65 (fulfills T 75 °C, when temperature at place of operation lies between -20 and +50 °C)
Approval:	BVS 05 E 041 U

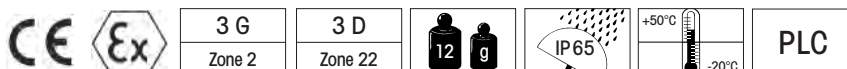
Seal included in assembly.

🛒 ORDER SPECIFICATIONS:

Voltage	24 V =
Current consumption	< 45 mA
red	770 100 55
green	770 200 55
yellow	770 300 55
clear	770 400 55

📐 TECHNICAL DIAGRAMS:

see page 281





Mainly sideways illumination

- Ex LED Permanent Beacon with M 22 thread for the control panel programme
- Extremely high light intensity
- Suitable for use in gas and dust explosion endangered areas (Zone 2 and 22)

**TECHNICAL SPECIFICATIONS:**

Dimensions (Ø x Height):	29 mm x 32 mm (Protrusion from panel)
Housing:	PC, black
Lens:	PC, transparent
Connection:	2 wires, c. 105 mm long
Fixing:	Installation mounting for Ø 22.5 mm (M 22 x 1.5 mm)
Explosion protection:	Ex II 3G Ex nA II (fulfills T4, when temperature at place of operation lies between -20 and +50 °C) Ex II 3D IP65 (fulfills T 75 °C, when temperature at place of operation lies between -20 and +50 °C)
Approval:	BVS 05 E 041 U

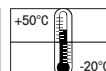
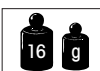
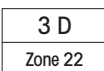
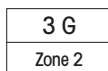
Seal included in assembly.

**ORDER SPECIFICATIONS:**

Voltage	24 V ~
Current consumption	< 45 mA
red	771 100 55
green	771 200 55
yellow	771 300 55
clear	771 400 55

**TECHNICAL DIAGRAMS:**

see page 281





Wire guard (accessory)



Clamp for tube mounting (accessory)



Mounting plate (accessory)



Bracket (accessory)

- Suitable for use in gas and dust explosion endangered areas (Zone 1 and 2, Zone 21 and 22)
- Connection area "e" for simple connection
- Extremely high light intensity
- Can be mounted as required
- Salt water resistant

**TECHNICAL SPECIFICATIONS:**

Life duration up to 50,000 hrs

Dimensions (Ø x Height):	209 mm x 315 mm
Housing:	Aluminium
Lens:	Reinforced borosilicate glass
Mounting Plate:	VA stainless steel
Connection:	Screw terminal max. 2.5 mm ²
Cable entry:	Cable gland M 20 x 1.5 mm Cable diameter 5-13 mm
Connection area:	Increased Safety "e"
Installation position:	As required
Fixing:	Base mounting, bracket mounting (accessory), tube mounting (accessory)
Duty cycle:	100 %
Explosion protection:	Ex II 2G Ex de IIC T6 Ex II 2D Ex tD A21 IP 66 T 80 °C
Approval:	PTB 06 ATEX 1039

**ORDER SPECIFICATIONS:**

Voltage	24 V =	230 V ~
Current consumption	200 mA	50 mA
red	782 100 55	782 100 68
yellow	782 300 55	782 300 68

**ACCESSORIES:**

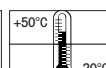
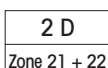
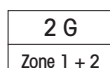
Wire guard	975 783 01
Mounting plate	975 783 02
Clamp for tube mounting 1 1/4"	975 783 03
Clamp for tube mounting 1 1/2"	975 783 04
Clamp for tube mounting 2"	975 783 05
Bracket	975 783 06

**TECHNICAL DIAGRAMS:**

see page 281



Excellent light intensity and long life duration





Wire guard (accessory)



Clamp for tube mounting (accessory)



Mounting plate (accessory)



Bracket (accessory)

- Suitable for use in gas and dust explosion endangered areas (Zone 1 and 2, Zone 21 and 22)
- Flame-proof enclosure "d" with "e" connection area
- High life duration thanks to low wear wheel and disc drive
- Can be mounted as required
- Salt water resistant

**TECHNICAL SPECIFICATIONS:**

Dimensions (Ø x Height):	209 mm x 315 mm
Housing:	Aluminium
Lens:	Reinforced borosilicate glass
Mounting Plate:	VA stainless steel
Connection:	Screw terminal max. 2.5 mm ²
Cable gland:	Cable gland M 20 x 1.5 mm Cable diameter 5-13 mm
Connection area:	Increased Safety "e"
Drive:	Wheel and disc drive, motor in centre of gravity
Installation position:	As required
Mirror rotation rate:	180 r.p.m.
Service life of drive:	> 5,000 hrs
Duty cycle:	100 %
Fixing:	Base mounting, bracket mounting (accessory), tube mounting (accessory)
Explosion protection:	Ex II 2G Ex de IIC T3-T4 (depending on version) Ex II 2D Ex tD A21 IP 66 T 105 °C – T 150 °C (depending on version)
Approval:	PTB 06 ATEX 1039
Halogen bulb included in assembly. Bulb overview see pages P. 168 + 169.	

**ORDER SPECIFICATIONS:**

Voltage	24 V ≈	24 V ≈	115 V ≈	230 V ~	230 V ~
Halogen bulb	20 W/24 V	35 W/24 V	35 W/12 V	20 W/12 V	35 W/12 V
Current consumption	900 mA	1,6 A	350 mA	110 mA	170 mA
Temperature Class (gas)	T4	T3	T3	T4	T3
Surface Temperature (dust)	105°C	150°C	150°C	105°C	150°C
red	783 110 75	783 100 75	783 100 77	783 110 68	783 100 68
yellow	783 310 75	783 300 75	783 300 77	783 310 68	783 300 68

**ACCESSORIES:**

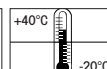
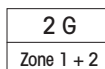
Wire guard	975 783 01
Mounting plate	975 783 02
Clamp for tube mounting 1 1/4"	975 783 03
Clamp for tube mounting 1 1/2"	975 783 04
Clamp for tube mounting 2"	975 783 05
Bracket	975 783 06

SPARE PARTS:

Halogen bulb 20 W/24 V for 24 V ≈	955 885 25
Halogen bulb 20 W/12 V for 230 V ~	955 885 24
Halogen bulb 35 W/24 V for 24 V ≈	955 883 35
Halogen bulb 35 W/12 V for 115 V ~ , 230 V ~	955 883 34

**TECHNICAL DIAGRAMS:**

see page 282





Ex LED Rotating Beacon
with wire guard (accessory)



- Suitable for use in gas and dust explosion endangered areas (Zone 1 and 2, Zone 21 and 22)
- Wear-free due to the absence of any moving mechanical components
- Intense rotating signal effect with low power consumption
- Connection area "e" for simple connection
- Can be mounted as required
- Salt water resistant

Life duration
up to 50,000 hrs

i TECHNICAL SPECIFICATIONS:

Dimensions (Ø x Height):	209 mm x 315 mm
Housing:	Aluminium
Lens:	Reinforced borosilicate glass
Mounting Plate:	VA stainless steel
Connection:	Screw terminal max. 2.5 mm ²
Cable entry:	Cable gland M 20 x 1.5 mm Cable diameter 5-13 mm
Connection area:	Increased Safety "e"
Installation position:	As required
Fixing:	Base mounting, bracket mounting (accessory), tube mounting (accessory)
Rotation rate:	c. 180 r.p.m.
Duty cycle:	100 %
Explosion protection:	Ex II 2G Ex de IIC T6 Ex II 2D Ex tD A21 IP 66 T 80 °C
Approval:	PTB 06 ATEX 1039

🛒 ORDER SPECIFICATIONS:

Voltage	24 V =	115-230 V ~
Current consumption	150 mA	70-180 mA
red	782 120 55	782 120 68
yellow	782 320 55	782 320 68

🏠 ACCESSORIES:

Wire guard	975 783 01
Mounting plate	975 783 02
Clamp for tube mounting 1 1/4"	975 783 03
Clamp for tube mounting 1 1/2"	975 783 04
Clamp for tube mounting 2"	975 783 05
Bracket	975 783 06

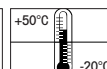
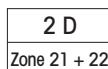
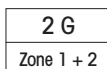
(Accessories see page 257)

📐 TECHNICAL DIAGRAMS:

see page 281



Generates a distinctive rotating
signal by triggering high output
LEDs in sequence





Wire guard (accessory)



Clamp for tube mounting (accessory)



Mounting plate (accessory)



Bracket (accessory)

- Suitable for use in gas and dust explosion endangered areas (Zone 1 and 2, Zone 21 and 22)
- 3 Fresnel lenses effect light convergence and optimise visibility
- Can be mounted as required
- Low rotation rate and long life duration thanks to low wear wheel and disc drive
- Flame-proof enclosure "d" with "e" connection area
- Salt water resistant

i TECHNICAL SPECIFICATIONS:

Dimensions (Ø x Height):	209 mm x 315 mm
Housing:	Aluminium
Lens:	Reinforced borosilicate glass
Mounting Plate:	VA stainless steel
Connection:	Screw terminal max. 2.5 mm ²
Cable gland:	Cable gland M 20 x 1.5 mm Cable diameter 5-13 mm
Connection area:	Increased Safety "e"
Drive:	Wheel and disc drive, motor in centre of gravity
Installation position:	As required
Halogen bulb:	GY 6.35 35 W 12 V / 24 V
Lens rotation rate:	60 r.p.m.
Service life of drive:	> 5,000 hrs
Duty cycle:	100 %
Fixing:	Base mounting, bracket mounting (accessory), tube mounting (accessory)
Explosion protection:	Ex II 2G Ex de IIC T4 Ex II 2D Ex tD A21 IP 66 T 105 °C
Approval :	PTB 06 ATEX 1039

Halogen bulb included in assembly. Bulb overview see pages 168 + 169.



ORDER SPECIFICATIONS:

Voltage	24 V ≈	115 V ≈	230 V ≈
Current consumption	1,6 A	350 mA	170 mA
red	784 100 75	784 100 77	784 100 68
yellow	784 300 75	784 300 77	784 300 68



ACCESSORIES:

Wire guard	975 783 01
Mounting plate	975 783 02
Clamp for tube mounting 1 1/4"	975 783 03
Clamp for tube mounting 1 1/2"	975 783 04
Clamp for tube mounting 2"	975 783 05
Bracket	975 783 06

SPARE PARTS:

Halogen bulb 35 W/24 V for 24 V ≈	955 883 35
Halogen bulb 35 W/12 V for 115 V ~, 230 V ~	955 883 34

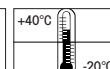


TECHNICAL DIAGRAMS:

see page 282



2 G	2 D
Zone 1 + 2	Zone 21 + 22





Wire guard (accessory)



Clamp for tube mounting (accessory)



Mounting plate (accessory)



Bracket (accessory)

- Suitable for use in gas and dust explosion endangered areas (Zone 1 and 2, Zone 21 and 22)
- Flame-proof enclosure "d" with "e" connection area
- High flash power from two consecutive flashes
- Can be mounted as required
- Salt water resistant

TECHNICAL SPECIFICATIONS:

Dimensions (Ø x Height):	209 mm x 315 mm
Housing:	Aluminium
Lens:	Reinforced borosilicate glass
Mounting Plate:	VA stainless steel
Connection:	Screw terminal max. 2.5 mm ²
Cable gland:	Cable gland M 20 x 1.5 mm Cable diameter 5-13 mm
Connection area:	Increased Safety "e"
Installation position:	As required
Flash energy:	15 Ws
Flash frequency:	1 Hz
Life duration:	4 x 10 ⁶ flashes
Fixing:	Base mounting, bracket mounting (accessory), tube mounting (accessory)
Explosion protection:	Ex II 2G Ex de IIC T5 Ex II 2D Ex tD A21 IP 66 T 85 °C – T 90 °C (depending on the voltage)
Approval:	PTB 06 ATEX 1039

ORDER SPECIFICATIONS:

Voltage	24 V =	115 V ~	230 V ~
Current consumption	700 mA	300 mA	200 mA
Surface Temp. (dust)	85 °C	90 °C	85 °C
red	738 100 55	738 100 67	738 100 68
yellow	738 300 55	738 300 67	738 300 68

ACCESSORIES:

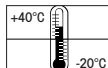
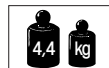
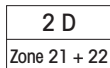
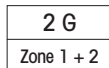
Wire guard	975 783 01
Mounting plate	975 783 02
Clamp for tube mounting 1 1/4"	975 783 03
Clamp for tube mounting 1 1/2"	975 783 04
Clamp for tube mounting 2"	975 783 05
Bracket	975 783 06

TECHNICAL DIAGRAMS:

see page 282



The Ex Double Flash Beacon 782 provides signalling in a range of different explosion protected areas





- Zone 1 and 2
- NEW** • Zone 21 and 22

- Compact flashing beacon
- Improved temperature range

i TECHNICAL SPECIFICATIONS:

Dimensions (L x H x W):	110 mm x 285 mm x 129 mm
Housing:	Aluminium
Lens:	Reinforced borosilicate glass
Wire guard:	Rust-proof steel, powder-coated
Connection:	Screwable 1.5 mm ² fine-strand, 2.5 mm ² single-wire
Cable entry:	Cable gland M 20 x 1.5 mm Cable diameter 6-9 mm
Life duration:	5 x 10 ⁶ flashes
Explosion protection:	Ⓔ II 2G Ex de IIC T*) *) T6 -40 °C ≤ Ta ≤ +40 °C *) T5 -40 °C ≤ Ta ≤ +55 °C Ⓔ II 2D Ex tD A21 IP 66 / IP 67 T80 °C
Approval:	PTB 01 ATEX 1057
Fixing:	Bracket mounting
Flash energy:	c. 15 Ws
Flash frequency:	1 Hz

🛒 ORDER SPECIFICATIONS:

Voltage	24 V =	230 V ~
Current consumption	1 A	200 mA
red	720 101 55	720 101 68
yellow	720 301 55	720 301 68

📐 TECHNICAL DIAGRAMS:

see page 280



- Zone 1 and 2
- Intrinsically safe Ex installation buzzer
- For use with a Zener Barrier
- IP 43 with cap
- Low current consumption
- Continuous tone



Cap (accessory)



Zener Barrier (accessory)

**TECHNICAL SPECIFICATIONS:**

Dimensions (Ø x Height):	43 mm x 13 mm (Protrusion from panel)		
Housing:	ABS		
Connection:	Spades 6.3 x 0.8 mm		
Audio frequency:	c. 2,400 Hz		
Duty cycle:	100 %		
Explosion protection:	Ex II 2G Ex ib IIC T4 / T5 / T6		
Approval:	DMT 98 ATEX E 005 X		
Maximum values of the Zener barrier:	Ui: 40 V $\bar{=}$, li: 660 mA		
Minimum values of the Zener barrier:	for 24 V $\bar{=}$ 15 V $\bar{=}$ / 20 mA		
Maximum Input Power Pi:	Temp.-	Max. surrounding temperature	
	classes	+ 40°C	+ 50°C
			+ 60°C
	T4	Pi = 1.3 W	Pi = 1.2 W
	T5	Pi = 0.82 W	Pi = 0.66 W
	T6	Pi = 0.6 W	Pi = 0.45 W
		Pi = 1.0 W	Pi = 0.52 W
		Pi = 0.52 W	Pi = 0.3 W

**ORDER SPECIFICATIONS:**

Voltage	24 V $\bar{=}$
Current consumption	20 mA
	718 000 55

**ACCESSORIES:**

PC/ABS-Blend Cap (IP 43)	975 118 00
Zener Barrier	975 714 01

**TECHNICAL DIAGRAMS:**

see page 279





Zener Barrier (accessory)

- Zone 0, 1 and 2
- 26 tones for a diverse range of applications
- For use with a Zener Barrier
- Adjustable sound output to 103 dB
- High protection rating IP 65
- Direct external setting of two tones possible

**TECHNICAL SPECIFICATIONS:**

Dimensions (Ø x Height):	93 mm x 103 mm
Housing:	ABS
Connection:	Screw terminal max. 2.5 mm ²
Cable entry:	Cable diameter max. 12 mm
Duty cycle:	100%
Tone types and frequencies:	Selectable via DIP switch, see table below
Fixing:	Wall mounting, base mounting
Installation position:	Sound outlet must not face upwards
Explosion protection:	Ex II 1G EEx ia IIC T4
Approval:	BASEEFA 06 ATEX 0161

**ORDER SPECIFICATIONS:**

Voltage	24 V =
Current consumption	14 mA
	714 000 55

**ACCESSORIES:**

Zener Barrier	975 714 01
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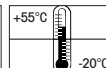
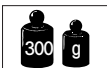
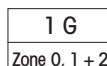
**tone types and frequencies:**

selectable via DIP switch

Ton A No.	Tone type	Ton A No.	Tone type
1	alternating 800/970 Hz in 2 Hz stroke	14	continuous 970 Hz
2	rising 800/970 Hz in 7 Hz stroke	15	554 Hz/100 ms alternating 440 Hz/400 ms
3	rising 800/970 Hz in 1 Hz stroke	16	660 Hz pulse: 150 ms ON, 150 ms OFF
4	continuous 2,850 Hz	17	660 Hz pulse: 1.8 sec. ON, 1.8 sec OFF
5	rising 2,400-2,850 Hz in 7 Hz stroke	18	660 Hz pulse: 6.5 sec. ON, 13 sec OFF
6	rising 2,400-2,850 Hz in 1 Hz stroke	19	continuous 660 Hz
7	500-1,200 Hz rising in 3 sec., 0.5 sec OFF	20	alternating 554/440 Hz in 0.5 Hz stroke
8	falling 1,200-500 Hz in 1 Hz stroke	21	pulse 660 Hz in 1 Hz stroke
9	alternating 2,400/2,850 Hz in 2 Hz stroke	22	2,850 Hz pulse: 150 ms ON / 100 ms OFF
10	pulse 970 Hz in 0.5 Hz stroke	23	rising 800/970 Hz in 50 Hz stroke
11	alternating 800/970 Hz in 1 Hz stroke	24	rising 2,400-2,850 Hz in 50 Hz stroke
12	pulse 2,850 Hz in 0.5 Hz stroke	25	970 Hz pulse: 3 x 500 ms ON, 500 ms OFF, 1.5 sec. pause
13	970 Hz pulse: 0.25 sec. ON / 1 sec. OFF	26	2,850 Hz pulse: 3 x 500 ms ON, 500 ms OFF, 1.5 sec. pause

**TECHNICAL DIAGRAMS:**

see page 279





- Zone 1 and 2
- Fully encapsulated

- Silicone free

**TECHNICAL SPECIFICATIONS:**

Dimensions (L x H x W):	148 mm x 360 mm x 152 mm
Housing:	PC / ABS-Blend
Connection:	Cable 3 m, 2 x 0.75 mm ²
Fixing:	Bracket mounting, sound outlet facing downwards
Explosion protection	Ex II 2G Ex mb II T5
Approval:	BVS 03 ATEX E 118X

**ORDER SPECIFICATIONS:**

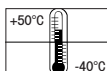
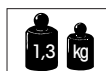
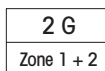
Voltage	24 V=	24 V~	48 V~	115 V~	230 V~
Voltage range	21,6 V ... 26,4 V	21,6 V ... 26,4 V	37,8 V ... 52,8 V	102,5 V ... 126,5 V (50 Hz)	108 V ... 131 V (60 Hz) 208 V ... 250 V (50 Hz)
Current consumpt.	350 mA	450 mA	220 mA	205 mA	70 mA
	750 000 55	750 000 65	750 000 66	750 000 67	750 000 68

**TECHNICAL DIAGRAMS:**

see page 281



The Ex Signal Horn 750 warns of imminent danger in the chemical industry and paint shops





- Zone 1 and 2, Zone 21 and 22
- IP 65 for indoor and outdoor applications
- Flexible mounting possibilities
- Suitable for use in areas liable to explosion caused by both gas or dust without the need for additional accessories

**TECHNICAL SPECIFICATIONS:**

Dimensions (L x H x W):	178 mm x 104 mm x 207 mm
Fixing dimensions (L x H):	130 mm x 160 mm
Housing:	PC
Connection:	CAGE CLAMP® max. 2.5 mm ²
Cable entry:	Cable gland M 16 x 1.5 mm Cable diameter 6.5-9.5 mm
Fixing:	Wall mounting, base mounting
Explosion protection:	Ex II 2G Ex emb II T5 Ex II 2D Ex td A21 IP65 T70°C
Approval:	BVS 03 ATEX E 118X

**ORDER SPECIFICATIONS:**

Voltage	24 V=	24 V~	48 V~	115 V~	230 V~
Voltage range	21.6 V ... 26.4 V	21.6 V ... 26.4 V	37.8 V ... 52.8 V	102.5 V ... 126.5 V (50 Hz)	108 V ... 131 V (60 Hz)
Current consumpt.	350 mA	450 mA	220 mA	205 mA	70 mA
	761 000 55	761 000 65	761 000 66	761 000 67	761 000 68

**TECHNICAL DIAGRAMS:**

see page 281



The Ex signal horn 761 can be used for a range of applications in gas and dust explosion endangered areas, e.g. in joinery and wood processing plants.



2 G	2 D
Zone 1 + 2	Zone 21 + 22

