

Safety – an absolute must

an
absolute
must



Your requirements are our priorities

Index

General information

pages 3-5

Explosion-proof connecting systems

pages 6-7

Explosion-proof CEAG plugs up to 415 V, 3 pins
Explosion-proof CEAG plugs up to 690 V, 5 pins



Explosion-proof cable reels

page 8

Explosion-proof cable reels type 502



Explosion-proof lamps

pages 9-11

Explosion-proof battery-powered hand-lamp
Explosion-proof battery-operated torches
Explosion-proof accumulator-powered handheld searchlight



General information

1. Introduction to explosion protection for electrical equipment

Introduction

Wherever flammable gases, vapours or dusts occur and mix with air or oxygen, an explosion risk exists. This is true not only for plants in the fields of chemical engineering and mining. A bottling plant for high-proof spirits or a grain silo are also potential sources of an explosion. Any unwanted explosion will endanger the health and the life of persons located nearby and is very likely to cause serious property damage. Therefore, measures have been developed early on to prevent explosions.

Primary and secondary explosion protection

Two basic possibilities exist to prevent explosions: primary and secondary explosion protection. Primary explosion protection is based on the avoidance of flammable substances. In the absence of flammable substances, no ignitable mixture will be created. As a result, no explosion risk will exist. This approach can, of course, only be applied to a very limited extent. After all, the flammability of many substances is a desired product property that is either indispensable or which cannot be controlled – for example gases and their release in the field of mining. In such cases, secondary explosion protection measures must be taken. They consist in the prevention of ignition sources which might ignite an explosive atmosphere. Such ignition sources include sparks and hot surfaces. It is obvious that, whenever possible, primary explosion protection measures should be taken, since they are inherently safe so that not even an error will lead to an explosion.

2. Explosion protection measures in Europe

Explosion protection regulations were standardised in Europe as far back as in 1980. This allows equipment that has been approved in one country of the EU to be used in all the other member countries.

EC Directive RL 94/EC ATEX 100a

In 1994, the EC Directive RL 94/EC ATEX 100a – abbreviated as “ATEX” – was issued. This Directive provides new regulations for the approval of explosion-proof equipment and defines requirements that the quality management systems of explosion-proof equipment manufacturers must meet.

Explosion protection standards

The explosion protection of electrical equipment is defined in the standards DIN EN 50014 to 50028 and EN 60079. DIN EN 50014 describes the basics of explosion protection, and the subsequent standards the individual ignition protection types. EN 60079 describes the installation of explosion-proof equipment on site.

Classification of explosion risks

Not all gas or dust and air mixtures pose the same explosion risk. Therefore, the cost requirements for preventing explosions will vary. To select the suitable type of explosion protection in a specific application, the standards describe different criteria for characterising the requirements.

Zones and categories

One criterion is the classification into zones posing different explosion risks. A distinction is made between Zones 0, 1 and 2 for gases and Zones 20, 21, 22 for dusts.

Explosion risk	Example	Gas	Dusts	Resulting category
Explosive atmosphere is present permanently or for an extended period of time	Inside vessels	Zone 0	Zone 20	1
Explosive gas atmosphere is present occasionally	In the area surrounding filling and emptying ports	Zone 1	Zone 21	2
Explosive gas atmosphere is rare and, when it does occur, is present only briefly	Areas around Zone 1	Zone 2	Zone 22	3

Explosion groups

Explosion-proof electrical equipment is divided into two groups:

- Group I: Electrical equipment for mining installations exposed to the risk of fire-damps
- Group II: Electrical equipment for all areas exposed to an explosion risk apart from mining installations exposed to the risk of fire-damps

The equipment of Group II is further divided into IIA, IIB, IIC, according to the properties of the explosive atmosphere for which it is destined. An explosive atmosphere rated IIC is easiest to ignite, one rated IIA hardest. As a result, a piece of equipment with – say – IIC approval is also allowed to be applied for IIB and IIA.

General information

Temperature classes

Another method of classifying electrical equipment is by temperature. Every gas and air mixture has a different ignition temperature. To allow a simple allocation of equipment to the ignition temperature, six temperature classes have been created.

Temperature class	Maximum surface temperature °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

For example, this means that equipment operated in an atmosphere with hydrogen sulphide with an ignition temperature of 270°C must comply at least with the temperature class T3. Equipment of temperature classes T4 to T6 would, of course, also be allowed.

Possibilities of implementing an explosion protection system

The European standards describe eight possible types of ignition protection. One or more of these types of ignition protection can be applied in a given device to achieve adequate explosion protection.

Types of ignition protection

a) Pressurisation EEx p

Pressurisation is a type of ignition protection **offering the widest variety of applications**. Its design is based on a housing in which a positive pressure of air or inert gas is maintained so that no explosive gases can enter the housing after the housing has been purged with pure air or inert gas. The only requirement that the internal components in the housing must satisfy is that the surface temperature does not exceed the specified temperature class. As a result, this type of ignition protection is especially suitable for retrofitting equipment not designed for such an application in explosive atmospheres.

b) Intrinsic safety EEx i

In the case of the ignition protection type of intrinsic safety, all currents, voltages, inductances and capacitances are limited so that no sparks capable of ignition can be generated. In addition, the equipment must be designed so that no component can be heated to above the specified temperature class. These conditions must also be satisfied in the event of one (Categories 2 and 3) or two (Category 1) faults.

c) Enhanced safety EEx e

The enhanced safety ignition protection type can only be applied for a few simple devices such as terminals, lamps, motors, etc. It is based on the oversizing of the components used so that no sparks or high temperatures are to be expected.

d) Encapsulation EEx m

The part of the equipment capable of ignition is encapsulated in a sealing compound, preventing any explosive atmosphere from reaching these components.

e) Flameproof enclosure EEx d

With a flameproof enclosure, the equipment is incorporated in a stable housing. If the explosive atmosphere ignites inside the housing, the housing will withstand the explosion pressure and the explosion will be restricted to the inside of the housing. Because of the high mechanical strength needed for the pressure-resistant housing, these housings are inevitably large and heavy.

f) Powder filling EEx q

With the powder filling method, the part of the equipment capable of ignition is embedded in quartz sand. Any sparks generated are extinguished by the quartz sand before they can ignite the surrounding explosive atmosphere.

g) Oil encapsulation EEx o

With the oil encapsulation type, the part of the equipment capable of ignition is immersed in oil, preventing any explosive atmosphere from reaching such components.

h) EEx n

The EEx type of ignition protection is different from the ones described above. It is a summary of different modified ignition protection types for Zone z. The relevant standard DIN EN 50021 is currently only available as a draft.

General information

Designation of explosion-proof electrical equipment

Every explosion-proof device must have a designation telling the user for what explosive atmospheres the equipment is suitable. The first part of the designation is made up of the device group and the category.

Zone	Device group	Category	Designation
*1	I	1	M1
*2	I	2	M2
0	II	1	1 G (gases)
1	II	2	2 G (gases)
2	II	3	3 G (gases)
20	II	1	1 D (dusts)
21	II	2	2 D (dusts)
22	II	3	3 D (dusts)

- *1: (M1) Permanant service
- *2: (M2) These devices have been designed to be deactivated in the presence of an explosive atmosphere.

The second part of the designation specifies the ignition protection types and the temperature class.

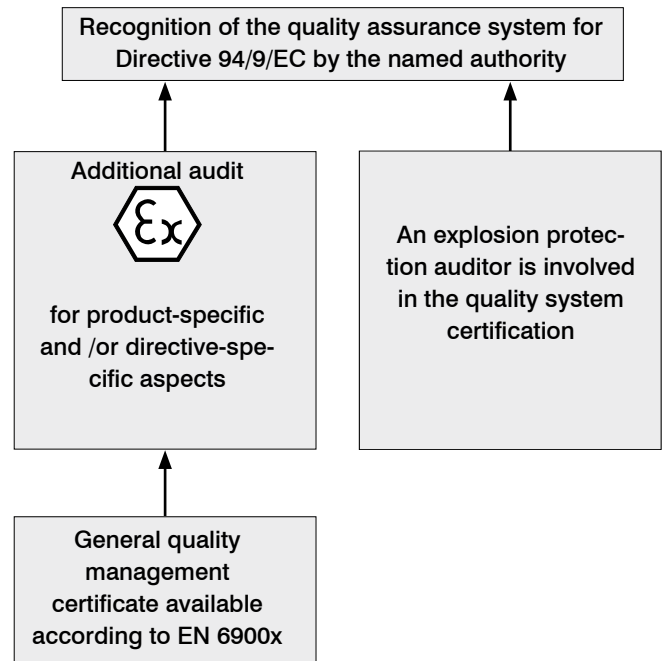
Complies with European standards	Ignition protection type(s)	Explosion group	Temperature class
EEx	me	II	T4 / T5
EEx	d / dMl	IIB	T4 / T5 / T6

The third part of the designation specifies when and by which testing authority the equipment has been certified.

Testing authority	Year	Acc. to ATEX	Laboratory and consecutive No.
SNCH	01	ATEX	3213/3214

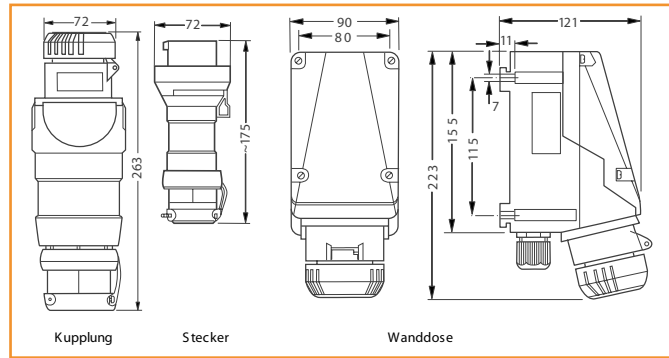
Recognition of quality systems

In the conformity evaluation, one of the core elements of the new concept is the quality assurance module in the production phase. In cases where a type certificate is demanded in the Directive 94/9/EC, also a quality assurance module is necessary, graduated according to categories, i.e. the hazard potential of the product. In other words, a general quality management system certificate (e.g. EN ISO9 ...) is not sufficient for obtaining an ATEX certificate. An additional product-specific or directive-specific rating is required – so to speak a “quality system after-burner” for explosion protection.



The recognition of this additional audit is limited to three years and therefore complies with the common procedure during quality management system certifications.

Explosion-proof CEAG plugs up to 415 V, 3 pins



Description

The most outstanding quality feature of any plug is the design of the transition between the plug and the socket. In designing plugs for applications in explosive atmospheres, the utmost attention has therefore been paid to this area. One crucial factor is the contact resistance at the transition between the pins and the socket holes, especially as a result of environmental influences such as moisture and contamination during service.

At the connection points of explosion-proof CEE plugs, the principle of self-cleaning contacts has been implemented. The heart of this contact consists of a spring-loaded contact lamella cage. The large number of load-bearing contact points minimises the contact resistance and therefore reduces heating. Thanks to the spring-loaded lamella supports, only low mating and unmating forces are needed. Perfect and durable self-cleaning is ensured by the configuration and geometry of the louvre-like contact lamellas. This multi-contact plug is therefore maintenance-free.

These plugs have been designed for extremely rough duty. As a result of the use of a bayonet coupling, the degree of protection IP 66 has proven to be reliable.

Special features

- Self-cleaning lamellar contacts, low contact resistance
- Variable cable entries for wall sockets
- Patented plug-and-rotate activation
- Easy to connect down to the last detail
- High protection thanks to bayonet coupling
- Low mating and unmating forces

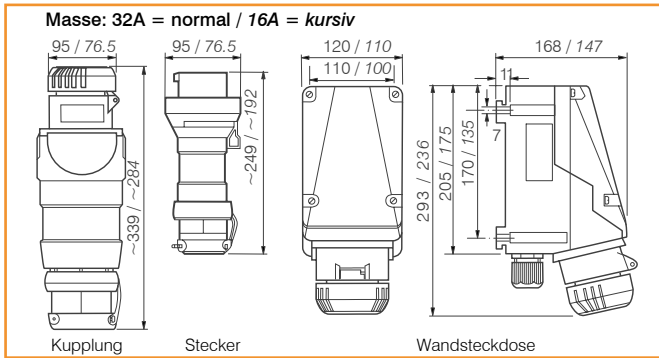
Technical data

Explosion-proof plug according to CEE and IEC 309-1/2

Ignition protection type	EEx de IIC T6 for Zones 1 and 2
Conformity certification	PTB 99 ATEX 1039
Degree of protection	IP66 to EN 60529
Rated voltage	up to 250 V ~
Rated current	max. 16 A
Frequency	50/60 Hz
Switching capacity	AC3 to 250 V ~ / 16 A
Power fuse max.	without thermal protection: 16 A with thermal protection: 25 A
Screw joint	wall socket: 1xM25 (from bottom) plug/plug socket: Ø 9-17 mm
Connection terminals	wall socket: 2x4 mm ² plug/plug socket: 4 mm ²

Type	Current	Number of pins	Voltage
Ex plug	16 A	1P+N+E	up to 415V
Ex plug socket	16 A	1P+N+E	up to 415V
Ex wall socket	16 A	1P+N+E	up to 415V

Explosion-proof CEAG plugs up to 690 V, 5 pins



Technical data

Explosion-proof plug according to CEE and IEC 309-1/2	
Ignition protection type	EEx de IIC T6 / T5 for Zones 1 and 2
Conformity certification	PTB 99 ATEX 1041
Degree of protection	IP66 to EN 60529
Rated voltage	up to 415 V ~
Rated current	max. 16 A
Frequency	50/60 Hz
Switching capacity	AC1 to 690 V ~ / 16 A AC3 230 V / 16 A 400 V / 16 A 500 V / 16 A 690 V / 16 A
Power fuse max.	without thermal protection: 16 A with thermal protection: 25 A
Screw joint	wall socket: 1xM25 (from bottom) plug: Ø 9-17 mm plug socket: Ø 13-20 mm
Connection terminals	wall socket: 2x6 mm ² plug/plug socket: 4 mm ²

Technical data

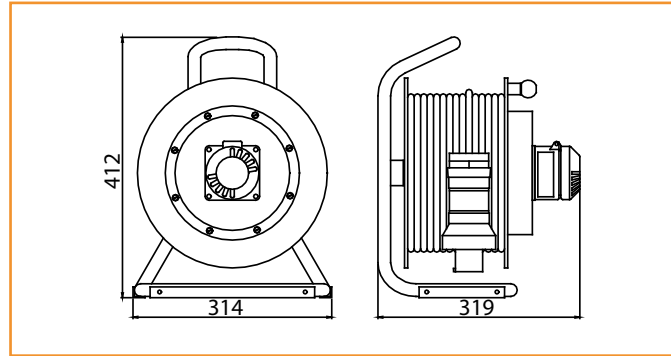
Explosion-proof plug according to CEE and IEC 309-1/2	
Ignition protection type	EEx de IIC T6 for Zones 1 and 2
Conformity certification	PTB-No. Ex-85.B.1066
Degree of protection	IP66 to EN 60529
Rated voltage	up to 690 V ~
Rated current	max. 32 A
Frequency	50/60 Hz
Switching capacity	AC1 to 690 V ~ / 32 A AC3 230 V / 32 A 400 V / 32 A 500 V / 32 A 690 V / 32 A
Power fuse max.	without thermal protection: 35 A with thermal protection: 40 A
Screw joint	wall socket: 1xM40 (from bottom) plug: Ø 18-27 mm plug socket: Ø 9-27 mm
Connection terminals	wall socket: 2x10 mm ² plug/plug socket: 6 mm ²

Type	Current	Number of pins	Voltage
Ex plug	16 A	3P+N+E	380-415 V
Ex plug socket	16 A	3P+N+E	380-415 V
Ex wall socket	16 A	3P+N+E	380-415 V

Type	Current	Number of pins	Voltage
Ex plug	32 A	3P+N+E	up to 690V
Ex plug socket	32 A	3P+N+E	up to 690V
Ex wall socket	32 A	3P+N+E	up to 690V

Other execution or products/types upon request.

Explosion-proof cable reels type 502



Description

The **502 Ex** cable reel is suitable for applications in explosive atmospheres of Zones 1 and 2. GIFAS cable reels are made of butyl rubber. This material guarantees high mechanical strength. The reels are also resistant to oils and acids. A matured design ensures technical reliability and a high quality standard. The 502 Ex cable reel has an internal brake which does not rub against the reel body.

Spare parts:

For safety reasons, no piece parts or spare parts are offered. All repairs must be carried out by the manufacturer, who must certify that a final test has been performed.

Sites of application:

In areas with potential explosive atmospheres such as chemical engineering, fire-fighting, tank storage facilities, filling equipment, fuel storage systems, etc.



II 2 G EEx de IIC T6

EC type certification: PTB03 ATEX 1186

Special features

- Solid, halogen-free reel body of hard rubber
- Solid, galvanised flat steel frame
- Internal wedge-type brake
- Maintenance-free
- Resistant to impact and aging
- High mechanical strength
- Resistant to chemical influences
- Resistant to UV radiation and weather
- High-quality accessories (Gifas-Euroflex cable, sockets, etc.)

Notes on safety

Before use, always read the labelling on the cable reels!

The 502Ex cable reel is not suitable for Zones 0, 20, 21 and 22. Observe the temperature class and ignition protection types specified on the device. To avoid unallowed heating of the cables, especially when wound up, do not exceed the maximum loads specified.

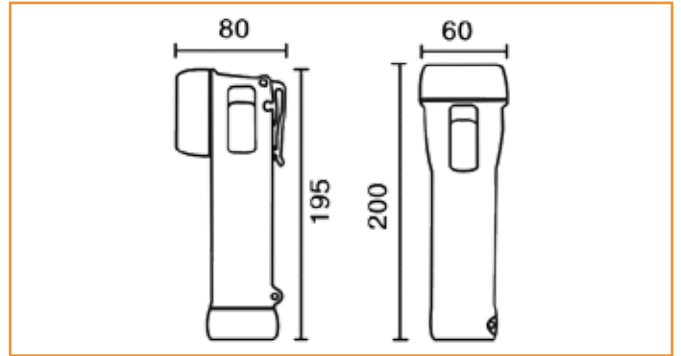
The use of the cable reel 502Ex in explosion group IIC is only allowed if the cable is first connected or the cable reel is standing on a conductible floor or a conductible and earthed (grounded) base. Otherwise, the cable reel can be used in all zones for explosion groups IIA and IIB only.

Do not make any modifications or retrofits to the cable reels. Only use the cable reels in an undamaged condition.

Also observe all national safety and accident prevention regulations.

Item	Type	Voltage/Current	Equipment
247373	502 Ex	400 V/16 A	Input: 30 m Gifas-Proflex cable 5x2,5 mm ² , plug CEE 5x16A, 400V, type CEAG Output: 1 flange socket CEE 5x16A, 400V, without fuse, type CEAG Execution: with designation K2 and Ex Designation: 502EXR30525/1/16/C
247389	502 Ex	230 V/16 A	Input: 50 m Gifas-Proflex cable 3x2,5 mm ² , plug CEE 3x16A, 230V, type CEAG Output: 1 flange socket CEE 3x16A, 230V, type CEAG Execution: with designation K2 and Ex Designation: 502EXR50325/13P/163P/C

Explosion-proof battery-operated torches




Description

Use the **VERTEX** as your personal safety torch for any occasion. With the explosion-proof version, you will be safe even in critical “enriched” environments. The Angular model is particularly popular, being equipped with a belt bracket. All models are equipped with a shoulder strap.

Product characteristics

Housing of thermoplastic material resistant to impact and hard to scratch, yellow, with black head ring. Dust-tight and moisture-resistant according to EN 50014. Scratch-resistant glass cover. Single-hand operation.

Technical data

Batteries	2 x battery R20 zinc/carbon 1.5V/7.3 Ah
Lamp	Xenon 2.4 V/0.7 A
Burning life	up to 12 h
Weight	400–500 g, depending on model, incl. batteries
Protection class	 II 2 GD Ex eib IIC T4
ATEX certification	BAS 02 ATEX 2220X

Item	Description
247889	Explosion-proof torch VERTEX Straight, type TS 24 T4, without battery, ATEX-certified
247932	Explosion-proof torch VERTEX Angular, type TS 24 T4, without battery, ATEX-certified
248170	Torch head without lamp insert
248171	Battery housing Straight, without batteries
248172	Battery housing Angular, without batteries
248173	Lamp insert incl. 2 bulbs
248174	Glass cover scratch-resistant
247931	Battery R20 zinc/carbon 1.5 V/7.3 Ah
248175	Spare bulb xenon 2.4 V/0.7 A

Explosion-proof accumulator-powered handheld searchlight



Description

MITRALUX L160-Ex – the most efficient torch light which is allowed for the use in explosive areas of the zone 1 and 2. The L160-Ex is a product of years of development and improvement work all over. The L160-Ex unites the demanded safety with modern product technology and handy, functional design. The light of a halogen micro projection lamp (20 W) is caught and projected into a variable-focus lens by a double-lens lights optic. Your advantage: The only inspection lamp for hazardous areas with a cone of light which is adjustable and delimited sharply – the light projection just how you need it.

- Certified by SEV 04 ATEX 0117 according the guideline 94/9/EG
- Meets the requirements of the European norms EN 1127-1, EN 50014, EN 50018, EN 50281-1-1
- Approved for use in hazardous areas of zones 1, 2, 21 and 22 and temperature class T5
- Water proof and dust proof IP68



- II 2GD EEx d IIC T5/T100°C
SEV 04 ATEX 0117

Technical data

- Concentrated white halogen light 20 Watt
- Up to 60 minutes full power operation
- Easy handling (switching ring)
- Continuously variable focus lens (2:1)
- Maintenance free NiMH battery, rechargeable within 14 hours (only outside of the hazardous area)
- Voltage monitoring prevent overcharging as well as complete discharge
- Waterproof up to a depth of 10 meters and dust proof IP68
- Operating temperature range: -20°C to +40°C
- Dimensions l x w: 480 x 75 mm
- Weight: 1,4 kg

Item	Description
247888	MITRALUX L160-Ex, tested by ATEX, hand-held light, complete without accessories
247247	Plug-in battery charger NiCd- and NiMH-accupacks, Euro-plug, 2P, 1,8m cable with special adapter, incl. 3 adapters for worldwide adoption
248973	Plug-in battery charger 110 VAC/7,2 VDC, 60 Hz, plug / 1,8 m cable with special adapter
247891	Shoulder strap to L160-Ex, synthetic fiber, adjustable
247893	Wall bracket, synthetic, to L160-Ex
247892	Belt bracket with safety clamp to L160-Ex
247895	Gaskets (5 pcs) to L160-Ex, for watertightness IP68
247894	Halogen projection lamp 6V/20W
248974	Charging cap complete

Description

Safe use and high design and production quality of the portable searchlight **IL-80** is ensured by explosion protection features and the embedding of the lamps in a housing resistant to impact and scratching. The housing is also resistant to acids and alkaline solutions and is jet-proof (IP66). Emergency light function through safety switching in the event of a power failure during charging. The portable searchlight is suitable for **Zones 1, 2, 21 and 22**.

Technical data



Classification	II 2GD EEx eib IIC T4
Certificate	VTT 03 ATEX 027X
Dimensions	LxHxT=216x21x121 mm
Degree of protection	IP66
Weight	1.4 kg
Lamp	Halogen 6 V/2.4 W PX13,5 S
Burning life	11h at full power, 18h at half power
Accumulator	NiCd 6V / 5.0 Ah
Service temp.	-20°C to +40°C
Housing	Polypropylene/carbon (antistatic)
Glass lens	5 mm mineral glass
Reflector	Point reflector (H0111-4)
Residual capacity	2-step switch for half and full power indicator

Item	Description
247577	Explosion-proof handheld searchlight IL-80 complete with wall support, car plug (937W2,4AH3.EX/T4/SET)
247193	Explosion-proof handheld searchlight IL-80 accu (937W2,4AH5.EX/T4/AKKU)
247241	Wall support for explosion-proof handheld searchlight IL-80 (without supply cord)
247244	Power pack for explosion-proof handheld searchlight IL-80 230 VAC/12 VDC with 2 m supply cord
247242	Car plug for explosion-proof handheld searchlight IL-80 12 VDC

Get in touch with us

We are looking forward to become acquainted with you personally!

Energy in the right dimension

GIFAS ELECTRIC GmbH
Borsigstrasse 9 • D-41469 Neuss
Postfach 21 03 63 • D-41429 Neuss
Telefon 02137 105-0 • Fax 02137 105-157
<http://www.gifas.de> • verkauf@gifas.de

