Protection – ATEX

Explosion Protection Catalogue | Version 05

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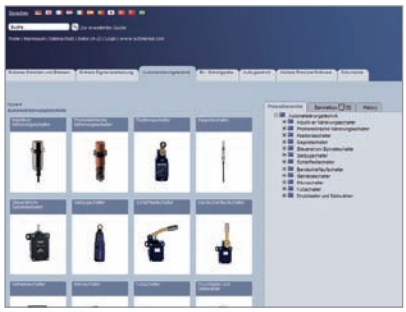


Online documentation in 13 languages

The online catalogue for our customers is permanently updated. The Main catalogue can be consulted on the Internet in as much as 13 languages.
The technical data of our entire product range are always up-to-date. The declarations of conformity, the test certificates and the mounting instructions can be consulted or even downloaded as well.

Service for designers

The online catalogue also includes the technical drawings of our products – a special service to designers. In this way, they can be downloaded and directly fed in CAD-systems.
The Schmersal homepage furthermore contains up-to-date information on general subjects, technical articles on machine safety as well as news regarding events and trainings. To be bookmarked!

The direct way

If you need further information or you want personal advice, you can call us as well: + 49-(0) 2 02-64 74-0.
The addresses of our representations in Germany and abroad can be found on the front pages of this catalogue.

We are at your disposal – anyplace, anywhere, anytime!

Attention!

The data specified in this catalogue are carefully checked typical standard values.
Subject to technical modifications and error.

Content

The basics of explosion protection

The implementation of the ATEX Directives (ATEX: ATmosphères EXplosibles) in Europe has changed the way of thinking with regard to the explosion protection. The manufacturers must follow the directive 94/4/EC to fulfill the harmonised standars in Europe. The directive is obligatory in all Member States and transposed into national law. This was carried out until 2003. On the other side the users have to fulfill the directive 1999/92/EC regarding the basic safety and health requirements for operation. Both Directives are based upon the standards listed in the Official Journal (OJ) of the European Commission. Not only the gas explosive protection is now standardised, but also the protection for dust atmospheres. In a few countries, e.g. in Germany, explosion protection regulations existed already at national level, however not harmonised.
Due to the internationalisation and the standardisation on EN basis, the standards defining the requirements on equipment to be used in explosive atmospheres will gradually be replaced by the European Standards series EN 60079. Hybrid mixtures from gas and dust are included in the standardisation work as well. The mechanical explosion protection required by the ATEX Directives however still is in its “infancy”.
The comprehensive product portfolio from Schmersal and Elan Schaltelemente complies with the requirements of the standards and directives. Our existing products and our innovations are consistently developed and refined on the basis of the current standards as well as the amendments, which are in the transitional stage. In this way, both the standard requirements and safety technology are integrated in the potentially explosive areas.

Source of ignition	Examples of the cause
Sparks	Mechanically generated sparks (e.g. by friction, stroke or cutting removal operations), electric sparks
Electric arcs/flashovers	Short-circuit, switching operations
Hot surfaces	Current in electrical installations, heaters and radiators, machining, heating during operation
Flames and hot gases	By combustion reactions, spark projection during welding
Electrical installations	Even extra-low voltages (U < 50 V) still can generate sufficient energy to ignite an explosive atmosphere. Opening/closing of contacts, loose or defective contacts
Static electricity	Separately arranged conductive parts, many plastics
Equalizing currents	Reverse current from generators, earth connection in case of faults, induction
Electromagnetic waves in the 3×10^{11} ... 3×10^{15} Hz range	Laser beam for range finding, especially in case of beam focusing
High frequency 10^4 ... 3×10^{12} Hz	Radio signals, industrial high-frequency generators for heating, drying, cutting, etc.
Lightning	Atmospheric disturbances
Ionizing radiation	X-ray device, radioactive substances, energy absorption leads to heating
Ultrasonic	Energy absorption in solid/liquid substances leads to heating
Adiabatic compression and shock waves	Strokewise opening of valves
Exothermal reactions	Chemical reaction

The basic physic and technical principles
Complete combustion
Combustion or burning is a complex sequence of exothermic chemical reactions. A fire starts when a flammable and/or combustible material with an adequate supply of oxygen is exothermically disintegrated. Depending on the speed of combustion, we speak of deflagration, explosion or detonation.
A complete combustion causes significant damages, which various with the combustion speed.
Order of magnitude of the speed of combustion

Deflagration	cm/s
Explosion	m/s
Detonation	km/s

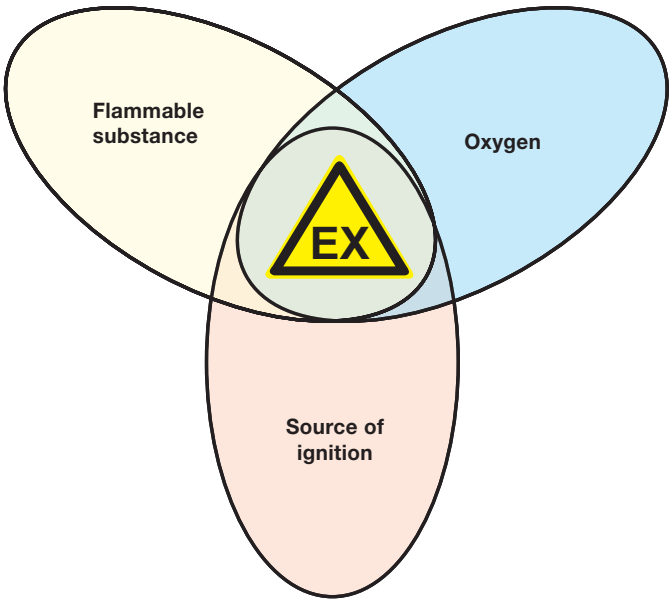
Explosion
An explosion can only occur, when three factors come together: flammable material in ignitable quantities, oxygen and an ignition source. If one component is missing, no exothermic reaction will occur.

Oxygen
When a flammable substance is mixed with oxygen, a potentially explosive mixture is created. For gases, the concentration ratio determines whether an explosion is possible. The mixture can only be ignited if the concentration of the substance in air is within the lower and upper explosive limits. Mixtures with concentrations smaller or greater these limits will not explode. A few chemically unstable substances (e.g. acetylene, ethylene oxide) have self-decomposing properties and therefore can also produce exothermal reactions without oxygen.
In these cases, the upper explosion limit (UEL) is 100 vol. %. For pressurised gases, the explosion ranges change. Dusts are also classified by a lower explosion limit (approx. at 20…60 g/m³) and an upper explosion limit (approx. at 2…6 kg/m³).

Potentially explosive substance
Any flammable substance in the form of gas, mist, vapour or dust is considered as potentially explosive substance. For mists and dusts, a potentially explosive atmosphere occurs when the drop or the particle size is smaller than 1 mm. Frequently-used mists, aerosols and dusts have a particle size between 0.001 mm and 0.1 mm. Dusts with larger particle sizes are not combustible.
Deposits of dust can be compared to porous elements and have hollow portion of up to 90%. The increase of temperature of dust deposits can cause the spontaneous ignition of the dust-like flammable substance. If a deposit of dust with small particle size is swirled up, the dust, along with the oxygen in the air, forms a combustible dust/air mix. The bigger the size reduction, the higher the explosion danger, since the surface of the hollow space increases. Dust explosions are often the consequence of smouldering dust layers which become stirred up and already carry the ignition initiation.

The potential danger of explosive dust atmospheres and the selection of the appropriate safety measures are evaluated by means of the safety characteristics of the substances concerned. To this end, dusts are classified in accordance with two of their substance-specific properties:
- Conductivity
  Dusts are considered to be conductive when they have a specific electric resistance of up to 10^3 ohmmeters.
- Combustibility
  Combustible dusts are characterised by the fact that they can burn or smoulder when mixed with air and that they form explosive mixtures along with oxygen under atmospheric pressure and at temperatures ranging from – 20°C to + 60°C.

The safety characteristics of swirled up dusts are for instance the minimum ignition energy and the ignition temperature, whereas for deposits of dust the smouldering temperature is a characteristic feature.



The basics of explosion protection

Classification of zones and selection of equipment
Setting-up installations in potentially explosive areas involves a great deal of precautions to be taken. For instance, the equipment, the resources, the cables and conductors as well as the construction have to meet special requirements. In case of doubt, the consultation of experts during the planning is recommended.

Risk assessment
It is the responsibility and duty of the user to perform a risk analysis prior to installing new facilities.
He must verify where there is a risk of explosion and then divide areas into zones accordingly. Every plant must be examined for its particularities.
If nonetheless an explosion would be caused, the possible hazard scenario must be taken into consideration in the forefront. Can chain reaction occur, are damages to the building to be expected and which are the impacts of the explosion of subsequent plant components and parts?
Potential interactions with adjacent plants can occur, which cannot be produced on the individual plant.
The risk analysis requires a great deal of experience as well as a correct assessment.
In case of doubt, consulting experts on this matter is highly recommended, considering that the risk analysis builds the basis of all further measures to be taken before the installation can be put into operation.

Analysis of the explosion protection risk
The user of a machine or installation has to perform an accurate analysis according to the standards EN 60079-10, EN 60079-14 and EN 1127-1. On the basis of this analysis, he has to classify the areas in which explosive atmospheres may be present into zones. These observations must be documented.

Documentation of the explosion protection
The documentation is essential to ensure a safe operation of the installation in the potentially explosive area. It is drawn up prior to the set-up and must always be kept up-to-date.
In case of changes to the installation, all the described influences data must be taken into account.

Example of an explosion protection document
Object responsible
Called by name in the documentation
Description of the structural/constructional and geographic conditions
Layout plan, building map, plant ventilation system
Description of the procedure, description of the plant with regard to explosion protection
Substance characteristics, list of all data including explosion-relevant parameters
Risk analysis, refer to checklist below
Protection concept, zone classification, explosion protection types used
Organisational measures
Instructions, prescriptions in written, work authorisations

Classification of the potentially explosive areas into zones

To determine the necessary protective measures to be taken and to select appropriate equipment, the potentially explosive areas have to be classified into zones. This classification of the potentially explosive areas into zones is based upon the frequency and the duration of the presence of the dangerous explosive atmosphere.

These framework conditions (frequency, duration) determine the classification and identification of gas explosion risk areas as zone 0, 1 or 2 as well as the required measures to be taken in order to avoid active sources of ignition.

Dust explosion risk areas are accordingly classified as zone 20, 21 or 22.

The EN 60079-10 standard can provide help with the classification of gas explosion risk areas into zones. The zone definition is included in all common documentation, i.e. in the ATEX Directive 1999/92/EC as well.

Zone 0 is an area, in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is present continuously or for long periods or frequently.

- Example: these conditions are usually found only inside containers, pipes, apparatus (evaporators, reaction chambers etc.).

Zone 1 is an area, in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is likely to occur occasionally in normal operation.

- Example: areas in the immediate surroundings of zone 0, of intakes and inlets, the areas around filling units and discharging equipment, the immediate surroundings of highly fragile apparatus or conductors in glass, ceramics etc., the area around insufficiently sealing gaskets, e.g. on pumps and dampers, the interior of apparatus such as evaporators and reaction chambers.

Zone 2 is an area, in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

- Example: areas surrounding zone 0 or 1, specific storage plants

Zone 20 is an area, in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously or for long periods or frequently.

- Example: these conditions are usually found only inside containers, pipes, apparatus, e.g. mills and grinders, dryers, mixers, feed pipes, silos etc.

Zone 21 is an area, in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur occasionally in normal operation.

- Example: also areas in the vicinity of inlets or work stations where dust is poured into containers, as well as areas where there are dust deposits and where a combustible dust/air mixture could form in the course of normal operation.

Zone 22 is an area, in which an explosive atmosphere in the form of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

- Example: this could also include areas in the vicinity of devices containing dust, protection systems or components from which dust leaks and forms deposits (e.g. milling/grinding facilities, from which dust leaks and forms layers)

Dust Ex: selection according to the smouldering temperature and the ignition temperature

When selecting electrical apparatus for use in dust explosion risk areas, the smouldering temperature of the deposited dust and the ignition temperature of the potentially explosive dust/air mixture must be known, regardless of the zone.

The smouldering temperature is the lowest temperature of a hot surface on which a dust deposit of a defined thickness is ignited.

The ignition temperature of a dust cloud is the lowest temperature of a heated wall of an oven that ignites the dust/air mixture upon brief contact.

Combustible dusts are not divided into temperature classes like gases. The maximum surface temperature must be mentioned on the electrical equipment.

The table below summarizes the explosion parameters (ignition temperature, smouldering temperature and minimum ignition energy) of a few dusts.

Please note that for flammable substances a collective name, e.g. mill dust, designates different kinds of that product, each of them with diverging safety characteristics and parameters. Wheat flour for instance has other parameters than rye flour.

The specific parameters of the dust, which is permanent in each dust explosive area, must be determinated. When the parameters of collective names are used, miscalculations can occur.

Substance	Ignition temperature Ti [°C]	Smouldering temperature Ts [°C]	ø Minimum energy ø Emin [mJ]
Flour	≥ 380	≥ 300	≥ 30
Wood	≥ 410	≥ 200	≥ 100
Brown coal	≥ 380	≥ 225	–
Coal	≥ 500	≥ 240	≥ 1000
PVC	≥ 530	≥ 340	≥ 5
Aluminium	≥ 560	≥ 270	≥ 5
Sulphur	≥ 240	≥ 250	10

Types of protection
General overview
Essential requirements
The EN 60079-0 describes the essential requirements, which apply to all types of explosion protection.

Mechanical protection
Mechanical tests are carried out in accordance with EN 60079-0. The enclosures or the exterior part of the enclosure, pushbuttons must withstand highimpact energy.

Type of protection „n“ EN 60079-15
The type of protection “n” originally was used as stand-alone standard for use in ATEX category 3G respectively was defined as zone 2 standard in IECEx. This standard has been designed for normal operation. The fault analysis, which is performed for the other types of protection, is not executed, considering that the explosive atmosphere and the ignition spark are very unlikely to occur simultaneously in zone 2; in other words: electrical apparatus cannot ignite an explosive atmosphere surrounding them in normal operation and under defined abnormal operating conditions.
Meanwhile, the EN 60079-15 has been rewritten, so that the essential requirements are now described in the EN 60079-0.
This reflects for instance in the following way: The type of protection Ex nL has been replaced with the Ex ic type of protection relative to intrinsic safety. The sub-group is transferred from the EN 60079-15 into the EN 60079-11. This leads to changes, which could require a more accurate analysis.

Temperature classes for gases (EN 60079-0):

Classification of the maximum surface temperature into classes for electrical apparatus belonging to Equipment Group II

T1	T2	T2	T4	T5	T6
450°C	300°C	200°C	135°C	100°C	85°C

Ignition protection type and the main characteristics

Ignition protection type	Basic principle, main application
Oil immersion „o“	The source of ignition is permanently immersed in oil. Application: switchgear and transformers
Pressurized enclosures „p“	The formation of a potentially explosive atmosphere inside an enclosure is prevented by maintaining a positive internal pressure of protective gas in relation to the surrounding atmosphere. Application: machinery, commutation motors, control cabinets, monitors, keyboards, analysers
Powder filling „q“	A fine granular packing material surrounds the ignition source, thus making it impossible for an electric arc created in the enclosure under certain operating conditions to ignite a potentially explosive atmosphere surrounding the enclosure. Application: capacitors, condensers, electronic ballast, sensors
Flameproof enclosures „d“	Parts which can ignite a potentially explosive atmosphere are surrounded by an enclosure which withstands the pressure of an explosive mixture exploding inside the enclosure and prevents the transmission of the explosion to the atmosphere surrounding the enclosure. Application: switchgear, spark-generating parts, power engineering, heavy-current engineering
Increased safety „e“	Additional measures are applied to increase the level of safety, thus preventing the possibility of excessive temperatures and the occurrence of sparks or electric arcs within the enclosure or on exposed parts of electrical apparatus, where such ignition sources would not occur in normal service. Application: terminal and connection boxes (engines)
Encapsulation „m“	Parts that are capable of igniting an explosive atmosphere by either sparking or heating are enclosed in a compound in such way as to avoid ignition of an explosive atmosphere. Application: sensors, variable speed drives
Intrinsic safety „i“	An electric circuit is intrinsically safe if no sparks or thermal effects produced under specified test conditions are not capable of causing ignition of a given explosive atmosphere. Application: measurement and control technology
Intrinsically safe systems „i-SYST“	The entirety of interlinked and interconnected electrical apparatus, documented by a system description. Circuits used completely or partly inside hazardous areas are intrinsic safe.

Intrinsic safety
Principle
The type of protection “intrinsic safety” Ex i is based on the principle of limitation of current, voltage and storable energy within an electric circuit. Intrinsic safety does not reduce the potentially explosive substance and/or the oxidizing agent.
The ignition of an explosive mixture is avoided, when neither electric sparks nor the effect of heat can occur. The electrical energy is limited in order to keep electrical sparks below the ignition limit.
The energy limitation avoids the excessive heating of the electrical apparatus and its surfaces. This also applies to the sensors integrated in the intrinsically safe electrical circuits. Electrical energy can be stored in capacities (condensers) or inductivities (coils) within the intrinsically safe electrical circuit.
Zener diodes, which are used for limiting voltage, become conductive as of a specific voltage. The increased voltage is conducted through the zener diode, i.e. the electrical circuit in the EX zone has limited voltage.
A series-wired resistance limits the current in the potentially explosive area.

$I_{max} = I_o = U_o/R$

With the limitation of voltage and current, the maximum power is

$P_o = U_o^2 / 4R$

The authorised maximum values are taken from the ignition limit curves, defined in the EN 60079-11 standard. For the gas groups I, IIA, IIB and IIC, there are four ignition limit curves. The classification is done according to the ignition energy.
The ignition limit curves have been calculated by means of a spark tester, as described in the EN 60079-11 standard.

Subdivision of the type of protection „n“ Ex n in Europe

Symbol	Meaning	Comparable with	Method	Subdivision
A	Non-sparking	Ex e	Occurrence of electric arcs, sparks or hot surfaces is minimised	None
C	Sparking apparatus	Partially Ex d, Ex m	Enclosed switching device, non-explosive components hermetically closed, sealed or encapsulated devices	IIA, IIB, IIC
R	Vapour-tight enclosure	–	Penetration of explosive gases is reduced	None
L*	Energy limitation	Ex i	Energy limitation, so that neither sparks nor thermal effects can produce an ignition	IIA, IIB, IIC
P	Simplified pressurized enclosure	Ex p	Penetration of explosive gases is avoided by overpressure. The monitoring unit will not switch-off	None

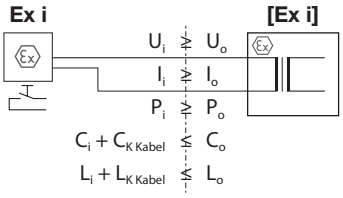
*different in North-America and Europe

Electrical apparatus and associated apparatus

An intrinsically safe electric circuit contains at least one electrical apparatus and one associated apparatus.
The electric circuits of the electrical apparatus meet the requirements of the intrinsic safety. The electrical apparatus must only be connected to non-intrinsically safe circuits through associated apparatus. An associated apparatus possesses both intrinsically safe and non-intrinsically safe circuits. To separate the electric circuits, a zener diode or galvanic isolators are used. The EN 60079-11 describes this separation calls as a “safety barrier”.
Intrinsically safe electrical apparatus and intrinsically safe components from associated equipment are classified in different levels of protection “ia”, “ib” and “ic” according to EN 60079-11. This classification is included as of the 5th edition of the IEC Ex version.
The “ia” category basically offers the highest level of protection, “ib” a higher level of protection and “ic” a high level of protection.
The category “ia” or “ib” determines whether the protective circuit offers a single fault safety or a double fault safety. For protection level “ic”, no fault analysis is performed.

Here the safety for normal operation is sufficient. Therefore, the standard EN 60079-14, chapter 12.3 recommends galvanic isolation for intrinsically safe circuits in zone 0, category “ia”. For intrinsic safety, a fault analysis is performed to exclude explosion risks. However, no statement whatsoever is made with regard to the operational safety. This means that a functional total breakdown is, for the explosion protection standpoint, allowed.
The electrical apparatus may be used in zone 0 in accordance with the category. The associated apparatus are installed in the safe area, only the intrinsically safe electric circuits are installed in the potentially explosive area in accordance with the category.
Basically it is possible to apply further protection measures. So that the associated apparatus can be installed in zone 2 or even in zone 1.

Design of intrinsically safe electric circuits



Design of intrinsically safe electric circuits (typical values)

Resistance (back/forth)	0.5 mm²	72 Ohm/km
	0.75 mm²	48 Ohm/km
	1.5 mm²	24 Ohm/km
Capacity		180-200 nF/km
Inductivity		0,8-1 mH/km

Simple electrical apparatus – intrinsic safety

Type	Condition	Example
Passive components	None	Switches, terminal/junction boxes (modular enclosures), resistance, simple semi-conductor components
Energy storage	Values must be observed during calculation	Capacitors, coils
Energy source	≤ 1,5 V ≤ 100 mA ≤ 25 mW	Thermocouple Photocell

Cables for zones 0, 1 and 2
The cables must be laid in such manner that they are protected against mechanical damages, corrosion, chemical and thermal influences. This is an obligatory requirement for the type of protection “intrinsic safety”. The accumulation of potentially explosive atmospheres must be prevented in shafts, pits, ducts, conduits and trenches.
The propagation of flammable gases, vapours, liquids or combustible dusts through shafts, pits, ducts, conduits and trenches must be prevented as well.
If possible, cables and conductors must be laid without interruption in the potentially explosive area. If this is impossible, the connection of cables must be realised in an junction box with the appropriate explosion protection type for that zone. If deviation of this stipulation is required for installation reasons, the requirements of the EN 60079-14 standard must be observed.

Appropriate cables must be selected for intrinsically safe electric circuits. Furthermore, the following conditions apply to intrinsically safe electric circuits, also when they are installed outside of the potentially explosive area:
- Protection against the ingress of external energy.
- Protection against external electric or magnetic fields.

Possible cause: overhead highvoltage line or 1-phase highvoltage lines.
- The conductors of intrinsically safe and non-intrinsically safe electric circuits must not be laid in the same conduit.
- In case of armoured, metal sheathed or shielded cables, intrinsically safe and non-intrinsically safe electric circuits can be laid in the same conduit.

In the control cabinet, the intrinsically safe electric circuits must be clearly marked. The standard prescribes no uniform procedure and only points out that for the marking preferably a light blue colour should be used. However, the neutral conductors of energy cables are usually also marked with a blue colour. In order to avoid confusion, another marking should be used for the intrinsically safe electric circuits in this case. What is important, is a conveniently arranged layout and a spatial separation in the control cabinet.

Conductive shields must only be earthed at places located outside the potentially explosive atmosphere.

Cable	Requirement	
Stationary apparatus	Enclosure	Thermoplastic, duroplast, elastomer or metal insulated with metal enclosure
Mobile, transportable apparatus	External enclosure	Heavy polychloroprene, synthetic elastomer, heavy rubber hose pipe or similar robust design
	Minimum section surface	1.0 mm^2
flexible	Design	– Light rubber hose pipe with/without polychloroprene enclosure – Heavy rubber hose pipe with/without polychloroprene enclosure – Plastic-insulated cable, similar to heavy rubber hose pipe

Selection criteria for cables for the type of protection “intrinsic safety”

Criterion	Condition	Note
Insulated cables	Test voltage ≥ 500 VAC	Cable ground, cable shield and shield ground
Diameter of the individual conductors	≥ 0,1 mm	Also for flexible conductors
Flexible conductors	To be protected against splicing	e.g. by using conductor ferrules
Multi-wire cables	Acceptable	The requirements for the error analysis to EN 60079-14 must be observed
Parameters	(Cc and Lc) or (Cc and Lc/Rc)	In case of doubt: worst case

EN 13463

Mechanical explosion protection
The general requirements can be summarised as follows:
- The equipment must meet all stipulated application requirements (e.g. rough operation, humidity effects, ambient temperature and pressure fluctuations, influence of chemical agents, corrosion, vibrations) (refer to the operating instructions);
- Determination and evaluation of the ignition hazards – Apparatus interior (heating due to failure capable of causing ignition inside the device) – Dust deposits (friction between moving parts) – Evaluation of the surface temperature according to the category
- Documentation of the ignition hazard analysis
- Determine the maximum surface temperature for internal and external surfaces (for category 1 maximum 80 % of T1 ... T6)
- Prevention of mechanically generated sparks by friction, stroke and grinding processes (aluminium, magnesium, titan and zirconium portion in alloys and coatings to be limited in accordance with the category); All conductive parts must be grounded and protected against sparks produced by static electricity; disruptive discharge voltage of non-conductive layers on metallic surfaces smaller than 4 kV; surface resistance smaller than 10^9 Ohm
- Further detailed requirements depending on the equipment category and possible sources of ignition.

The maximum authorised mass portions for the material used for external parts in case an ignition hazard is present due to friction, stroke or friction sparks according to the ignition hazard evaluation, amount to:
- Category M1/M2: not more than 15% aluminium, magnesium, titan and zirconium in total as well as not more than 6% magnesium, titan and zirconium in total
- Category 1: not more than 10 % aluminium, magnesium, titan and zirconium in total as well as not more than 7.5 % magnesium, titan and zirconium in total
- Category 2: not more than 7.5 % magnesium,
- Category 3: no special requirements.

EN 13463-1, clause 5.2 “Evaluation of the ignition hazard” requires an assessment of the ignition hazards as well as a corresponding report in tabular form (example: refer to page 13). The ignition hazard assessment is used for the classification into equipment categories:
“If an equipment has been designed and built in accordance with good engineering practices and the assessment of the ignition hazards ensures that under normal operation, the equipment has no potential source of ignition, the equipment can be classified into the equipment category 3.
If the ignition hazard assessment ensures that the equipment has no potential source of ignition in case of expected or rare malfunctions, it can be classified into the equipment category 2 or 1”.

Section 5.2.7 of the EN 13463-1 includes an assessment report for Group II equipment.

Constructional safety „c“
- Type of protection, in which constructional measures are applied to ensure protection against potential ignition by hot surfaces, sparks and adiabatic compressions generated by moving parts,
- Using proven technical principles,
- The probability of a dangerous failure is very low
- Observations with regard to the lifetime of ball and rolling bearings, distances between moving and fixed parts, rotation speeds higher than 1 m/s, electrostatic problem for belt transmissions.

Marking
- Basic requirement: the field of application of all EX-relevant equipment, protective systems and components must be identified.
- Marking example: ⟨Ex⟩ II 1G c T4

Conditions for safe operation
- The special conditions for a safe application are described in the operating instructions manual of the individual Ex safety switchgear.

Assessment of the ignition hazard for equipment of Group II (EN 13463-1), gas

Potential ignition source (1)			Measures applied to prevent the source becoming effective (2)	Ignition protection used (3)
Normal operation (1b)	Expected malfunction (1b)	Rare malfunction (1c)		

Columns (1b) and (1c) are only required, when the definition of the equipment category of Group II requires that they must be protected in case of specific malfunctions, e.g. for equipment category 2 or 1.
The manufacturer of the equipment performs and documents the risk analysis of the ignition hazard. The user must also perform a risk analysis for the equipment, which was integrated in the machine at the time when it had to meet the requirements of the ATEX 1999/92/EC.

Product designation

	1		2					3			4					
	Ignition hazard															
	a	b	a	b	c	d	e	a	b	c	a	b	c	d	e	f
No.	Potential ignition source		During normal operation	During expected malfunction	During rare malfunction	Not to be observed	Reasons for assessment	Description	Description of the protective measurement (standards, technical rules, experimental results)	Proof (including relevant Ex features listed in column 1)	During normal operation	During expected malfunction	During rare malfunction	Not to be observed	Resulting equipment category in respect of this ignition hazard	Necessary restrictions
1																
2																
3																
										Resulting equipment category including all existing ignition hazards						

Safety relay modules

The safety relay modules of the PROTECT series SRB 101Exi (one safety release) and SRB 200Exi (two safety releases) are suitable for use in potentially explosive atmospheres or Ex zones. There are variants with monitored reset function (trailing edge) as well as with automatic or manual reset function. All these versions have a stop 0 safety release and optionally can be supplied with cross-wire short detection.

Content

PROTECT SRB 101EXi-...

- 1 or 2 channel control
- 1 safety contact
- Suitable for signal processing of emergency stop control devices, interlocking equipment, etc.
- 1 additional signalling contact (auxiliary contacts must not be used in safety circuits)
- Trailing edge (version -1R)
- Automatic reset function (version -1A)
- Optionally cross-wire short recognition (through switch)
- Current and voltage limitation of the input circuits (intrinsically safe)
- Green LED indications for relays K1, K2, U_B, U_i and U_{EXi}
- DIN rail mounting to DIN EN 60715:2001
- Thermoplastic enclosure to UL-94-V-0, graphite black RAL 9011
- Certification to DIN EN ISO 13849-1:2007
- Certification to ATEX 94/9/EG
- Electric circuits up to zone 1/21
- Installation in zone 2 possible

Approvals

Technical data

Equipment category, explosion protection type:	Gas: ⟨Ex⟩ II 3 G Ex nAnC IIC T5 (SRB in zone 2); Gas/dust: ⟨Ex⟩ II (2) GD [Ex ib] IIC/[Ex ibD]
Inputs (S11-S12, S21-S22, X1-X2/X3):	[Ex ib] IIC/[Ex ibD]
Temperature class:	T5
Voltage U_o:	33.6 V
Current I_o:	57.0 mA
Capacity P_o:	478.8 mW (linear characteristic)
Maximum safety voltage U_m:	253 VAC
Isolation:	safe separation to EN 60079-11: Amplitude of the voltage 375 V
Rated operating voltage:	24 VDC –15%/+20%, residual ripple max. 10%
Recommended fuse for the operating voltage:	internal fuse F1: T 50 mA/250 V; internal fuse F2: T 100 mA/250 V
Protection class:	enclosure: IP40 Terminals: IP20 Wiring compartment: IP54
Power consumption:	max. 3.0 W
Switching capacity of the enabling paths:	230 V; 3 A ohmic (inductive with suitable protective circuit) AC-15: 230 VAC/3 A DC-13: 24 VDC/3 A
Recommended fuse for the enabling paths:	3.15 A slow blow
Min. switching capacity:	min. 10 V/10 mA
Contact resistance:	max. 100 mΩ in new state
Contact material/contacts:	AgSnO, self-cleaning, positive drive
Switching capacity of the auxiliary contacts (21-22):	24 VDC, 2 A
Recommended fuse for the auxiliary contacts:	2 A slow blow
Current and voltage at S11-S12, S21-S22:	24 VDC, 5 mA
Current limitation at S11-S12, S21-S22:	15 mA
Pull-in delay:	approx. 300 ms (Version -1A) approx. 20 ms (Version -1R)
Drop-out delay:	in case of emergency stop: approx. 20 ms; in case of voltage drop: approx. 20 ms
Bridging in case of voltage drops:	approx. 15 ms
Air clearances and creepage distances:	EN 60664-1:2003 (DIN VDE 0110-1), 4 kV/2; EN 60079-11:2007 (VDE 0170/0171 Part 7)
Max. total line resistance:	30 Ohm
Ambient operating:	–25 °C ... +60 °C
Storage temperature:	–40 °C ... +85 °C
EMV:	EN 61000-6-2:2005
Vibrations:	EN 60068-2-6:1996
Frequency:	10 … 55 Hz
Amplitude:	0.35 mm
Climatic resistance:	EN 60068-2-3:1986
Mechanical life:	10^7 operations
Weight:	230 g
Dimensions:	22.5 x 100 x 121 mm

Ordering details

SRB 101EXi-1①

No.	Option	Description
①	R	Trailing edge
	A	Automatic reset function

Classification

Safety parameters:

Standards:	EN ISO 13849-1, IEC 61508, EN 60947-5-1
PL:	STOP 0: up to e
Category:	STOP 0: up to 4
PFH value:	STOP 0: ≤ 2.00 x 10^{-8}/h
SIL:	STOP 0: up to 3
Mission time:	20 years

The PFH value of 2.00 x 10^{-8}/h applies to the combinations of contact load (current through enabling contacts) and number of switching cycles (n-op/y) mentioned in the table below. At 365 operating days per year and a 24-hours operation, this results in the below-mentioned switching cycle times (t-cycle) for the relay contacts.
Diverging applications upon request.

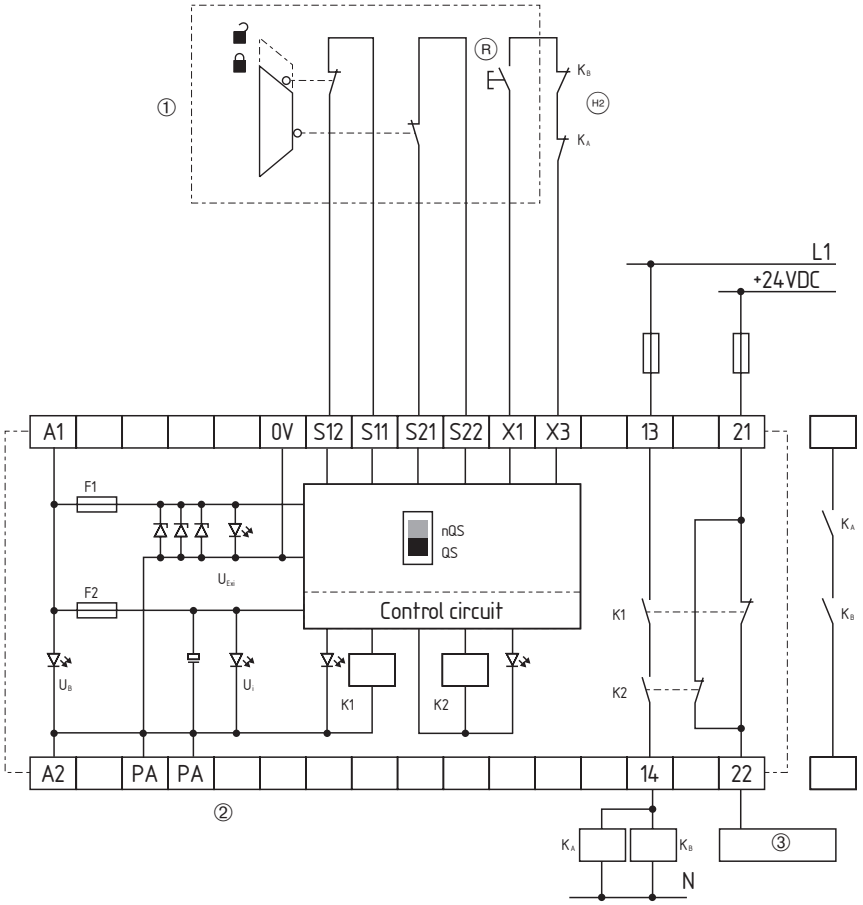
Contact load	n-op/y	t-cycle
20 %	525,600	1.0 min
40 %	210,240	2.5 min
60 %	75,087	7.0 min
80 %	30,918	17.0 min
100 %	12,223	43.0 min

SRB-EXi safety relay module

Note

- 2-channel control, shown for a guard door monitor with two position switches where one has a positive break contact; with external reset button Ⓡ.
- Relay outputs: 2-channel control, suitable for contact reinforcement or multiplication by means of contactors or relays with positive-drive contacts.
- Ⓗ2 = Feedback circuit
- The control recognizes cable break, cross-wire shorts (switch in position “QS”) and earth leakages in the monitoring circuit.
- The safety function is defined as the opening of release 13-14 when the inputs S11-S12 or S21-S22 are opened.

Wiring diagram



Note

- Cable connections:
  single strand: rigid or flexible (with or without conductor ferrules) 0.25 … 2.5 mm²;
  multi-strand with identical section:
  rigid or flexible (with conductor ferrules without plastic) 0.25 … 2.5 mm²;
  flexible (without or with TWIN conductor ferrules) 0.5 … 1.5 mm²

Legend

① Sensor: Installation in zone 1/21
② SRB Exi: Installation in zone 2
③ Control

PROTECT SRB 200EXi-...

- 1 or 2 channel control
- 2 safety contacts
- Suitable for signal processing of emergency stop control devices, interlocking equipment, etc.
- Trailing edge (version -1R)
- Automatic reset function (version -1A)
- Optionally cross-wire short recognition (through switch)
- Current and voltage limitation of the input circuits (intrinsically safe)
- Green LED indications for relays K1, K2, U_B, U_i and U_{EXi}
- DIN rail mounting to DIN EN 60715:2001
- Thermoplastic enclosure to UL-94-V-0, graphite black RAL 9011
- Certification to DIN EN ISO 13849-1:2007
- Certification to ATEX 94/9/EG
- Electric circuits up to zone 1/21
- Installation in zone 2 possible

Approvals

Technical data

Equipment category, explosion protection type:	Gas: Ⓔx II 3 G Ex nAnC IIC T5 (SRB in zone 2) Gas/dust: Ⓔx II (2) GD [Ex ib] IIC/[Ex ibD]
Inputs (S11-S12, S21-S22, X1-X2/X3):	[Ex ib] IIC/[Ex ibD]
Temperature class:	T5
Voltage U_o:	33.6 V
Current I_o:	57.0 mA
Capacity P_o:	478.8 mW (linear characteristic)
Maximum safety voltage U_m:	253 VAC
Isolation:	safe separation to EN 60079-11: Amplitude of the voltage 375 V
Rated operating voltage:	24 VDC –15%/+20%, residual ripple max. 10%
Recommended fuse for the operating voltage:	internal fuse F1: T 50 mA/250 V; internal fuse F2: T 100 mA/250 V
Protection class:	enclosure: IP40 Terminals: IP20 Wiring compartment: IP54
Power consumption:	max. 3.0 W
Switching capacity of the enabling paths:	230 V; 3 A ohmic (inductive with suitable protective circuit) AC-15: 230 VAC/3 A DC-13: 24 VDC/3 A
Recommended fuse for the enabling paths:	3.15 A slow blow
Min. switching capacity:	min. 10 V/10 mA
Contact resistance:	max. 100 mΩ in new state
Contact material/contacts:	AgSnO, self-cleaning, positive drive
Current and voltage at S11-S12, S21-S22:	24 VDC, 5 mA
Current limitation at S11-S12, S21-S22:	15 mA
Pull-in delay:	approx. 300 ms (Version -1A) approx. 20 ms (Version -1R)
Drop-out delay:	in case of emergency stop: approx. 20 ms; in case of voltage drop: approx. 20 ms
Bridging in case of voltage drops:	approx. 15 ms
Air clearances and creepage distances:	EN 60664-1:2003 (DIN VDE 0110-1), 4 kV/2; EN 60079-11:2007 (VDE 0170/0171 Part 7)
Max. total line resistance:	30 Ohm
Ambient operating:	–25 °C ... +60 °C
Storage temperature:	–40 °C ... +85 °C
EMV:	EN 61000-6-2:2005
Vibrations:	EN 60068-2-6:1996
Frequency:	10 … 55 Hz
Amplitude:	0.35 mm
Climatic resistance:	EN 60068-2-3:1986
Mechanical life:	10^7 operations
Weight:	230 g
Dimensions:	22.5 x 100 x 121 mm

Ordering details

SRB 200EXi-1①

No.	Option	Description
①	R	Trailing edge
	A	Automatic reset function

Classification

Safety parameters:

Standards:	EN ISO 13849-1, IEC 61508, EN 60947-5-1
PL:	STOP 0: up to e
Category:	STOP 0: up to 4
PFH value:	STOP 0: ≤ 2.00 x 10^{-8}/h
SIL:	STOP 0: up to 3
Mission time:	20 years

The PFH value of 2.00 x 10^{-8}/h applies to the combinations of contact load (current through enabling contacts) and number of switching cycles (n-op/y) mentioned in the table below. At 365 operating days per year and a 24-hours operation, this results in the below-mentioned switching cycle times (t-cycle) for the relay contacts.
Diverging applications upon request.

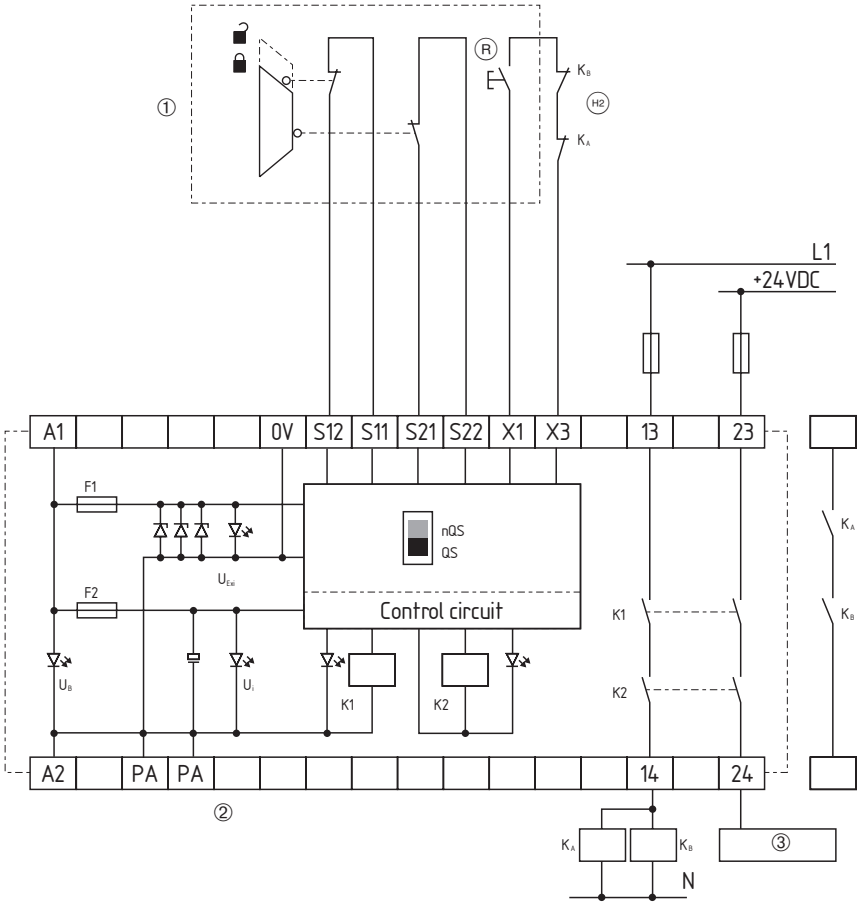
Contact load	n-op/y	t-cycle
20 %	525,600	1.0 min
40 %	210,240	2.5 min
60 %	75,087	7.0 min
80 %	30,918	17.0 min
100 %	12,223	43.0 min

SRB-EXi safety relay module

Note

- 2-channel control, shown for a guard door monitor with two position switches where one has a positive break contact; with external reset button Ⓡ.
- Relay outputs: 2-channel control, suitable for contact reinforcement or multiplication by means of contactors or relays with positive-drive contacts.
- Ⓗ2 = Feedback circuit
- The control recognizes cable break, cross-wire shorts (switch in position “QS”) and earth leakages in the monitoring circuit.
- The safety function is defined as the opening of release 13-14 when the inputs S11-S12 or S21-S22 are opened.

Wiring diagram



Note

- Cable connections:
  single strand: rigid or flexible (with or without conductor ferrules) 0.25 … 2.5 mm²;
  multi-strand with identical section:
  rigid or flexible (with conductor ferrules without plastic) 0.25 … 2.5 mm²;
  flexible (without or with TWIN conductor ferrules) 0.5 … 1.5 mm²

Legend

① Sensor: Installation in zone 1/21
② SRB Exi: Installation in zone 2
③ Control

Simple electric apparatus, type of protection “intrinsic safety”

For the classification of the protection type "intrinsic safety", an assessment of simple electrical apparatus to EN 60079-11 and EN 61241-11 must be executed.
As simple electrical apparatus within the meaning of intrinsic safety do not represent a potential source of ignition, the Directive 94/9/EC is not applicable. To demonstrate the intrinsic safety to EN 60079-14, a declaration of the manufacturer therefore can be used.
The devices classified as simple electrical apparatus can be used in the Zones 1 /2 and 21 / 22.
On the basis of a valid declaration of the manufacturer with an assessment as simple electrical apparatus, the following devices can be used:

Series	Switch	Page
Safety switch	EX-AZ 16-…-3D	22
	EX-AZ 335-…-3D	25
	EX-AZ 355-…-3D	26
	EX-AZ 415-…-3D	28
	EX-AZ 3350-…-3D	30
Position switches	EX-Z/T 235-...-3D	44
	EX-Z/T 335-...-3D	54
Safety sensors	EX-BNS 33-...-3G/D, however without LED	94
	EX-BNS 120-...-3G/D, however without LED	96
	EX-BNS 180-...-3G/D	98
	EX-BNS 303-...-3G/D, however without LED	100
Magnetic reed switches	EX-BN 20-...-3G/D	106
Reset buttons	Ex-RDT	114
	Ex-RDM	114
Emergency stop control devices	Ex-RDRZ45	118

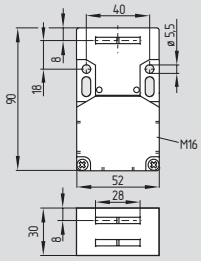
Safety switch with separate actuator

In the class 2 safety switches, the switching element and the actuator are not physically connected, but brought together or separated upon switching. When the safety guard is opened, the actuator is separated from the base unit. During this process, the NC contacts in the safety switch are positively opened and the NO contacts closed.

Content

Safety switch with separate actuator

EX-AZ 16-...-3D



- Ex certified
- Thermoplastic enclosure
- Multiple coding
- Long life
- Double insulated X
- 3 cable entries M16
- Large wiring compartment
- High level of contact reliability with low voltages and currents
- Not sensitive to dirty conditions by virtue of patented roller system
- Slotted holes for adjustment, circular holes for location
- Including Ex-certified screwed cable gland and screw plug

Approvals

Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Enclosure:	glass-fibre reinforced thermo-plastic, self-extinguishing
Max. impact energy:	1 J
Actuating speed:	max. 1 m/s
Actuator:	stainless steel 1.4301
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb or 3 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1 slow action, NC contact with positive break
Connection:	screw terminals
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
Cable entry:	3 x M16
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	2.5 A
Utilisation category:	AC-15 DC-13
I_e/U_e:	2.5 A / 230 VAC 2.5 A / 24 VDC
Max. fuse rating:	4 A gG D-fuse
Positive break travel:	8 mm
Positive break force:	10 N for each
Ambient temperature:	– 20 °C ... + 70 °C
Mechanical life:	> 1 million operations
Latching force:	30 N for ordering suffix R
Cable cross-section	min. Ø 5 mm
of the cable glands:	max. Ø 10 mm
	⟨Ex⟩ II 2D

Contact variants

1 NO / 2 NC

3 NC contacts

Ordering details

EX-AZ16-①ZV②K-③-3D

No.	Option	Description
①	03	3 NC contact
	12	1NO/2NC contacts
②		Ejection force
	R	Latching force 30 N
③	2254	Latching force 5 N
	1762	Front mounting
	1637	Gold-plated contacts

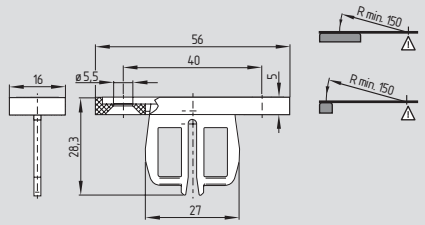
Note

Actuators must be ordered separately.

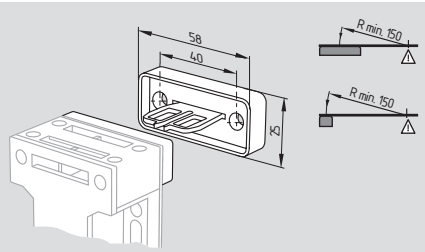
Dust zone 22

Safety switch with separate actuator

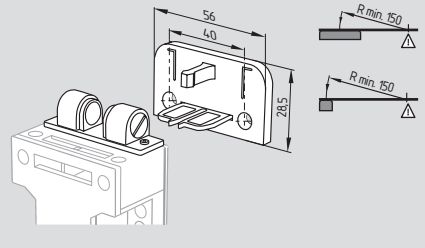
System components



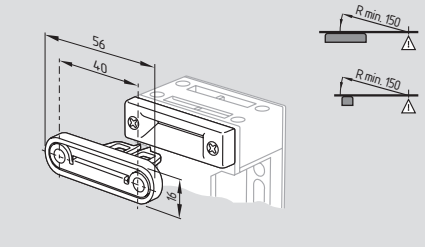
Straight actuator B1



Actuator B1-2024 with slot lip-seal

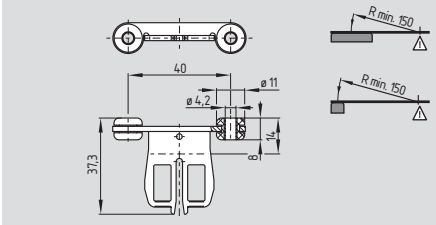


Actuator B1-2053 with ball latch

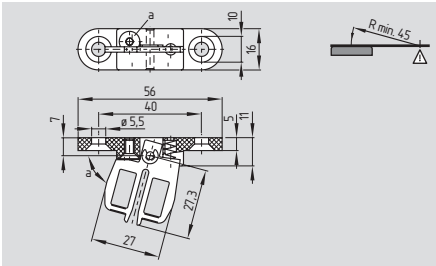


Actuator B1-2177 with centering guide

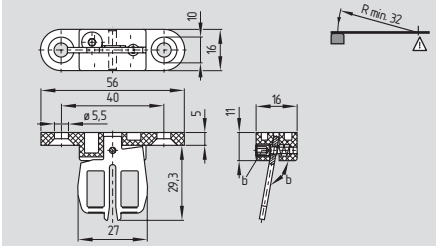
System components



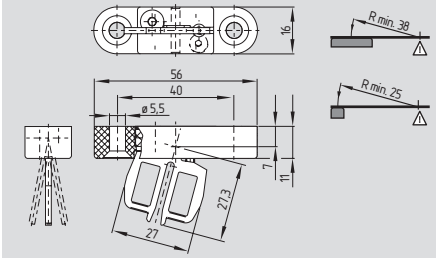
With rubber mounting B1-2245



Flexible actuator B2

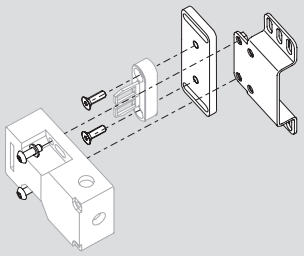


Flexible actuator B3

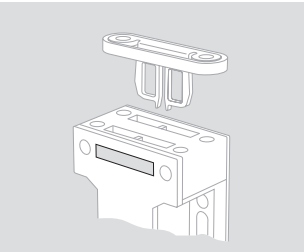


Flexible actuator B6

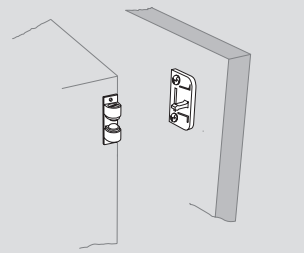
System components



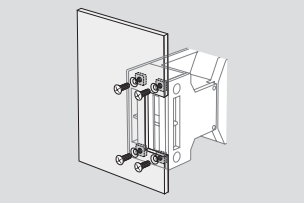
Mounting set MS AZ 15/16



Slot sealing plug AZ 15/16-1476



Ball catch 2053-2



Front mounting -1762

Ordering details

Straight actuator	**AZ 15/16-B1**
with slot lip-seal	**AZ 15/16-B1-2024**
with ball latch	**AZ 15/16-B1-2053**
with centering guide	**AZ 15/16-B1-2177**

Ordering details

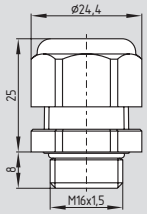
Straight actuator	**AZ 15/16-B1-2245**
Flexible actuator	**AZ 15/16-B2**
Flexible actuator	**AZ 15/16-B3**
Flexible actuator	**AZ 15/16-B6**

Ordering details

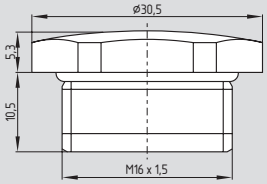
Mounting set	**MS AZ 15/16**
Slot sealing plug	**AZ 15/16-1476**
Ball catch	**-2053-2**
Front mounting with M5 nuts	**-1762**

System components

Tamperproof screws



EX-certified screwed cable gland



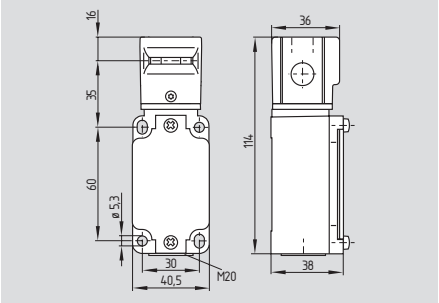
EX-certified screw plug

Ordering details

Tamperproof screws	
M5 x 12	**101135338**
M5 x 16	**101135339**
M5 x 20	**101135340**
(Quantity 2 pcs)	
EX-certified screwed cable gland	**EX-KLE-M16x1.5**
EX-certified screw plug	**EX-VS-M16x1.5**

Safety switch with separate actuator

EX-AZ 335-…-3D



- Ex certified
- Metal enclosure
- 3 contacts
- Long life
- High level of contact reliability with low voltages and currents
- Mounting details to EN 50041
- Actuator heads can be repositioned in steps 4 x 90°
- Can be mounted on a flat surface
- Slotted holes for adjustment, circular holes for location
- 1 Cable entry M20
- Including Ex-certified screwed cable gland

Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Actuator:	stainless steel 1.4301
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over with double break Zb, or 3 NC contacts, galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1 slow action, NC contact with positive break
Connection:	screw terminals
Cable section:	max. 2.5 mm², min. 0.75 mm² (incl. conductor ferrules)
Cable entry:	M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	10.7 mm
Positive break force:	5 N for each
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	10 million operations
Latching force:	30 N for ordering suffix R
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm ⟨Ex⟩ II 2D

Contact variants

1 NO / 2 NC

3 NC contacts

Approvals

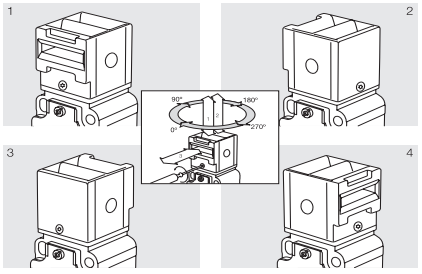
⟨Ex⟩ CE

Ordering details

EX-AZ 335-①-z②k-③-3D

No.	Option	Description
①	03	3 NC contact
	12	1NO/2NC contacts
②		Latching force 5 N
	R	Latching force 30 N
	UE	With overlapping contacts
③	1637	Gold-plated contacts

Note



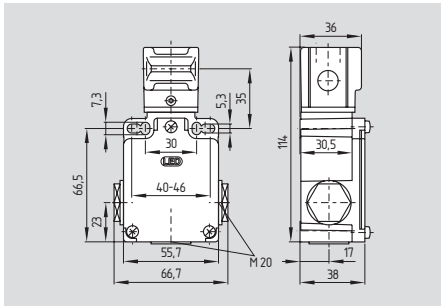
By turning the head in 90° steps, 8 actuating planes are possible. A Torx T10 screwdriver is required for this purpose.

Note

Actuators must be ordered separately.

Dust zone 22

EX-AZ 355-…-3D



- Ex certified
- Metal enclosure
- 3 contacts
- Long life
- High level of contact reliability with low voltages and currents
- Mounting details to EN 50041
- Actuator heads can be repositioned in steps 4 x 90°
- Can be mounted on a flat surface
- Transverse and longitudinal slotted holes
- 3 cable entries M20
- Including Ex-certified screwed cable gland and screw plug

Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Actuator:	stainless steel 1.4301
Max. impact energy:	1 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb or 3 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1 slow action, NC contact with positive break
Connection:	screw terminals
Cable section:	max. 2.5 mm², min. 0.75 mm² (incl. conductor ferrules)
Cable entry:	3 x M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC; 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	10.7 mm
Positive break force:	5 N for each
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	10 million operations
Latching force:	30 N for ordering suffix R
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	⟨Ex⟩ II 2D

Contact variants

1 NO / 2 NC

3 NC contacts

Approvals

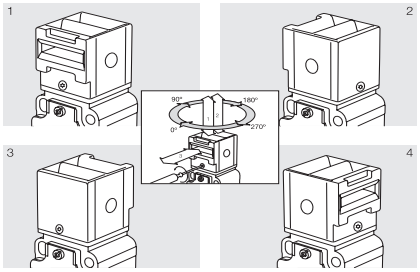
⟨Ex⟩ CE

Ordering details

EX-AZ 355-①-Z②K-③-3D

No.	Option	Description
①	03	3 NC contact
	12	1NO/2NC contacts
②		Latching force 5 N
	R	Latching force 30 N
	UE	With overlapping contacts
③	1637	Gold-plated contacts

Note



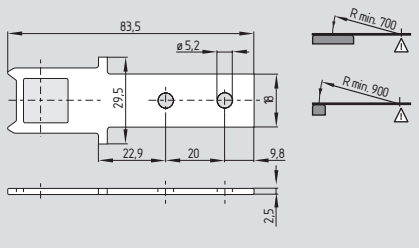
By turning the head in 90° steps, 8 actuating planes are possible. A Torx T10 screwdriver is required for this purpose.

Actuators must be ordered separately.

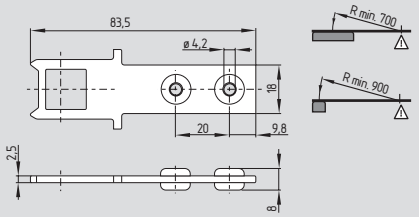
Dust zone 22

Safety switch with separate actuator

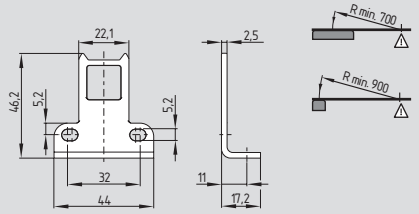
System components



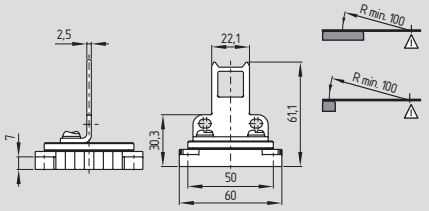
Straight actuator B1



With rubber mountings B1-2245



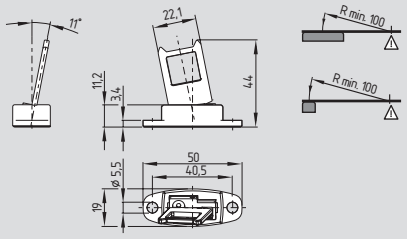
Angled actuator B5



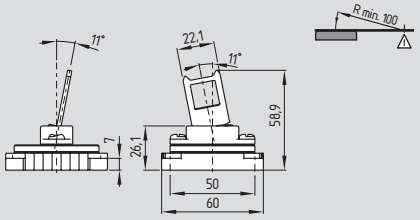
Angled actuator B5-Flex

Ordering details

Straight actuator	**AZ 335/355-B1**
with rubber mounting	**AZ 335/355-B1-2245**
Angled actuator	**AZ 335/355-B5**
Angled actuator	**AZ 335/355-B5-Flex**



Flexible actuator B6

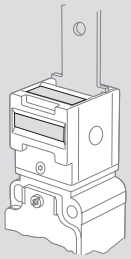


Flexible actuator B6-Flex

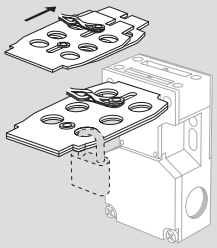
Ordering details

Flexible actuator	**AZ 335/355-B6**
Flexible actuator	**AZ 335/355-B6-Flex**

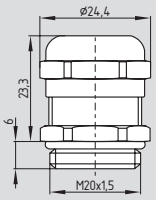
System components



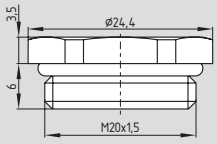
Slot sealing plug AZ 335/355-1990



Lockout tag SZ 16/335



EX-certified screwed cable gland

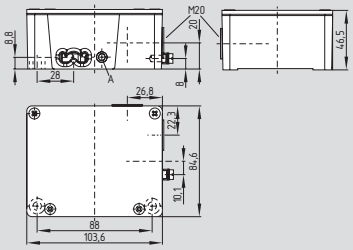


EX-certified screw plug M20

Ordering details

Slot sealing plug	**AZ 335/355-1990**
Lockout tag	**SZ 16/335**
EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**

EX-AZ 415-…-3D



A: setting screw ball latch 30 - 500 N

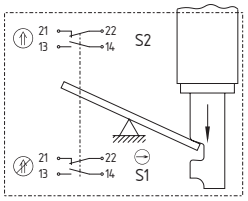
- Ex certified
- Metal enclosure
- 2 switches with different actuating functions in a single enclosure
- Long life
- High level of contact reliability with low voltages and currents
- Adjustable ball latch to 500 N
- Spring-loaded actuators
- 2 cable entries M20
- Including Ex-certified screwed cable gland and screw plug

Technical data

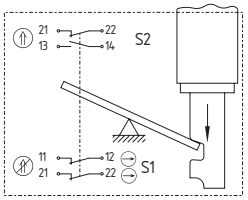
Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T60°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Actuator:	zinc-plated brass / aluminium
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1 slow action, NC contact with positive break
Connection:	screw terminals
Cable section:	max. 1.5 mm² min. 0.75 mm² (incl. conductor ferrules)
Cable entry:	2 x M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	6 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	3.8 mm
Positive break force:	min. 31 N
Ambient temperature:	– 10 °C … + 50 °C
Mechanical life:	> 1 million operations
Latching force:	30 - 500 N (adjustable)
Cable cross-section	min. Ø 7 mm
of the cable glands:	max. Ø 12 mm
	⟨Ex⟩ II 2D

Contact variants

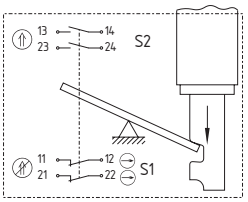
11/11 **1 NO contact / 1 NC contact**
1 NO contact / 1 NC contact



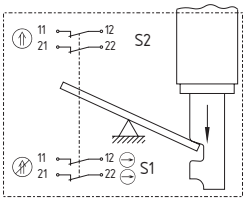
02/11 **2 NC contacts**
1 NO contact / 1 NC contact



02/20 **2 NO contacts**
2 NC contacts



02/02 **2 NC contacts**
2 NC contacts



Approvals

⟨Ex⟩ CE

Ordering details

Ex-AZ 415-①ZPK-②-3D

No.	Option	Description
①		**S1 / S2**
	11/11	1NO 1NC / 1NO 1NC contact
	02/11	2NC / 1NO 1NC contact
	02/20	2NC / 2NO contact
	02/02	2NC / 2NC contact
②	1637	Gold-plated contacts

Note

Actuators must be ordered separately.

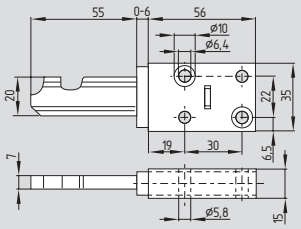
Note

Contact symbols shown for the closed condition of the guard device.

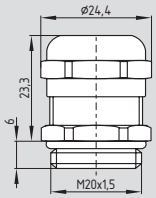
Dust zone 22

Safety switch with separate actuator

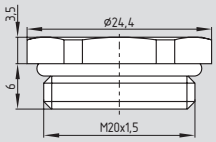
System components



Straight actuator B1



EX-certified screwed cable gland



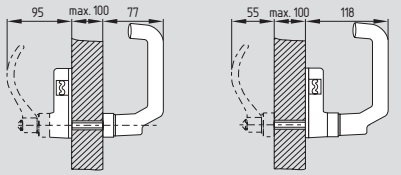
EX-certified screw plug M20

Ordering details

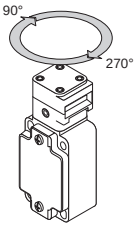
Straight actuator	**AZ/AZM 415-B1**
EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**

Safety switch with separate actuator

EX-AZ 3350-…-3D



- Ex certified
- Metal enclosure
- Long life
- High level of contact reliability with low voltages and currents
- Shearing force 15,000 N
- Door handle latching
- Lockout tag against unintentional locking available
- Centring device available
- 1 Cable entry M20
- Including Ex-certified screwed cable gland
- Actuating head:

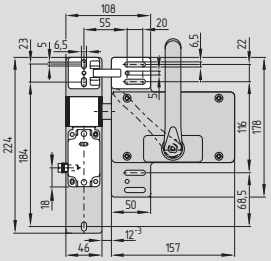


Approvals

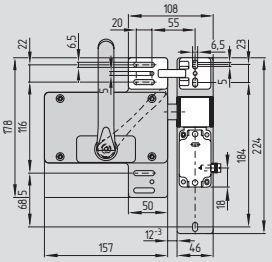
Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Actuator:	brass, blue chrome-plated
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over with double break Zb, or 3 NC contacts, galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1, BG-GS-ET-15, slow action, NC contact with positive break
Connection:	screw terminals
Cable section:	max. 1.5 mm² (incl. conductor ferrules)
Cable entry:	1 x M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 V 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	10.7 mm
Positive break force:	5 N for each
Ambient temperature:	
Mechanical life:	1 million operations
Cable cross-section	min. Ø 7 mm
of the cable glands:	max. Ø 12 mm
	⟨Ex⟩ II 2D

EX-AZ 3350-STS30-…



EX-AZ 3350-STS30-02/-04/-05/-07



EX-AZ 3350-STS30-01/-03/-06/-08

Ordering details

EX-AZ 3350-①-②-③-3D

No.	Option	Description
①	03-ZK	3 NC contact
	12-ZUEK	1NO/2NC contacts
②	1637	Gold-plated contacts
③	U90	Actuating head 90° rotation Door hinge on the left-hand side
	U270	270° rotation Door hinge on the right-hand side

Note

Included in delivery

- Mounting plate for safety switch
- Actuator incl. mounting plate
- Emergency handle (For variant -05 and -06 incl. mounting plate)

Ordering example

To order, first choose the desired safety switch and then the door handle system:

for example EX-AZ 3350-12-ZUEK-U90 and EX-AZ 3350-STS30-02

Ordering details

The drawings are always shown with a view to the switch.

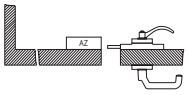
When the TF. centering device is used, the maximum actuating speed for closing the safety guard is limited to 1 m/s.

Dust zone 22

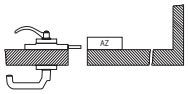
Safety switch with separate actuator

System variants

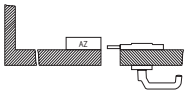
EX-AZ 3350-STS30-01



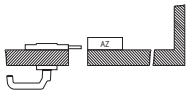
EX-AZ 3350-STS30-01



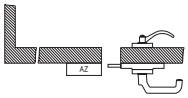
EX-AZ 3350-STS30-03



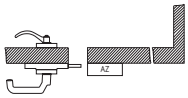
EX-AZ 3350-STS30-04



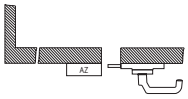
EX-AZ 3350-STS30-05



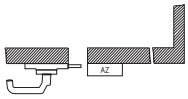
EX-AZ 3350-STS30-06



EX-AZ 3350-STS30-07

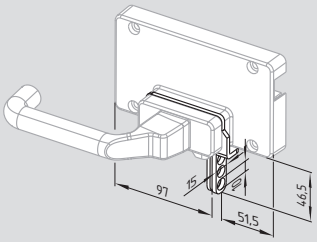


EX-AZ 3350-STS30-08

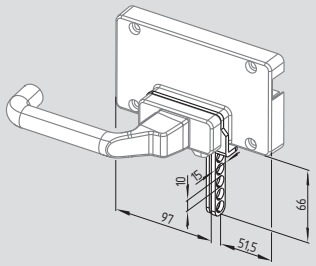


In all images, the guard door opens outwards.

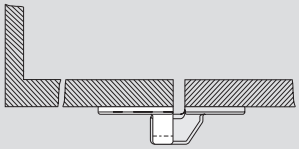
System components



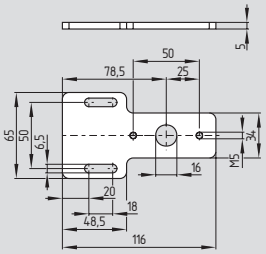
Lockout tag SZ 415-1/-2



Lockout tag SZ 415-1/-2 -2477

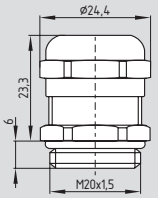


Centring device TF.



Mounting plate MP TG-01

System components



EX-certified screwed cable gland

Dust zone 22

Ordering details

Mounting inside with emergency handle

Door hinge right	**EX-AZ 3350-STS30-01**
Door hinge left	**EX-AZ 3350-STS30-01**

without emergency handle

Door hinge right	**EX-AZ 3350-STS30-03**
Door hinge left	**EX-AZ 3350-STS30-04**

Mounting outside with emergency handle

Door hinge right	**EX-AZ 3350-STS30-05**
Door hinge left	**EX-AZ 3350-STS30-06**

without emergency handle

Door hinge right	**EX-AZ 3350-STS30-06**
Door hinge left	**EX-AZ 3350-STS30-08**

Ordering details

Lockout tag

for ...STS30-01/-03/-06/-08	**SZ 415-1**
for ...STS30-02/-04/-05/-07	**SZ 415-2**

Lockout tag with 5 bore holes

for ...STS30-01/-03/-06/-08	**SZ 415-1-2177**
for ...STS30-02/-04/-05/-07	**SZ 415-2-2177**

Centering device:

Mounting outside	**TFA-010**
Mounting inside	**TFI-010**

For product information and dimensions, please refer to the Main Catalogue "Safety Technology".

Mounting plate	**MP TG-01**

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**

More Details

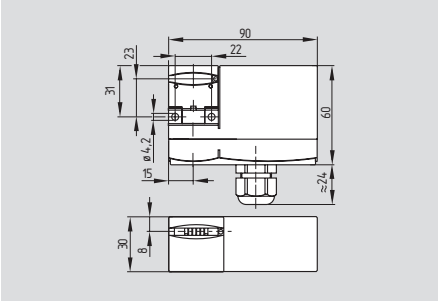
Detailed technical information at:
www.schmersal.com

Solenoid interlocks

In the solenoid interlocks of the EX-AZM series, the switching element with interlocking device and the actuator are not physically connected, but brought together or separated upon switching. When the safety guard is opened in the unlocked condition, the actuator is separated from the base unit. During this process, the NC contacts are positively opened and the NO contacts closed. Interlocking is carried out by means of a blocking bolt / latching bolt. This latching bolt blocks the actuator so that it cannot be withdrawn from the interlock. The machine control is only enabled when the actuator has been inserted into the interlock and the latching bolt is in the blocking position. This is ensured by the contact monitoring of the latching bolt.

Content

EX-AZM 170-…-3G/D



- Ex certified
- Interlock with protection against incorrect locking
- Thermoplastic enclosure
- **cut clamp terminals**
- Compact design
- Manual release
- Long life
- Double insulated ⧈
- High holding force 1000 N
- Latching force 5 N or 30 N
- Power to unlock / Power to lock
- Individual coding available on request
- 1 cable entry M20
- Including Ex-certified screwed cable gland

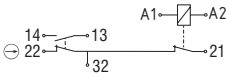
Approvals

Technical data

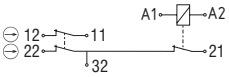
Equipment category:	Ⓔx II 3GD
Ex protection:	Ex nC IIC T5 X Ex tD A22 IP67 T80°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 EN 60079-0 EN 60079-15 BG-GS-ET-19
Enclosure:	glass-fibre reinforced thermo-plastic, self-extinguishing
Max. impact energy:	1 J
Actuating speed:	max. 1 m/s
Actuator and locking bolt:	stainless steel 1.4301
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, positive break NC contact
Connection:	cut clamp terminals
Cable section:	0.75 – 1.0 mm², flexible
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	2 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	2 A / 230 VAC 2 A / 24 VDC
Max. fuse rating:	2 A gG D-fuse
Positive break travel:	11 mm
Positive break force:	6 N for each NC contact fitted
Magnet:	100% ED
U_s:	24 VAC/DC
Power consumption:	max. 10 W
Ambient temperature:	– 15 °C … + 45 °C
Mechanical life:	> 1 million operations
F_{max}:	1000 N
Latching force:	30 N for ordering suffix R
Cable cross-section of the cable glands:	min. Ø 6.5 mm max. Ø 12 mm
	Ⓔx II 2D

Contact variants

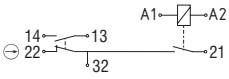
Power to unlock 1 NO / 1 NC



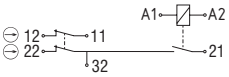
2 NC contacts



Power to lock 1 NO / 1 NC



2 NC contacts

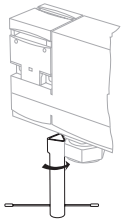


Ordering details

EX-AZM 170-①Z②K③-24VAC/DC-④-3G/D

No.	Option	Description
①	11	1NO/1NC contacts
	02	2 NC contact
②		Latching force 5 N
	R	Latching force 30 N
③		Power to unlock
	A	Power to lock
④		Manual release
	1637	Gold-plated contacts

Note



Manual release (left)

- For manual release using M5 triangular key, available as accessory
- Included in standard version

Note

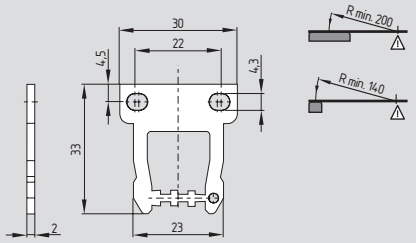
The contact 21-32 is actuated when A1-A2 is energised or de-energised.
At least one magnetic contact with positive break ⊖ must be integrated in the safety circuit.
Circuit diagrams show the de-energised condition with actuator inserted (0 in switch travel diagram).

Interlocks with the power to lock principle may only be used in special cases after a thorough evaluation of the accident risk, since the guarding device can immediately be opened on failure of the electrical power supply or when the main switch is opened.

Actuators must be ordered separately.

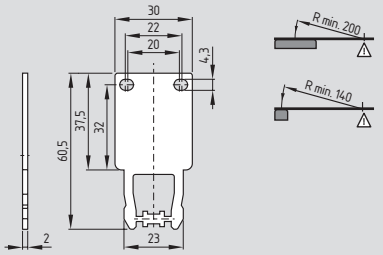
Solenoid interlocks

System components



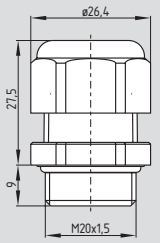
Straight actuator B1

System components

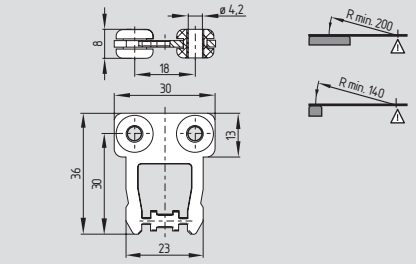


Long straight actuator B11

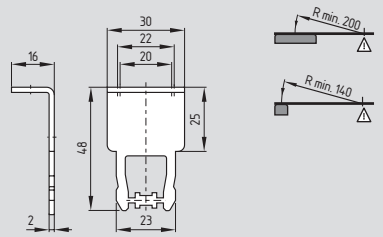
System components



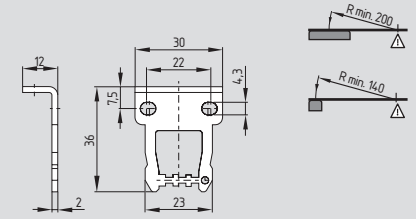
EX-certified screwed cable gland



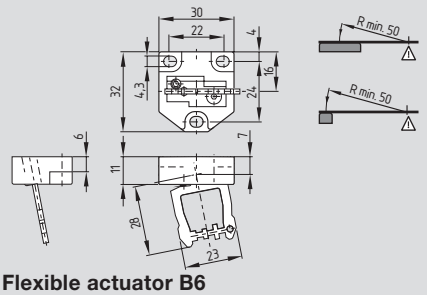
With rubber mounting B1-2245



Long angled actuator B15



Angled actuator B5



Flexible actuator B6

Ordering details

Straight actuator	**AZ 17/170-B1**
with rubber mountings	**AZ 17/170-B1-2245**
Angled actuator	**AZ 17/170-B5**
Flexible actuator	**AZM 170-B6**

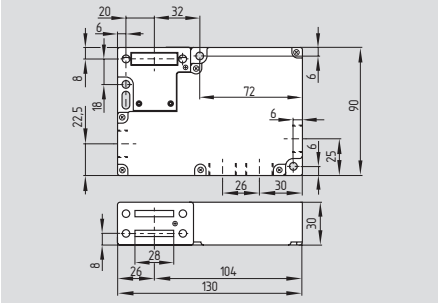
Ordering details

Long straight actuator	**AZ 17/170-B11**
Long angled actuator	**AZ 17/170-B15**

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**

EX-AZM 161-...-3D



- Ex certified
- Interlock with protection against incorrect locking
- Thermoplastic enclosure
- 6 contacts
- Manual release
- Long life
- Double insulated ⧈
- High holding force 2000 N
- Large wiring compartment
- Power to unlock / Power to lock
- Cage clamps or screw terminals
- 4 cable entries M16
- Including Ex-certified screwed cable gland

Approvals

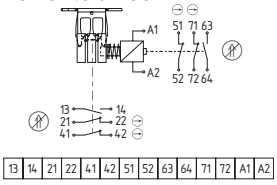
Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T80°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-19
Enclosure:	glass-fibre reinforced thermo-plastic, self-extinguishing
Actuator and locking bolt:	stainless steel 1.4301
Protective cover:	Steel painted
Max. impact energy:	1 J 7 J (with AZM 161-ME)
Actuating speed:	max. 1 m/s
Protection class:	IP67
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, positive break NC contact
Connection:	screw terminals or cage clamps
Cable section:	max. 1.5 mm² (incl. conductor ferrules)
Cable entry:	4x M16
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	5 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 2.5 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	9.5 mm
Positive break force:	10 N for each NC contact fitted
U_s:	24 VAC/DC
Magnet:	100% ED
Power consumption:	max. 10 W
Ambient temperature:	– 15 °C … + 50 °C
Mechanical life:	> 1 million operations
F_{max}:	2000 N
Latching force:	30 N for ordering suffix R
Cable cross-section of the cable glands:	min. Ø 5 mm max. Ø 10 mm
	⟨Ex⟩ II 2D

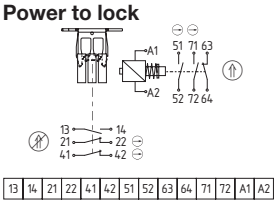
Contact variants

2 NO contact / 4 NC contacts (12/12)

Power to unlock



Power to lock

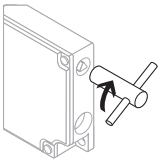


Ordering details

EX-AZM 161 ①-12/12-②K③-024-3D

No.	Option	Description
①	SK	Screw terminals
	CC	Cage clamps
②		Latching force 5 N
	R	Latching force 30 N
③		Power to unlock
	A	Power to lock

Note



Manual release

- For manual release using M5 triangular key, available as accessory
- For Maintenance purposes only.

Note

At least one magnetic contact with positive break ⊖ must be integrated in the safety circuit.

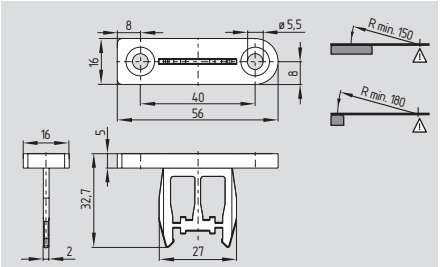
Contact variants are shown in the de-energised condition with the actuator inserted (0 in switch travel diagram).

Interlocks with the power to lock principle may only be used in special cases after a thorough evaluation of the accident risk, since the guarding device can immediately be opened on failure of the electrical power supply or when the main switch is opened.

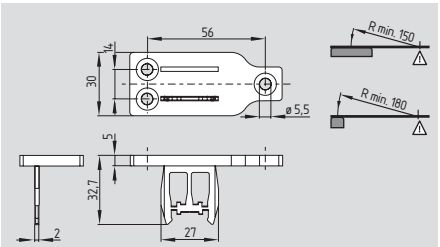
Actuators and protective cover must be ordered separately.

Solenoid interlocks

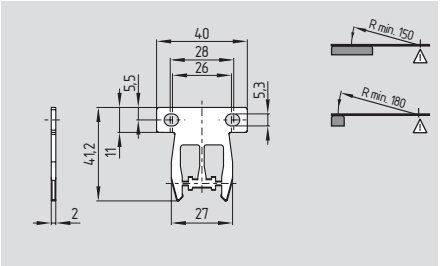
System components



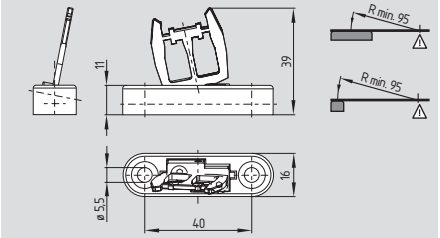
Straight actuator B1



Straight actuator B1E

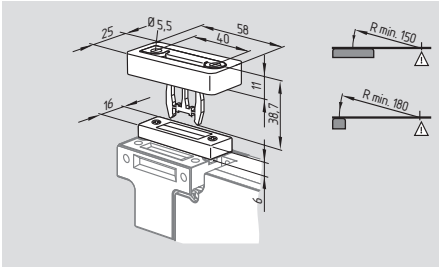


Straight actuator B1F

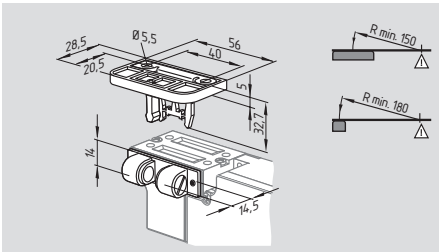


Flexible actuator B6

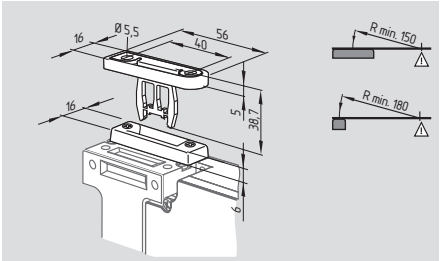
System components



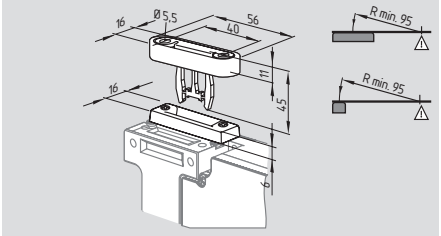
Actuator B1-2024 with slot lip-seal



Actuator B1-2053 with ball latch

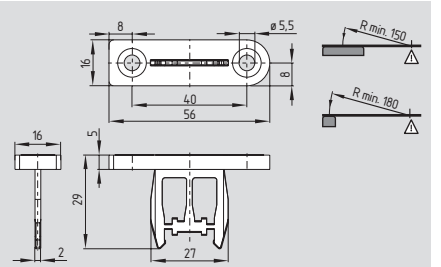


Actuator B1-2177 with centering guide

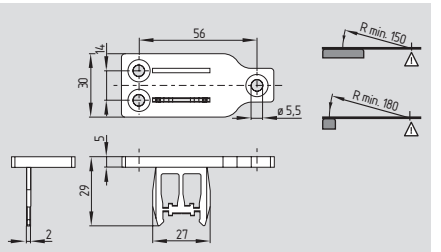


Actuator B6-2177 with centering guide

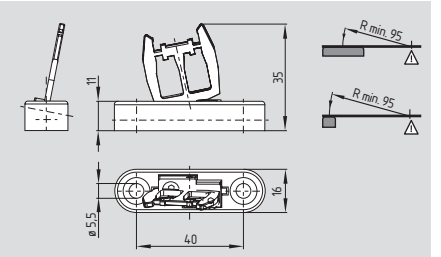
System components



Shortened straight actuator B1S



Shortened straight actuator B1ES



Shortened angled actuator B6S

Ordering details

Straight actuator	**AZM 161-B1**
Straight actuator	**AZM 161-B1E**
Straight actuator	**AZM 161-B1F**
Flexible actuator	**AZM 161-B6**

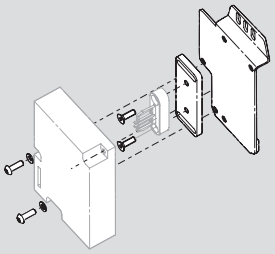
Ordering details

Straight actuator	
with slot lip-seal	**AZM 161-B1-2024**
with ball latch	**AZM 161-B1-2053**
with centering guide	**AZM 161-B1-2177**
Flexible actuator	
with centering guide	**AZM 161-B6-2177**

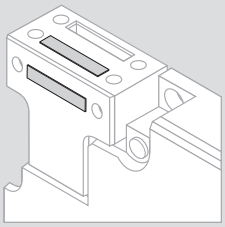
Ordering details

Shortened straight actuator	**AZM 161-B1S**
Shortened straight actuator	**AZM 161-B1ES**
Shortened angled actuator	**AZM 161-B6S**

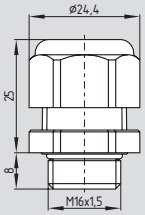
System components



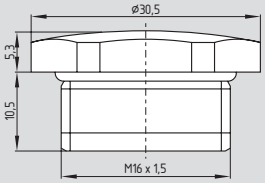
Mounting set MS AZM 161 P



Slot sealing plug AZM 161



EX-certified screwed cable gland

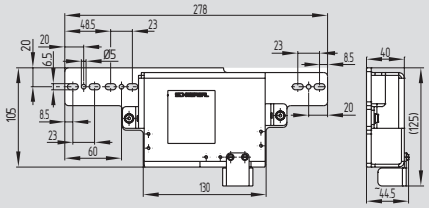


EX-certified screw plug

Ordering details

Mounting set	**MS AZM 161 P** **MS AZM 161 R/P**
Slot sealing plug AZM 161	**101145379**
Tamperproof screws with unidirectional slots (without drawing)	
M5 x 12	**101135338**
M5 x 16	**101135339**
M5 x 20	**101135340**
(Quantity 2 pcs)	
EX-certified screwed cable gland	**EX-KLE-M16x1.5**
EX-certified screw plug	**EX-VS-M16x1.5**

System components



Protective cover AZM 161-ME

Ordering details

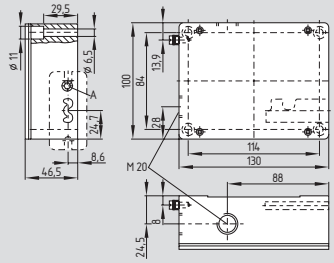
Protective cover	**AZM 161-ME**

Dust zone 22

Download now

Data sheets, mounting and wiring instructions, declaration of conformity and other information at:
www.schmersal.com

EX-AZM 415-…-3D



A: setting screw ball latch 30 - 400 N

- Ex certified
- Interlock with protection against incorrect locking
- Metal enclosure
- Two switches in one enclosure
- Problem-free opening of stressed doors by means of bell-crank system
- Robust design
- Long life
- High holding force 3500 N
- Adjustable ball latch to 400 N
- Power to unlock / Power to lock
- 2 cable entries M20
- Including Ex-certified screwed cable gland and screw plug

Approvals

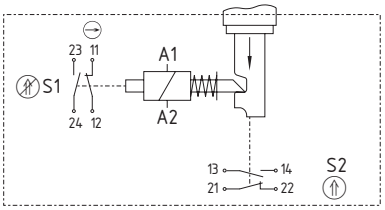
Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-19
Enclosure:	light-alloy die-cast, enamel finish
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Actuator:	zinc-plated brass/aluminium
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, positive break NC contact
Connection:	Screw terminals
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
Cable entry:	2 x M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	6 A
Utilisation category:	AC-15
I_e/U_e:	4 A / 230 VAC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	5 mm
Positive break force:	min. 15 N (depending on the setting of the ball latch)
Magnet:	100% ED
U_s:	24 VAC/DC
Power consumption:	max. 10 W
Ambient temperature:	– 10 °C … + 50 °C
Mechanical life:	> 1 million operations
F_{max}:	3500 N
Latching force:	30 - 400 N (adjustable)
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	⟨Ex⟩ II 2D

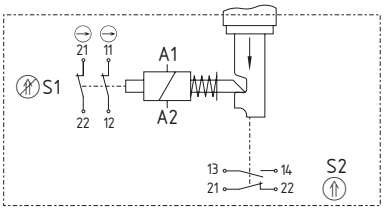
Contact variants

Power to unlock

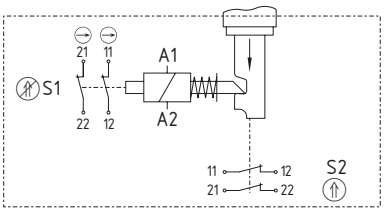
11/11 2NC/2NO



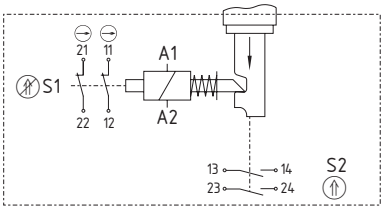
02/11 3NC/1NO



02/02 4NC



02/20 2NC/2NO



Ordering details

EX-AZM 415-①ZPK② ③-24VAC/DC-3D

No.	Option	Description
①	11/11	2NC/2NO
	02/11	3NC/1NO
	02/20	2NC/2NO
	02/02	4NC
②		Power to unlock
	A	Power to lock
③	1637	Gold-plated contacts

Note

Actuators must be ordered separately.

Note

Contact symbols are shown for the closed condition of the guard device.

The contacts 11-12 and 23-24 are actuated when the solenoid A1-A2 is energised or de-energised.

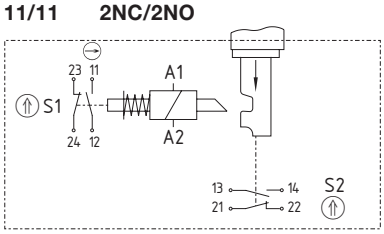
At least one magnetic contact with positive break ⊖ must be integrated in the safety circuit.

Solenoid interlocks

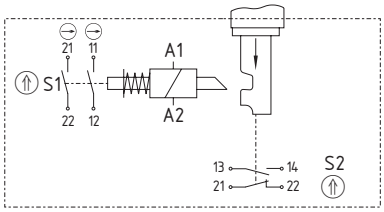
Contact variants

Power to lock

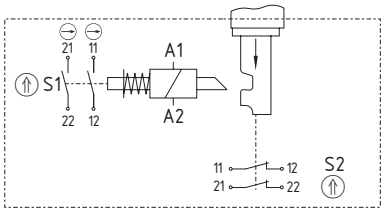
11/11 2NC/2NO



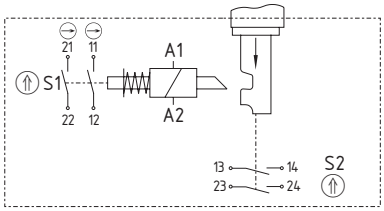
02/11 3NC/1NO



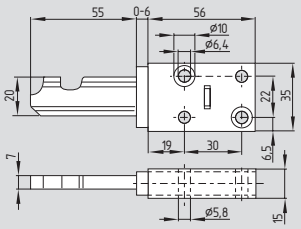
02/02 4NC



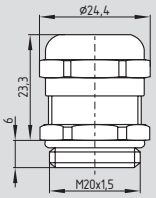
02/20 2NC/2NO



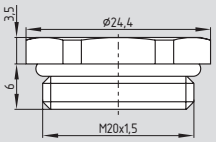
System components



Straight actuator B1



EX-certified screwed cable gland



EX-certified screw plug M20

Note

Interlocks with the power to lock principle may only be used in special cases after a thorough evaluation of the accident risk, since the guarding device can immediately be opened on failure of the electrical power supply or when the main switch is opened.

Ordering details

Straight actuator	**AZ/AZM 415-B1**
EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**

More Details

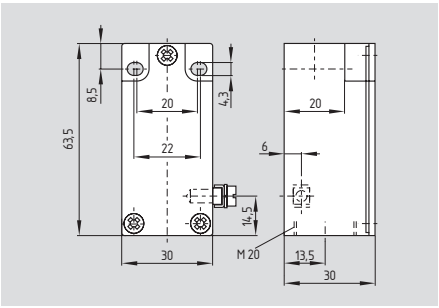
Detailed technical information at:
www.schmersal.com

Position switches with safety function

The position switches with safety function are suitable for sliding and hinged guards, which need to be closed in order to ensure the required operational safety.

Content

EX-Z/T 235-…-3D



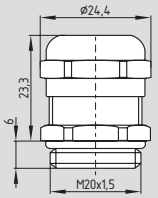
- Ex certified
- Mounting details to EN 50047
- Metal enclosure
- Available with 2 positive break NC contacts
- Snap action with constant contact pressure up to switching point
- Slow action available with overlapping or staggered contacts
- Wiring compartment
- Wide range of alternative actuators
- Actuator heads can be repositioned by 4 x 90°
- Angle of roller lever adjustable in 10° steps
- Good resistance to oil and petroleum spirit
- Metal roller available on request
- 1 cable entry M20
- incl. Ex-certified cable gland

Approvals

Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Design:	fixings to EN 50047
Enclosure:	zinc die-cast, enamel finish
Max. impact energy:	1 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1 slow or snap action, NC contacts with positive break
Connection:	screw terminals
Cable section:	max. 2.5 mm², min. 0.75 mm² (including conductor ferrules)
Cable entry:	M20
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	6 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 1 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	20 million operations
Switching frequency:	max. 5000/h
Bounce duration:	Snap action: < 3 ms; Slow action: in accordance with the actuating speed
Switchover time:	Snap action: > 5.5 ms; Slow action: in accordance with the actuating speed
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm ⟨Ex⟩ II 2D

System components



EX-certified screwed cable gland

Ordering details

EX-①② 235-③Z④-⑤-⑥-⑦-3D

No.	Option	Description
①	Z	Snap action ⊖
	T	Slow action ⊖
②	For the appropriate actuator: see page 47	
③	02	2 NC contacts
	11	1 NO contact / 1 NC contact
	20	2 NO contacts
④	H	Slow action with staggered contacts
	UE	with overlapping contacts
⑤	1297	Enclosure with transverse slotted holes
⑥	2138	Roller lever 7H for safety duties
⑦	1637	Gold-plated contacts

Ordering details

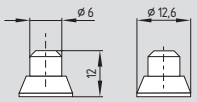
* Switches with 2 NO contacts are **only** suitable for positioning tasks!

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**

Position switches with safety function

Plunger S

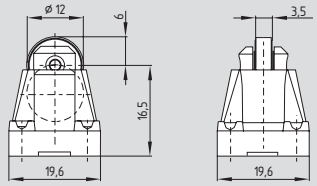


- Actuator type B to EN 50047
- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 0° to switch axis
  Snap action: Min. 10 mm/min, max. 1 m/s
  Slow action: Min. 60 mm/min, max. 1 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZS 235-11Z-3D**	**EX-TS 235-11Z-3D**	**EX-TS 235-11ZUE-3D**	
2 NC	**EX-ZS 235-02Z-3D**	**EX-TS 235-02Z-3D**		**EX-TS 235-02ZH-3D**
2 NO		**EX-TS 235-20Z-3D**		**EX-TS 235-20ZH-3D**

Roller plunger R

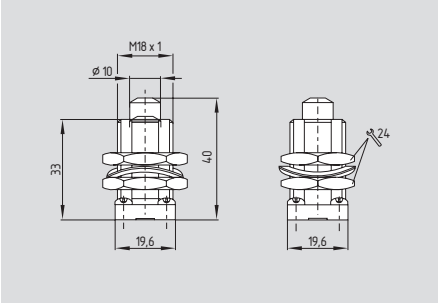


- Actuator type C to EN 50047
- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 20 mm/min, max. 1 m/s
  Slow action: Min. 120 mm/min, max. 1 m/s

Contact variants

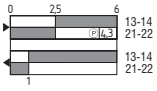
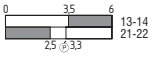
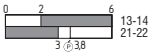
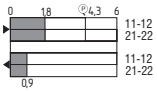
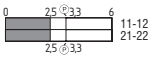
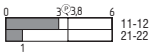
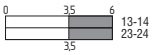
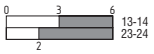
Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZR 235-11Z-3D**	**EX-TR 235-11Z-3D**	**EX-TR 235-11ZUE-3D**	
2 NC	**EX-ZR 235-02Z-3D**	**EX-TR 235-02Z-3D**		**EX-TR 235-02ZH-3D**
2 NO		**EX-TR 235-20Z-3D**		**EX-TR 235-20ZH-3D**

Plunger 4S

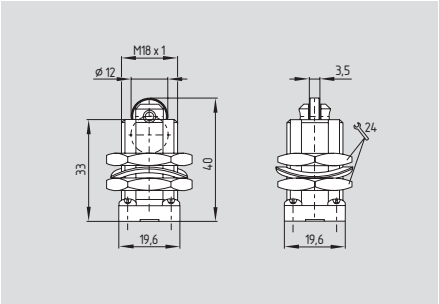


- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 0° to switch axis
  Snap action: Min. 10 mm/min, max. 1 m/s
  Slow action: Min. 60 mm/min, max. 1 m/s

Contact variants

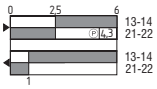
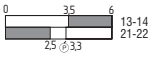
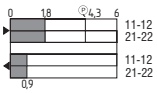
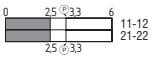
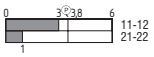
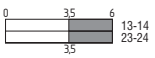
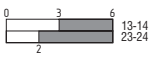
Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4S 235-11Z-3D** 	**EX-T4S 235-11Z-3D** 	**EX-T4S 235-11ZUE-3D** 	
2 NC	**EX-Z4S 235-02Z-3D** 	**EX-T4S 235-02Z-3D** 		**EX-T4S 235-02ZH-3D** 
2 NO		**EX-T4S 235-20Z-3D** 		**EX-T4S 235-20ZH-3D** 

Roller plunger 4R



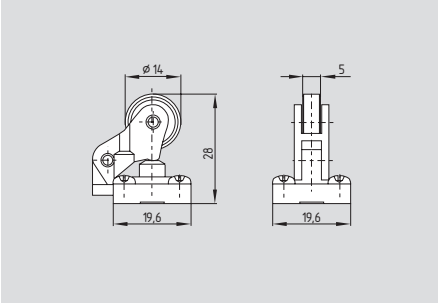
- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 20 mm/min, max. 1 m/s
  Slow action: Min. 120 mm/min, max. 1 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4R 235-11Z-3D** 	**EX-T4R 235-11Z-3D** 	**EX-T4R 235-11ZUE-3D** 	
2 NC	**EX-Z4R 235-02Z-3D** 	**EX-T4R 235-02Z-3D** 		**EX-T4R 235-02ZH-3D** 
2 NO		**EX-T4R 235-20Z-3D** 		**EX-T4R 235-20ZH-3D** 

Position switches with safety function

Offset roller lever 1R

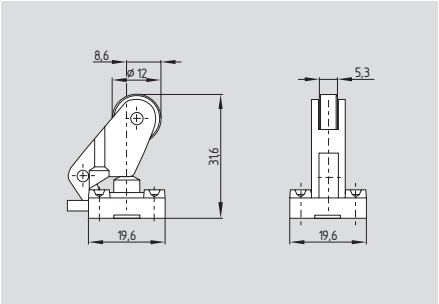


- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 27 mm/min, max. 1 m/s
  Slow action: Min. 160 mm/min, max. 1 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-Z1R 235-11Z-3D**	**EX-T1R 235-11Z-3D**	**EX-T1R 235-11ZUE-3D**
2 NC	**EX-Z1R 235-02z-3D**	**EX-T1R 235-02Z-3D**	
2 NO		**EX-T1R 235-20Z-3D**	

Offset roller lever K



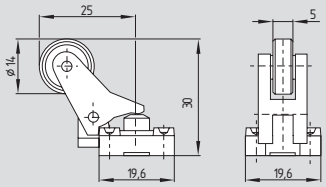
- Actuator type E to EN 50047
- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 24 mm/min, max. 1 m/s
  Slow action: Min. 240 mm/min, max. 1 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZK 235-11Z-3D**	**EX-TK 235-11Z-3D**	**EX-TK 235-11ZUE-3D**	
2 NC	**EX-ZK 235-02Z-3D**	**EX-TK 235-02Z-3D**		**EX-TK 235-02ZH-3D**
2 NO		**EX-TK 235-20Z-3D**		**EX-TK 235-20ZH-3D**

Position switches with safety function

Angle roller lever 3K

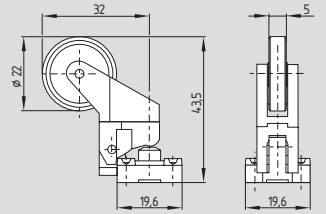


- Actuating force: Min. 9 N
- Positive break force: 19 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 27 mm/min, max. 1 m/s
  Slow action: Min. 160 mm/min, max. 1 m/s
- Actuation from bottom parallel to the switch, therefore only suitable for small housings (Z/T 235 and Z/T 236)

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z3K 235-11Z-3D**	**EX-T3K 235-11Z-3D**	**EX-T3K 235-11ZUE-3D**	
2 NC	**EX-Z3K 235-02Z-3D**	**EX-T3K 235-02Z-3D**		**EX-T3K 235-02ZH-3D**
2 NO		**EX-T3K 235-20Z-3D**		**EX-T3K 235-20ZH-3D**

Angle roller lever 4K



- Actuating force: Min. 6 N
- Positive break force: 16 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 44 mm/min, max. 1 m/s
  Slow action: Min. 264 mm/min, max. 1 m/s
- Actuation from bottom parallel to the switch, therefore only suitable for small housings (Z/T 235 and Z/T 236)

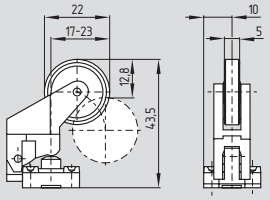
Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4K 235-11Z-3D**	**EX-T4K 235-11Z-3D**	**EX-T4K 235-11ZUE-3D**	
2 NC	**EX-Z4K 235-02Z-3D**	**EX-T4K 235-02Z-3D**		**EX-T4K 235-02ZH-3D**
2 NO		**EX-T4K 235-20Z-3D**		**EX-T4K 235-20ZH-3D**

Dust zone 22

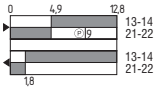
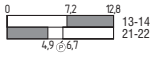
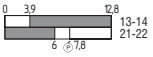
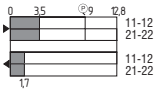
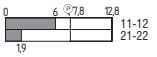
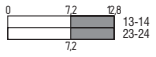
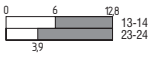
Position switches with safety function

Angle roller lever K4

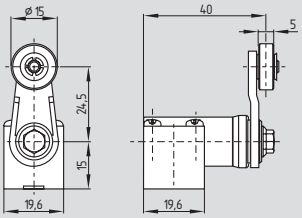


- Actuating force: Min. 6 N
- Positive break force: 16 N
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 56 mm/min, max. 1 m/s
  Slow action: Min. 336 mm/min, max. 1 m/s

Contact variants

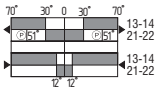
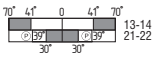
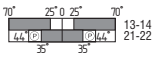
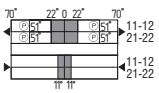
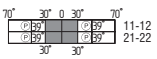
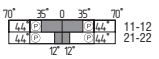
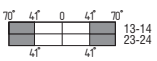
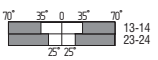
Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZK4 235-11Z-3D** 	**EX-TK4 235-11Z-3D** 	**EX-TK4 235-11ZUE-3D** 	
2 NC	**EX-ZK4 235-02Z-3D** 	**EX-TK4 235-02Z-3D** 		**EX-TK4 235-02ZH-3D** 
2 NO		**EX-TK4 235-20Z-3D** 		**EX-TK4 235-20ZH-3D** 

Roller lever 1H

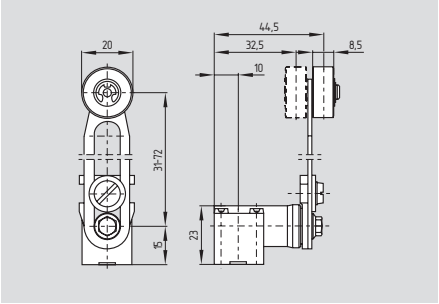


- Plastic lever
- Actuator type A to EN 50047
- Angle of roller lever adjustable in 10° steps
- Actuating torque: Min. 15 Ncm
- Positive break torque: 18.5 Ncm
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 92 mm/min, max. 1 m/s
  Slow action: Min. 492 mm/min, max. 1 m/s
- Actuator head gasket, ordering suffix -Z

Contact variants

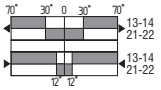
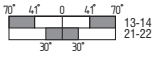
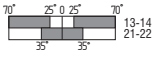
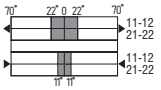
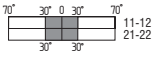
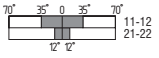
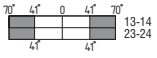
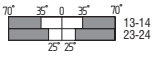
Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZV1H 235-11Z-3D** 	**EX-TV1H 235-11Z-3D** 	**EX-TV1H 235-11ZUE-3D** 	
2 NC	**EX-ZV1H 235-02Z-3D** 	**EX-TV1H 235-02Z-3D** 		**EX-TV1H 235-02ZH-3D** 
2 NO		**EX-TV1H 235-20Z-3D** 		**EX-TV1H 235-20ZH-3D** 

Roller lever 7H



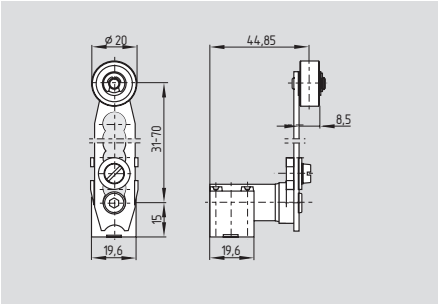
- **only for positioning tasks**
- Angle of roller lever adjustable in 10° steps
- Actuating torque: Min. 15 Ncm
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 240 mm/min, max. 1 m/s
  Slow action: Min. 1440 mm/min, max. 1 m/s
- Actuator head gasket, ordering suffix -Z

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZV7H 235-11Z-3D** 	**EX-TV7H 235-11Z-3D** 	**EX-TV7H 235-11ZUE-3D** 	
2 NC	**EX-ZV7H 235-02Z-3D** 	**EX-TV7H 235-02Z-3D** 		**EX-TV7H 235-02ZH-3D** 
2 NO		**EX-TV7H 235-20Z-3D** 		**EX-TV7H 235-20ZH-3D** 

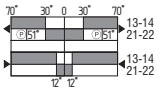
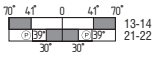
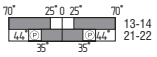
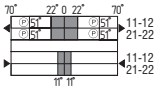
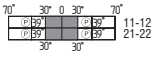
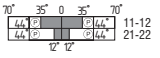
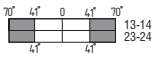
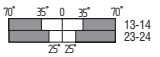
Dust zone 22

7H-2138



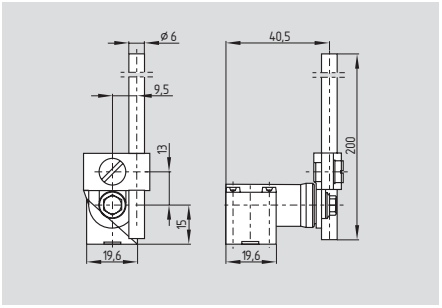
- Angle of roller lever adjustable in 10° steps
- Actuating torque: Min. 15 Ncm
- Positive break torque: 18.5 Ncm
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 240 mm/min, max. 1 m/s
  Slow action: Min. 1440 mm/min, max. 1 m/s
- Actuator head gasket, ordering suffix -Z

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZV7H 235-11Z -2138-3D** 	**EX-TV7H 235-11Z -2138-3D** 	**EX-TV7H 235-11ZUE -2138-3D** 	
2 NC	**EX-ZV7H 235-02Z -2138-3D** 	**EX-TV7H 235-02Z -2138-3D** 		**EX-TV7H 235-02ZH -2138-3D** 
2 NO		**EX-TV7H 235-20Z -2138-3D** 		**EX-TV7H 235-20ZH -2138-3D** 

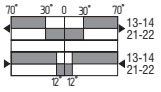
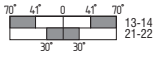
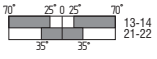
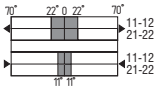
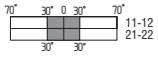
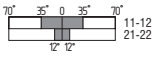
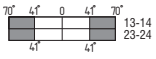
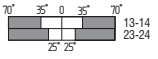
Position switches with safety function

Rod lever 10H

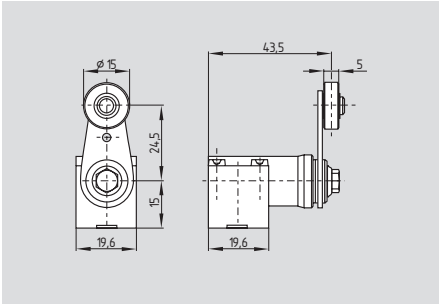


- **only for positioning tasks**
- Angle of roller lever adjustable in 10° steps
- Plastic rod
- Actuating torque: Min. 15 Ncm
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 687 mm/min, max. 1 m/s
  Slow action: Min. 4122 mm/min, max. 1 m/s
- Actuator head gasket, ordering suffix -Z
- Aluminium rod, ordering suffix -1183

Contact variants

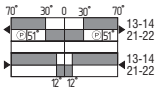
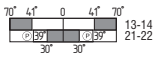
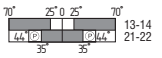
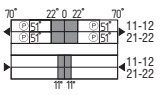
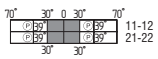
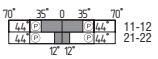
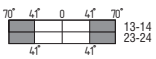
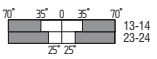
Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZV10H 235-11Z-3D** 	**EX-TV10H 235-11Z-3D** 	**EX-TV10H 235-11ZUE-3D** 	
2 NC	**EX-ZV10H 235-02Z-3D** 	**EX-TV10H 235-02Z-3D** 		**EX-TV10H 235-02ZH-3D** 
2 NO		**EX-TV10H 235-20Z-3D** 		**EX-TV10H 235-20ZH-3D** 

Roller lever 12H

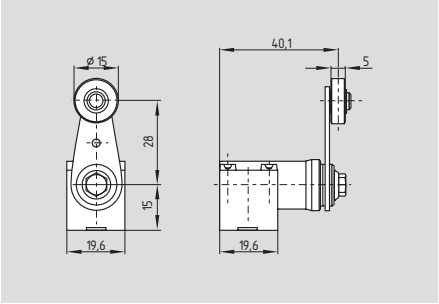


- Metal lever with plastic roller
- Actuator type A to EN 50047
- Angle of roller lever adjustable in 10° steps
- Actuating torque: Min. 15 Ncm
- Positive break torque: 18.5 Ncm
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 687 mm/min, max. 1 m/s
  Slow action: Min. 4122 mm/min, max. 1 m/s
- Actuator head gasket, ordering suffix -Z
- Available with metal roller, ordering suffix –RMS

Contact variants

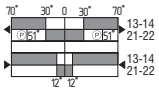
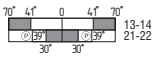
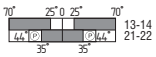
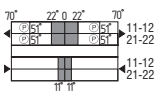
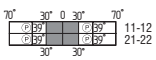
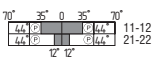
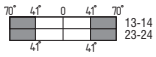
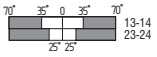
Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZV12H 235-11Z-3D** 	**EX-TV12H 235-11Z-3D** 	**EX-TV12H 235-11ZUE-3D** 	
2 NC	**EX-ZV12H 235-02Z-3D** 	**EX-TV12H 235-02Z-3D** 		**EX-TV12H 235-02ZH-3D** 
2 NO		**EX-TV12H 235-20Z-3D** 		**EX-TV12H 235-20ZH-3D** 

Roller lever 14H



- Metal lever with plastic roller
- Angle of roller lever adjustable in 10° steps
- Actuating torque: Min. 15 Ncm
- Positive break torque: 18.5 Ncm
- Actuating speed with actuating angle 30° to switch axis
  Snap action: Min. 687 mm/min, max. 1 m/s
  Slow action: Min. 4122 mm/min, max. 1 m/s
- Actuator head gasket, ordering suffix -Z
- Available with metal roller, ordering suffix –RMS

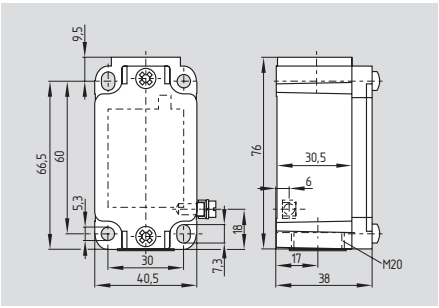
Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-ZV14H 235-11Z-3D** 	**EX-TV14H 235-11Z-3D** 	**EX-TV14H 235-11ZUE-3D** 	
2 NC	**EX-ZV14H 235-02Z-3D** 	**EX-TV14H 235-02Z-3D** 		**EX-TV14H 235-02ZH-3D** 
2 NO		**EX-TV14H 235-20Z-3D** 		**EX-TV14H 235-20ZH-3D** 

More Details

Detailed technical information at:
www.schmersal.net

EX-Z/T 335-…-3G/D



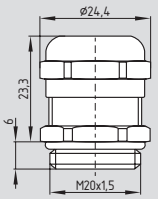
- Ex certified
- Mounting details to EN 50041
- Metal enclosure
- Snap action with constant contact pressure up to switching point
- Slow or snap action available with 2 positive break NC contacts to EN 60947-5-1
- Slow action available with overlapping or staggered contacts
- Wide range of alternative actuators
- Actuator heads can be repositioned by 4 x 90°
- Angle of roller lever adjustable in 10° steps
- Good resistance to oil and petroleum spirit
- 1 cable entry M20
- incl. Ex-certified cable gland

Approvals

Technical data

Equipment category:	⟨Ex⟩ II 3GD
Ex protection:	Ex nC IIC T5 X Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 EN 60079-0 EN 60079-15 BG-GS-ET-15
Design:	DIN EN 50041
Enclosure:	light-alloy diecast, paint finish
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	Change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action or snap action, positive break NC contact
Connection:	screw terminals
Cable section:	max. 2.5 mm² (including conductor ferrules)
Cable entry:	M20
U_{imp}:	6 kV -03Z, -12Z: 4kV
U_i:	500 V -03Z, -12Z: 250 V
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 4 A / 24VDC
Max. fuse rating:	6 A gG D-fuse
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	30 million operations
Switching frequency:	max. 5000/h
Bounce duration:	Snap action: in accordance with actuating speed; Slow action: < 2ms
Switchover time:	Snap action: < 2 ms; Slow action: in accordance with actuating speed
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	⟨Ex⟩ II 2D

System components



EX-certified screwed cable gland

Ordering details

EX-①② 335-③Z④-⑤-⑥-⑦-3G/D

No.	Option	Description
①	Z	Snap action ⊖
	T	Slow action ⊖
②	For the appropriate actuator: see page 58	
③	11	1 NO contact / 1 NC contact
	02	2 NC contacts
	20	2 NO contacts*
	01/01	1 NC contact to the left/ 1 NC contact to the right
	12	1 NO contact / 2 NC contacts
	03	3 NC contacts
④	H	Slow action with staggered contacts
	UE	with overlapping contacts

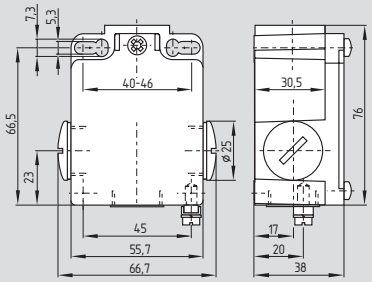
No.	Option	Description
⑤	1297	Enclosure with transverse slotted holes
⑥	2138	Roller lever 7H for safety duties
⑦	1637	Gold-plated contacts

* Switches with 2 NO contacts are only suitable for positioning tasks!

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**

EX-Z/T 355-...-3G/D



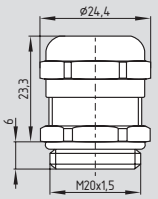
- Ex certified
- Mounting details to EN 50041
- Metal enclosure
- Snap action with constant contact pressure up to switching point
- Slow or snap action available with 2 positive break NC contacts to EN 60947-5-1
- Slow action available with overlapping or staggered contacts
- Wide range of alternative actuators
- Actuator heads can be repositioned by 4 x 90°
- Angle of roller lever adjustable in 10° steps
- Good resistance to oil and petroleum spirit
- 3 cable entries M20
- Including EX-certified screwed cable gland

Approvals

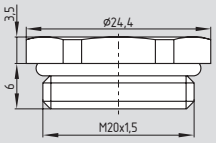
Technical data

Equipment category:	⟨Ex⟩ II 3GD
Ex protection:	Ex nC IIC T5 X Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 EN 60079-0 EN 60079-15 BG-GS-ET-15
Design:	DIN EN 50041
Enclosure:	light-alloy diecast, paint finish
Max. impact energy:	1 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact type:	Change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action or snap action, positive break NC contact
Connection:	screw terminals
Cable section:	max. 2.5 mm² (including conductor ferrules)
Cable entry:	3 x M 20
U_{imp}:	6 kV -03z, -12z: 4kV
U_i:	500 V -03z, -12z: 250 V
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 4 A / 24VDC
Max. fuse rating:	6 A gG D-fuse
Ambient temperature:	– 20 °C ... + 60 °C
Mechanical life:	30 million operations
Switching frequency:	max. 5000/h
Bounce duration:	
Bounce duration:	Snap action: in accordance with actuating speed; Slow action: < 2ms
Switchover time:	Snap action: < 2 ms; Slow action: in accordance with actuating speed
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	⟨Ex⟩ II 2D

System components



EX-certified screwed cable gland



EX-certified screw plug M20

Ordering details

EX-①② 355-③Z④-⑤-⑥-⑦-3G/D

No.	Option	Description
①	Z	Snap action ⊖
	T	Slow action ⊖
②	For the appropriate actuator: see page 58	
③	11	1 NO contact / 1 NC contact
	02	2 NC contacts
	20	2 NO contacts*
	01/01	1 NC contact to the left/ 1 NC contact to the right
	12	1 NO contact / 2 NC contacts
	03	3 NC contacts
④	H	Slow action with staggered contacts
	UE	with overlapping contacts

No.	Option	Description
⑤	1297	Enclosure with transversely slotted mounting holes
⑥	2138	Roller lever 7H for safety duties
⑦	1637	Gold-plated contacts

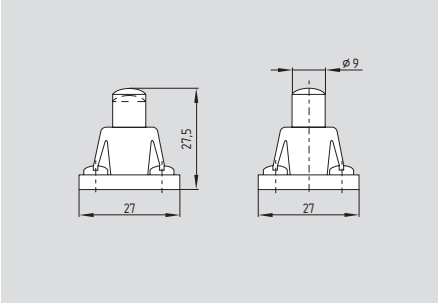
* Switches with 2 NO contacts are only suitable for positioning tasks!

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**

Position switches with safety function

Plunger S

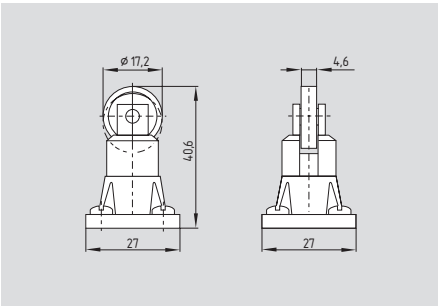


- Actuator type B to EN 50041
- Required actuating force
  Snap action: 12 N
  Slow action: 17 N
- Actuating speed with actuating angle 0° to switch axis: max. 0.5 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	EX-ZS 3..-11Z-3G/D	EX-TS 3..-11Z-3G/D	EX-TS 3..-11ZUE -3G/D	
2 NC	EX-ZS 3..-02Z-3G/D	EX-TS 3..-02Z-3G/D		EX-TS 3..-02ZH-3G/D
2 NO		EX-TS 3..-20Z-3G/D		EX-TS 3..-20ZH-3G/D
1 NO / 2 NC		EX-TS 3..-12Z-3G/D	EX-TS 3..-12ZUE -3G/D	
3 NC		EX-TS 3..-03Z-3G/D		EX-TS 3..-03ZH-3G/D

Roller plunger R



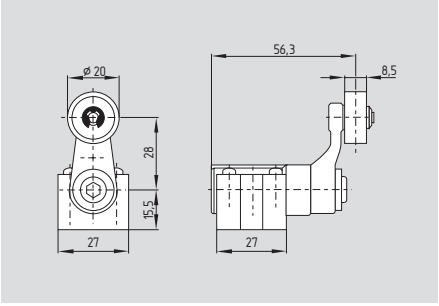
- Actuator type C to EN 50041
- Required actuating force
  Snap action: 12 N
  Slow action: 17 N
- Actuating speed with actuating angle 30° to switch axis: max. 0.5 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	EX-ZR 3..-11Z-3G/D	EX-TR 3..-11Z-3G/D	EX-TR 3..-11ZUE-3G/D	
2 NC	EX-ZR 3..-02Z-3G/D	EX-TR 3..-02Z-3G/D		EX-TR 3..-02ZH-3G/D
2 NO		EX-TR 3..-20Z-3G/D		EX-TR 3..-20ZH-3G/D
1 NO / 2 NC		EX-TR 3..-12Z-3G/D	EX-TR 3..-12ZUE-3G/D	
3 NC		EX-TR 3..-03Z-3G/D		EX-TR 3..-03ZH-3G/D

Position switches with safety function

Roller lever H



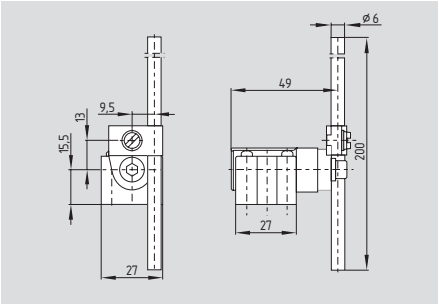
- Actuator type A to EN 50041
- Required actuating torque
  Snap action: 26 Ncm
  Slow action: 31 Ncm
- Actuating speed with actuating angle 30° to switch axis: max. 2.5 m/s
- also available with plastic roller, ordering suffix: 1H
- Available with metal roller, ordering suffix –RMS

On version EX-TVH …-01/01Z positive break only to one side.

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4VH 3..-11Z-3G/D**	**EX-T4VH 3..-11Z-3G/D**	**EX-T4VH 3..-11Z-3G/D**	
2 NC	**EX-Z4VH 3..-02Z-3G/D**	**EX-T4VH 3..-02Z-3G/D**		**EX-T4VH 3..-02ZH-3G/D**
2 NO		**EX-T4VH 3..-20Z-3G/D**		**EX-T4VH 3..-20ZH-3G/D**
1 NC left 1 NC right		**EX-T4VH 3..-01701Z-3G/D**		
1 NO / 2 NC		**EX-T4VH 3..-12Z-3G/D**	**EX-T4VH 3..-12ZUE-3G/D**	
3 NC		**EX-T4VH 3..-03Z-3G/D**		**EX-T4VH 3..-03Z-3G/D**

Rod lever 10H



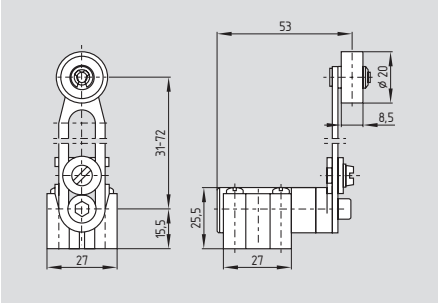
- **only for positioning tasks**
- Actuator type D to EN 50041
- Plastic rod
- Required actuating torque
  Snap action: 26 Ncm
  Slow action: 31 Ncm
- Actuating speed with actuating angle 30° to switch axis: max. 2.5 m/s
- Aluminium rod, ordering suffix -1183

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4V10H 3..-11Z-3G/D**	**EX-T4V10H 3..-11Z-3G/D**	**EX-T4V10H 3..-11ZUE-3G/D**	
2 NC	**EX-Z4V10H 3..-02Z-3G/D**	**EX-T4V10H 3..-02Z-3G/D**		**EX-T4V10H 3..-02ZH-3G/D**
2 NO		**EX-T4V10H 3..-20Z-3G/D**		**EX-T4V10H 3..-20ZH-3G/D**
1 NC left 1 NC right		**EX-TV10H 3..-01/01Z-3G/D**		
1 NO / 2 NC		**EX-T4V10H 3..-12Z-3G/D**	**EX-T4V10H 3..-12ZUE-3G/D**	
3 NC		**EX-T4V10H 3..-03Z-3G/D**		**EX-T4V10H 3..-03ZH-3G/D**

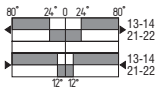
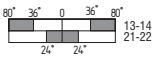
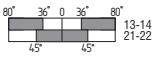
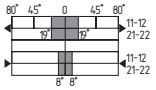
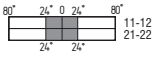
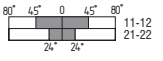
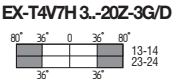
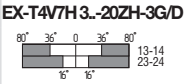
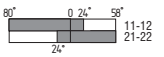
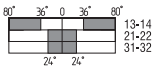
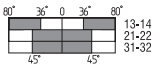
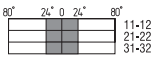
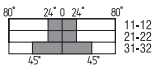
Position switches with safety function

Roller lever 7H

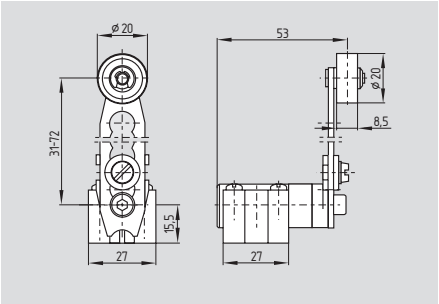


- **only for positioning tasks**
- Required actuating torque
  Snap action: 26 Ncm
  Slow action: 31 Ncm
- Actuating speed with actuating angle 30° to switch axis: max. 2.5 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4V7H 3..-11Z-3G/D** 	**EX-T4V7H 3..-11Z-3G/D** 	**EX-T4V7H 3..-11ZUE-3G/D** 	
2 NC	**EX-Z4V7H 3..-02Z-3G/D** 	**EX-T4V7H 3..-02Z-3G/D** 		**EX-T4V7H 3..-02ZH-3G/D** 
2 NO		**EX-T4V7H 3..-20Z-3G/D** 		**EX-T4V7H 3..-20ZH-3G/D** 
1 NC left 1 NC right		**EX-TV7H 3..-01/01Z-3G/D** 		
1 NO / 2 NC		**EX-T4V7H 3..-12Z-3G/D** 	**EX-T4V7H 3..-12ZUE-3G/D** 	
3 NC		**EX-T4V7H 3..-03Z-3G/D** 		**EX-T4V7H 3..-03ZH-3G/D** 

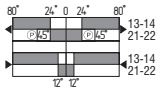
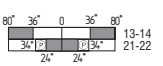
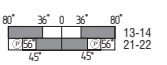
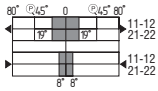
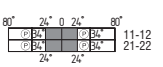
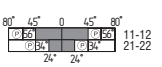
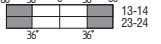
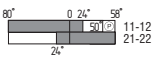
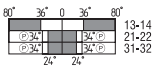
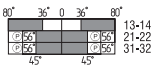
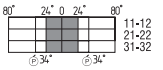
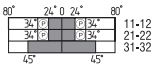
7H-2138



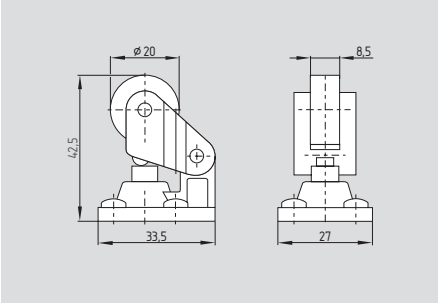
- for safety duties A
- Required actuating torque
  Snap action: 26 Ncm
  Slow action: 31 Ncm
- Actuating speed with actuating angle 30° to switch axis: max. 2.5 m/s

On version TVH ...-01/01Z positive break only to one side.

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	**EX-Z4V7H 3..-11Z -2138-3G/D** 	**EX-T4V7H 3..-11Z -2138-3G/D** 	**EX-T4V7H 3..-11ZUE- -2138 -3G/D** 	
2 NC	**EX-Z4V7H 3..-02Z -2138-3G/D** 	**EX-T4V7H 3..-02Z -2138-3G/D** 		**EX-T4V7H 3..-02ZH- -2138-3G/D** 
2 NO		**EX-T4V7H 3..-20Z -2138-3G/D** 		**EX-T4V7H 3..-20ZH- -2138-3G/D** 
1 NC left 1 NC right		**EX-TV7H 3..-01/01Z -2138-3G/D** 		
1 NO / 2 NC		**EX-T4V7H 3..-12Z -2138-3G/D** 	**EX-T4V7H 3..-12ZUE -2138-3G/D** 	
3 NC		**EX-T4V7H 3..-03Z -2138-3G/D** 		**EX-T4V7H 3..-03ZH- -2138-3G/D** 

Offset roller lever 1K

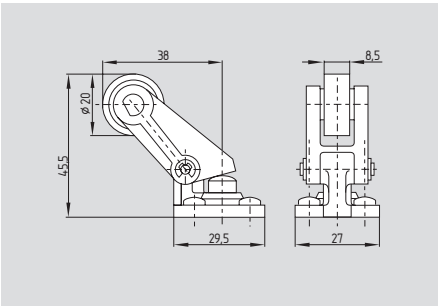


- Required actuating force
  Snap action: 12 N
  Slow action: 17 N
- Actuating speed with actuating angle 30° to switch axis: max. 0.5 m/s

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	EX-Z1K 3..-11Z-3G/D	EX-T1K 3..-11Z-3G/D	EX-T1K 3..-11ZUE-3G/D	
2 NC	EX-Z1K 3..-02Z-3G/D	EX-T1K 3..-02Z-3G/D		EX-T1K 3..-02ZH-3G/D
2 NO		EX-T1K 3..-20Z-3G/D		EX-T1K 3..-20ZH-3G/D
1 NO / 2 NC		EX-T1K 3..-12Z-3G/D	EX-T1K 3..-12ZUE-3G/D	
3 NC		EX-T1K 3..-03Z-3G/D		EX-T1K 3..-03ZH-3G/D

Angle roller lever 3K

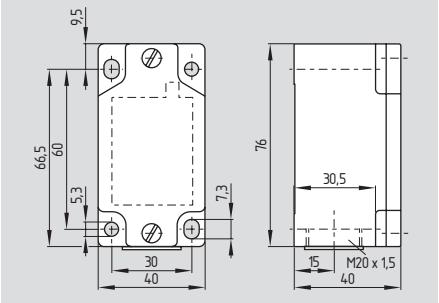


- Required actuating force
  Snap action: 12 N
  Slow action: 17 N
- Actuating speed with actuating angle 30° to switch axis: max. 0.5 m/s
- Actuation parallel to axis of switch from below

Contact variants

Contacts/ Switch travel	Snap action	Slow action	Slow action with overlapping contacts	Slow action with staggered contacts
1 NO / 1 NC	EX-Z3K 3..-11Z-3G/D	EX-T3K 3..-11Z-3G/D	EX-T3K 3..-11ZUE-3G/D	
2 NC	EX-Z3K 3..-02Z-3G/D	EX-T3K 3..-02Z-3G/D		EX-T3K 3..-02ZH-3G/D
2 NO		EX-T3K 3..-20Z-3G/D		EX-T3K 3..-20ZH-3G/D
1 NO / 2 NC		EX-T3K 3..-12Z-3G/D	EX-T3K 3..-12ZUE-3G/D	
3 NC		EX-T3K 3..-03Z-3G/D		EX-T3K 3..-03ZH-3G/D

EX-MAF 330-...-3D



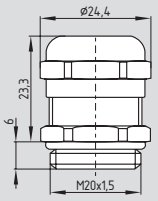
- Ex certified
- Metal enclosure
- Snap action with self-cleaning contacts, change-over contact with double break, silver contacts
- type Zb, with galvanically separated contact bridges
- Suitable for low actuating speeds
- 3 contacts
- Long life
- High level of contact reliability with low voltages and currents
- Mounting details to EN 50041
- Actuator heads can be repositioned in steps 4 x 90°
- Can be mounted on a flat surface
- Slotted holes for adjustment, circular holes for location
- 1 cable entry M20
- Including Ex-certified screwed cable gland
- Actuating speed min. 10 mm/min related to the plunger

Approvals

Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP65 T100°C X
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Actuator:	stainless steel 1.4301
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Protection class:	IP65 to EN 60529
Contact material:	Silver
Contact type:	Change-over contact with double break type Zb, 3 NC contacts with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, positive break NC contact
Connection:	screw terminals
Cable section:	max. 2.5 mm² min. 0.75 mm² (including conductor ferrules)
Cable entry:	M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	10.7 mm
Positive break force:	each NC contact 5 N
Ambient temperature:	– 15 °C ... + 80 °C
Mechanical life:	10 million operations
Latching force:	30 N for ordering suffix R
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm ⟨Ex⟩ II 2D

System components



EX-certified screwed cable gland

Ordering details

EX-MAF 330-11Y-①-②

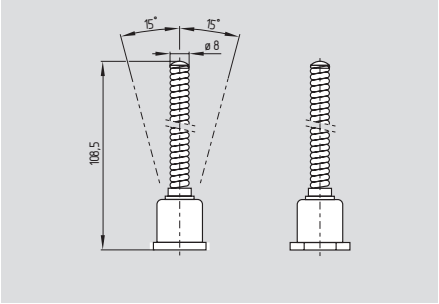
No.	Option	Description
①		without LED
②	AuNi	Gold-nickel alloy contacts

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**

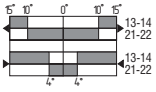
Dust zone 22

Spring rod lever AF

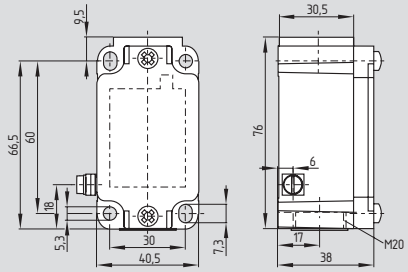


- Required actuating force 9.0 N
- can be deflected in any direction
- Elasticity of the spring allows for deflection above the max. switching angle of 15°

Contact variants

Contacts/ Switch travel	Snap action
1 NO / 1 NC	**MAF 330-11y** 

EX-T 335-...



- Ex certified
- Mounting details to EN 50041
- Metal enclosure
- Slow action with 2 positive-break NC contacts to EN 60947-5-1 available
- Slow action available with overlapping contacts
- Wide range of alternative actuators
- Actuator heads can be repositioned by 4 x 90°
- Angle of roller lever adjustable in 10° steps
- Good resistance to oil and petroleum spirit
- 1 cable entry M20
- Including Ex-certified screwed cable gland

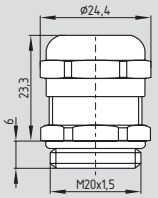
Approvals

IECEx CE

Technical data

Equipment category:	Ⓔx II 2GD
Ex protection:	Ex de IIC T6 Ex tD A21 IP65 T80°C
Standards:	EN 60947-5-1 EN 61241-0 EN 61241-1 EN 60079-0 EN 60079-1 BG-GS-ET-15
Design:	DIN EN 50041
Enclosure:	zinc die-cast, paint finish
Max. impact energy:	7 J
Actuating speed:	max. 1 m/s
Protection class:	IP65, IP67 to EN 60529
Contact material:	Silver
Contact type:	Change-over contact with double break, type Zb or 2 NC contacts, with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, positive break NC contact
Connection:	screw terminals
Cable section:	1 mm² ... 2.5 mm² (including conductor ferrules)
Cable entry:	M20
U_{imp}:	4 kV
U_i:	250 V
I_{the}:	5 A
Utilisation category:	AC-1
Max. fuse rating:	6 A gG D-fuse
Ambient temperature:	
- cable section 2.5 mm²	– 20 °C ... + 55 °C
- cable section 1 mm²	– 20 °C ... + 50 °C
Mechanical life:	> 1 million operations
Switching frequency:	max. 1800/h
Bounce duration:	< 3 ms
Switchover time:	in accordance with actuating speed
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	Ⓔx II 2D

System components



EX-certified screwed cable gland

Ordering details

EX-T① 335-②Y③-④

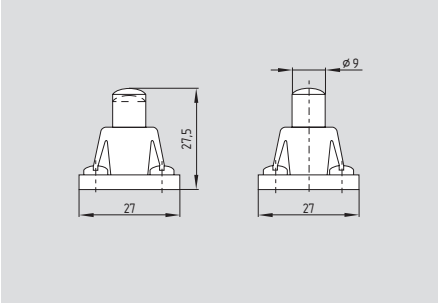
No.	Option	Description
①		For the appropriate actuator: see page 65
②	11	1 NO contact / 1 NC contact
	02	2 NC contacts
	20	2 NO contacts*
③	UE	with overlapping contacts with staggered contacts
④	2138	Roller lever 7H for safety duties

* Switches with 2 NO contacts are only suitable for positioning tasks!

Ordering details

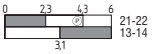
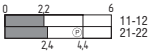
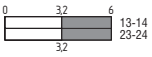
EX-certified screwed cable gland	**EX-KLE-M20x1.5**

Plunger S

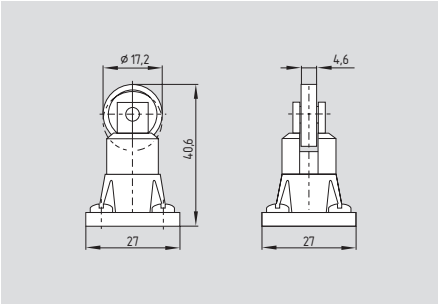


- Actuator type B to EN 50041
- Required actuating force
  Slow action: 17 N
- Actuating speed with actuating angle 0°
  to switch axis: max. 0.5 m/s

Contact variants

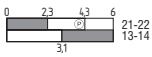
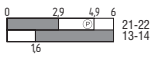
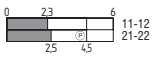
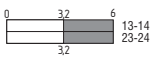
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-TS 335-11Y** 	**EX-TS 335-11YUE** 
2 NC	**EX-TS 335-02Y** 	
2 NO	**EX-TS 335-20Y** 	

Roller plunger R

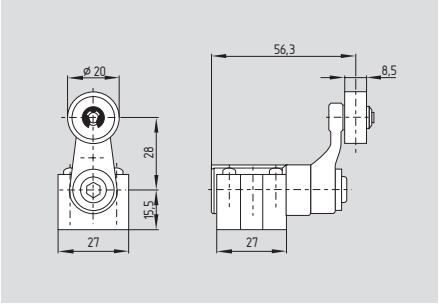


- Actuator type C to EN 50041
- Required actuating force
  Slow action: 17 N
- Actuating speed with actuating angle 30°
  to switch axis: max. 0.5 m/s

Contact variants

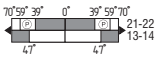
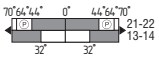
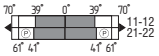
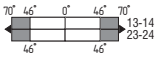
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-TR 335-11Y** 	**EX-TR 335-11YUE** 
2 NC	**EX-TR 335-02Y** 	
2 NO	**EX-TR 335-20Y** 	

Roller lever H

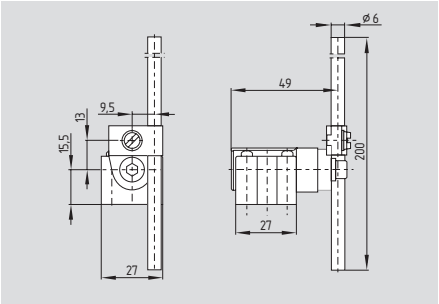


- Actuator type A to EN 50041
- Required actuating torque
  Slow action: 31 Ncm
- Actuating speed with actuating angle 30°
  to switch axis: max. 2.5 m/s

Contact variants

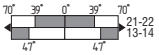
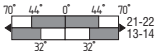
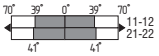
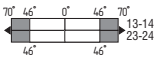
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-T4VH 335-11Y** 	**EX-T4VH 335-11YUE** 
2 NC	**EX-T4VH 335-02Y** 	
2 NO	**EX-T4VH 335-20Y** 	

Rod lever 10H

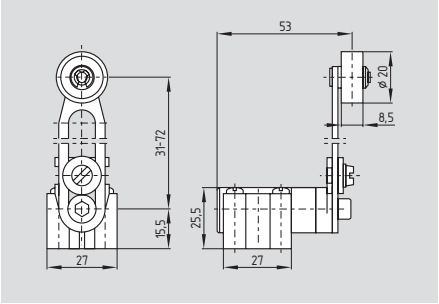


- **only for positioning tasks**
- Actuator type D to EN 50041
- Plastic rod
- Required actuating torque
  Slow action: 31 Ncm
- Actuating speed with actuating angle 30°
  to switch axis: max. 2.5 m/s

Contact variants

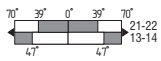
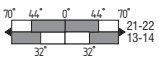
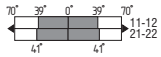
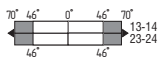
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-T4V10H 335-11Y** 	**EX-T4V10H 335-11YUE** 
2 NC	**EX-T4V10H 335-02Y** 	
2 NO	**EX-T4V10H 335-20Y** 	

Roller lever 7H

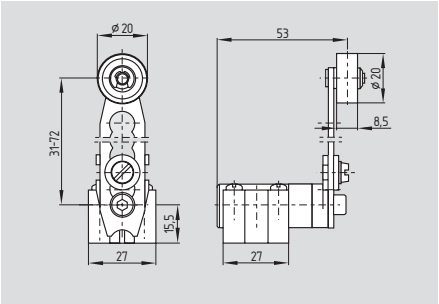


- **only for positioning tasks**
- Required actuating torque
- Slow action: 31 Ncm
- Actuating speed with actuating angle 30° to switch axis: max. 2.5 m/s

Contact variants

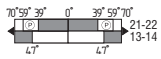
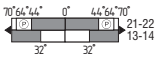
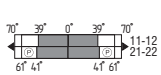
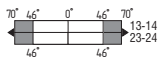
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-T4V7H 335-11Y** 	**EX-T4V7H 335-11YUE** 
2 NC	**EX-T4V7H 335-02Y** 	
2 NO	**EX-T4V7H 335-20Y** 	

7H-2138

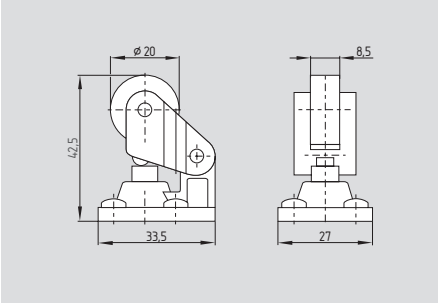


- for safety duties ⊖
- Required actuating torque Slow action: 31 Ncm
- Actuating speed with actuating angle 30° to switch axis: max. 2.5 m/s

Contact variants

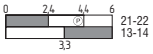
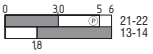
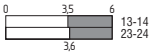
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-T4V7H 335-11Y -2138** 	**EX-T4V7H 335-11YUE-2138** 
2 NC	**EX-T4V7H 335-02Y -2138** 	
2 NO	**EX-T4V7H 335-20Y -2138** 	

Offset roller lever 1K

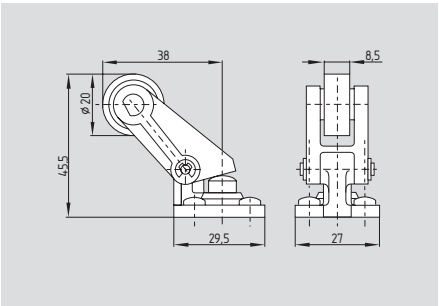


- Required actuating force
  Slow action: 17 N
- Actuating speed with actuating angle 30° to switch axis: max. 0.5 m/s

Contact variants

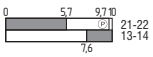
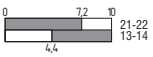
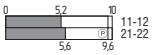
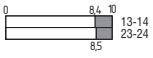
Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-T1K 335-11Y** 	**EX-T1K 335-11YUE** 
2 NC	**EX-T1K 335-02Y** 	
2 NO	**EX-T1K 335-20Y** 	

Angle roller lever 3K



- Required actuating force
  Slow action: 17 N
- Actuating speed with actuating angle 30° to switch axis: max. 0.5 m/s
- Actuation parallel to axis of switch from below

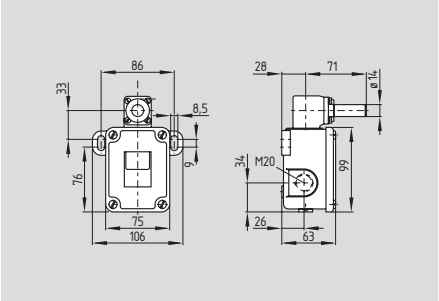
Contact variants

Contacts/ Switch travel	Slow action	Slow action with overlapping contacts
1 NO / 1 NC	**EX-T3K 335-11Y** 	**EX-T3K 335-11YUE** 
2 NC	**EX-T3K 335-02Y** 	
2 NO	**EX-T3K 335-20Y** 	

More Details

Detailed technical information at:
www.schmersal.net

EX-T/M 441-...



- Ex certified
- Metal enclosure
- Slow action, change-over contact with double break
- Snap action, change-over contact with double break
- 2 cable entries M20
- Protection class IP65, IP66 and IP67
- Suitable for heavy duty

Approvals

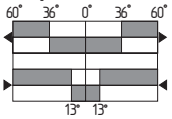
Technical data

Equipment category:	Ⓔx II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1; EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	Snap- and slow action with double break
Contact type:	Slow action: positive break NC contact ⊖ double break of 2 separated contact bridges
Connection:	screw terminals M 4
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
U_{imp}:	Snap action: 4 kV; Slow action: 6 kV
U_i:	Slow action: 250 V; Snap action: 400 V
I_{the}:	16 A
I_e/U_e:	Snap action: 4 A / 230 V; Slow action: 4 A / 400 V
Utilisation category:	AC-15
Max. fuse rating:	16 A gG D-fuse
Contact break:	Snap action: max. 2 × 2.5 mm Slow action: max. 2 × 6.0 mm
Switchover time:	Snap action: 35 ms
Bounce duration:	Snap action: 5 ms
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	10 million operations
Switching frequency:	max. 3000/h
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	Ⓔx II 2D

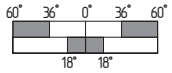
Contact variants

1 NO / 1 NC contacts

Snap action



Slow action



Ordering details

EX-①441-11Y-②-1276-2

N°	Option	Description
①	M.	Snap action
	T.	Slow action
②	UE	Slow action with overlapping contacts

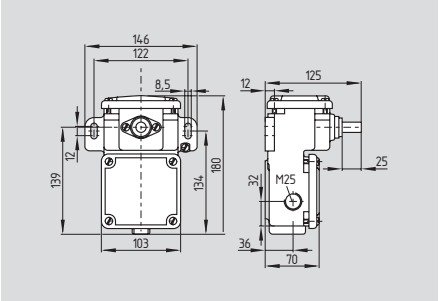
Ordering details

see page 84

EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screwed cable gland	**EX-KLE-M25x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**
EX-certified screw plug	**EX-VS-M25x1.5**

see page 76
Actuator selection (actuators must be ordered separatedly)

EX-T/M 250-...



- Ex certified
- Metal enclosure
- Slow action, change-over contact with double break
- Snap action, change-over contact with double break
- 2 cable entries M25
- Protection class IP65, IP66 and IP67
- Suitable for heavy duty

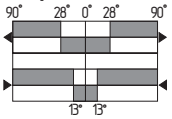
Technical data

Equipment category:	Ⓔx II 2D
Ex protection:	Ex tD A21 IP67 T90°C
Standards:	EN 60947-5-1; EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Contact type:	snap action, change-over contact, slow action positive break NC contact ⊖ double break with 2 separate contact bridges
Switching system:	Snap- and slow action
Connection:	screw terminals M 4
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	16 A
I_e/U_e:	4 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	16 A gG D-fuse
Contact break:	Snap action: max. 2 × 2.5 mm Slow action: max. 2 × 2 mm
Switchover time:	35 ms
Bounce duration:	5 ms
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	10 million operations
Switching frequency:	max. 3000/h
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm
	Ⓔx II 2D

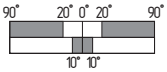
Contact variants

1 NO / 1 NC contacts

Snap action

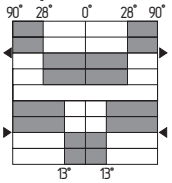


Slow action

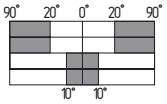


2 NO / 2 NC contacts

Snap action



Slow action



Approvals

Ordering details

EX-①250-②Z-1276-2

No.	Option	Description
①	M.	Snap action
	T.	Slow action
②	11	1 NO/1 NC contacts
	22	2 NO/2 NC

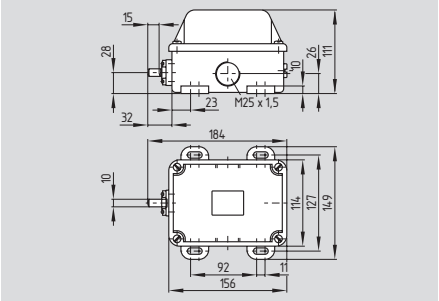
Ordering details

see page 84

EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screwed cable gland	**EX-KLE-M25x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**
EX-certified screw plug	**EX-VS-M25x1.5**

see page 76
Actuator selection (actuators must be ordered separatedly)

EX-TS 064-...



- Ex certified
- Metal enclosure
- 3 or 4 contact, slow action ⊖
- Roller levers J and X can be subsequently fitted at plunger S
- Actuator head can be repositioned in steps 4 x 90°
- 2 cable entries M25
- Protection class IP65, IP66 and IP67

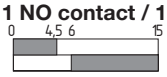
Actuation from the side of the plunger should be avoided, since this reduces the mechanical life of the position switch. Recommendation: use roller lever

Technical data

Equipment category:	⟨Ex⟩ II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1, EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Actuating speed:	max. 1 m/s, min. 0.01 m/s at the plunger
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	slow action with double break
Contact type:	NC contact positive break ⊖
Connection:	screw terminals M 5
Cable section:	max. 4 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	25 A
I_e/U_e:	25 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	16 A gG D-fuse
Allowed horsepower:	at 400 V 3-phase 5.5 kW (squirrel-cage rotor n = 1500 rpm)
Contact break:	max. 2 x 4 mm
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	1 million operations
Switching frequency:	max. 1000/h
Actuating angle:	max. 20°
Weight:	approx. 3.2 kg
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm ⟨Ex⟩ II 2D

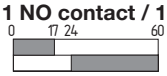
Contact variants

Plunger S
1 NO contact / 1 NC contact



Offset roller lever J
1 NO contact / 1 NC contact

Offset roller lever X
1 NO contact / 1 NC contact



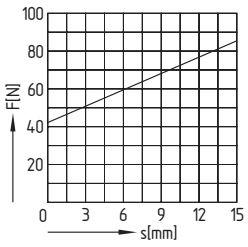
Approvals

Ordering details

EX-T① 064-②Y-③-1276-2

N°	Option	Description
①		For the appropriate actuator: see page 72
②	03	3 NC contacts
	12	1 NO/2 NC
	21	2 NO/1 NC
	30	3 NO contacts
	04	4 NC contacts
	13	1 NO/3 NC
	22	2 NO/2 NC
	31	3 NO/1 NC
	40	4 NO contacts
③	UE	Slow action with overlapping contacts
	H	with staggered contacts

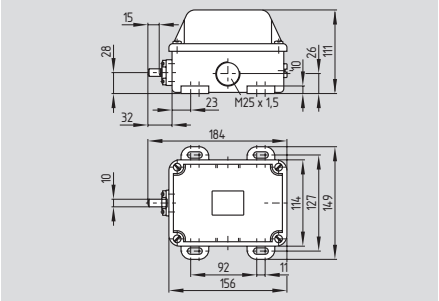
Force-travel diagram



Ordering details

EX-certified screwed cable gland	**EX-KLE-M25x1.5**
EX-certified screw plug	**EX-VS-M25x1.5**

EX-MS 064-...



- Ex certified
- Metal enclosure
- 3 or 4 contact, snap action with double break
- Roller levers J and X can be subsequently fitted at plunger S
- Actuator head can be repositioned in steps 4 x 90°
- 2 cable entries M25
- Protection class IP65, IP66 and IP67

Actuation from the side of the plunger should be avoided, since this reduces the mechanical life of the position switch. Recommendation: use roller lever

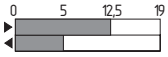
Technical data

Equipment category:	⟨Ex⟩ II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1, EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	snap action with double break
Contact type:	change-over contact, galvanically separated contact bridges
Connection:	screw terminals M 5
Cable section:	max. 4 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	25 A
I_e/U_e:	25 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	25 A gG D-fuse
Allowed horsepower:	at 400 V 3-phase 5.5 kW (squirrel-cage rotor n = 1500 rpm)
Contact break:	max. 2 x 4 mm
Ambient temperature:	– 20 °C ... + 60 °C
Mechanical life:	30000 operations
Switching frequency:	max. 1000/h
Actuating speed:	max. 1 m/s, min. 0.01 m/s at the plunger
Actuating angle:	max. 20°
Weight:	approx. 3.6 kg
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm
	⟨Ex⟩ II 2D

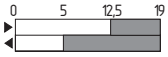
Contact variants

Plunger S

1 NC contact

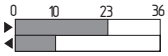


1 NO contact

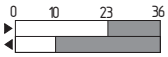


Offset roller lever J

1 NC contact

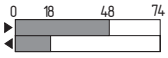


1 NO contact



Offset roller lever X

1 NC contact



1 NO contact

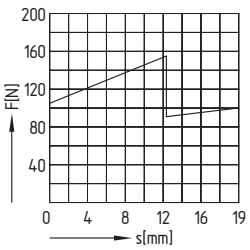
Approvals

Ordering details

EX-M① 064-②Y-1276-2

No.	Option	Description
①	For the appropriate actuator: see page 72	
②	03	3 NC contacts
	12	1 NO/2 NC
	21	2 NO/1 NC
	30	3 NO contacts
	04	4 NC contacts
	13	1 NO/3 NC
	22	2 NO/2 NC
	31	3 NO/1 NC
	40	4 NO contacts

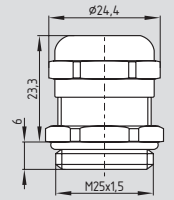
Force-travel diagram



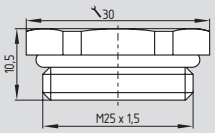
Ordering details

EX-certified screwed cable gland	**EX-KLE-M25x1.5**
EX-certified screw plug	**EX-VS-M25x1.5**

System components

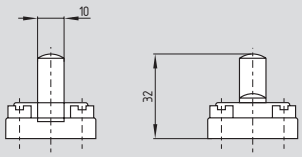


EX-certified screwed cable gland



EX-certified screw plug

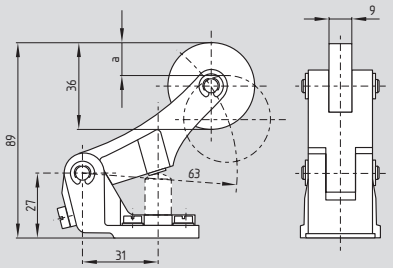
Plunger S



- Actuating speed 1 m/s with an actuating angle of max. 20°
- Roller levers J and X can be subsequently fitted at plunger S

Actuation from the side of the plunger should be avoided, since this reduces the mechanical life of the position switch.
Recommendation: use roller lever

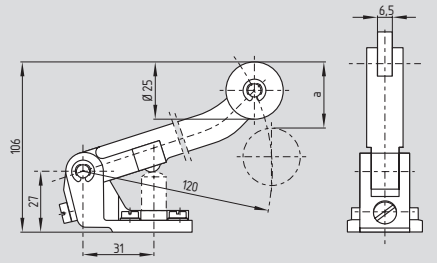
Offset roller lever J



- Actuating speed max. 0.5 m/s with an actuating angle of a = 45° and b = 30°
- Plastic roller (metal roller on request)
- Actuator head can be repositioned in steps 4 x 90°
- Available with rubber roller, ordering suffix -1

Actuation from the right side of the plunger should be avoided, since this reduces the mechanical life of the position switch.

Offset roller lever X



- Actuating speed max. 0.5 m/s with an actuating angle of α = 45° and β = 30°
- Plastic roller (metal roller on request)
- Actuator head can be repositioned in steps 4 x 90°

Actuation from the right side of the plunger should be avoided, since this reduces the mechanical life of the position switch.

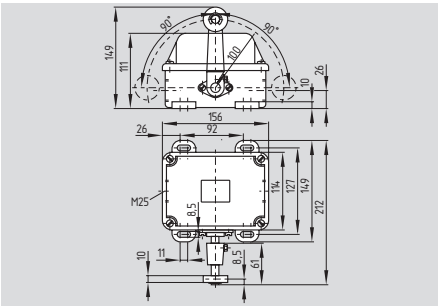
Note

Legend
α: Actuating angle from right of switch axis
β: Actuating angle from left of switch axis

Ordering details

EX-certified screwed cable gland	**EX-KLE-M25x1.5**
EX-certified screw plug	**EX-VS-M25x1.5**

EX-T. 064-...



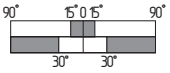
- Ex certified
- Metal enclosure
- 3 contact, slow action ⊖
- Actuating direction, each time 90° right-hand side and left-hand side rotation
- 2 cable entries M25
- Protection class IP65, IP66 and IP67
- Splined shaft and lever available with 10° toothing

Technical data

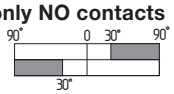
Equipment category:	⟨Ex⟩ II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1, EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	slow action with double break
Contact type:	NC contact positive break ⊖
Connection:	screw terminals M 5
Cable section:	max. 4 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	25 A
I_e/U_e:	25 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	16 A gG D-fuse
Allowed horsepower:	at 400 V 3-phase 5.5 kW (squirrel-cage rotor n = 1500 rpm)
Contact break:	max. 2 x 4 mm
Ambient temperature:	– 20 °C ... + 60 °C
Mechanical life:	1 million operations
Switching frequency:	max. 1000/h
Actuating speed:	max. 3 m/s, min. 0.05 m/s
Actuating angle:	max. 30°
Weight:	approx. 3.5 kg
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm
	⟨Ex⟩ II 2D

Contact variants

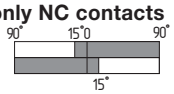
Roller lever
1 NO contact
1 NC contacts



only NO contacts



only NC contacts



Approvals

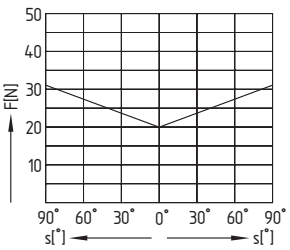
⟨Ex⟩ IECEx CE

Ordering details

EX-T. 064-①Y-②-1276-2③

No.	Option	Description
①	03	3 NC contacts
	12	1 NO/2 NC
	21	2 NO/1 NC
	30	3 NO contacts
	01/02	1 NC to the left/2 NC to the right
	02/01	2 NC to the left/1 NC to the right
	10/20	1 NC to the left/2 NC to the right
	20/10	2 NC to the left/1 NC to the right
②	H	with staggered contacts
	R	Latching 2 x 45°
③	1877	Toothed shaft

Force-travel diagram

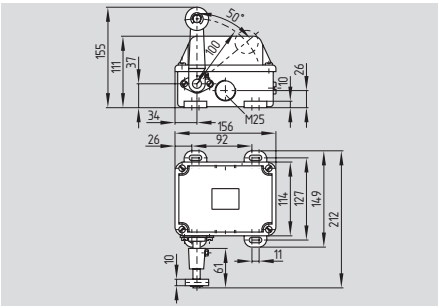


Ordering details

see page 72
EX-certified screwed cable gland **EX-KLE-M25x1.5**
EX-certified screw plug **EX-VS-M25x1.5**

see page 76
Actuator selection (actuators must be ordered separatedly)

EX-M. 064 R



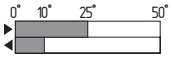
- Ex certified
- Metal enclosure
- 3 or 4 contact, snap action with double break
- Actuating direction always 50° right-hand side rotation
- 2 cable entries M25
- Protection class IP65, IP66 and IP67
- Splined shaft and lever available with 10° toothing

Technical data

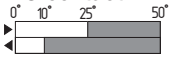
Equipment category:	Ⓔx II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1, EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	snap action with double break
Contact type:	change-over contact, galvanically separated contact bridges
Connection:	screw terminals M 5
Cable section:	max. 4 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	25 A
I_e/U_e:	25 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	25 A gG D-fuse
Allowed horsepower:	bei 400 V 3-phase 5.5 kW (squirrel-cage rotor n = 1500 rpm)
Contact break:	max. 2 x 4 mm
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	30000 operations
Switching frequency:	max. 1000/h
Actuating speed:	max. 3 m/s, min. 0.05 m/s
Actuating angle:	max. 30°
Weight:	approx. 3.7 kg
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm
	Ⓔx II 2D

Contact variants

Roller lever
1 NC contacts



1 NO contact



Approvals

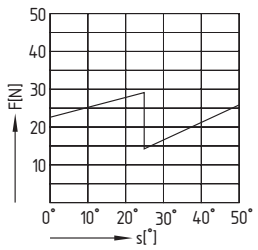
Ⓔx IECEx CE

Ordering details

EX-M. 064-①-Y-R-1276-2②

No.	Option	Description
①	12	1 NO/2 NC
	21	2 NO/1 NC
	30	3 NO contacts
	22	2 NO/2 NC contacts
	31	3 NO/1 NC
	40	4 NO contacts
②	1877	Toothed shaft

Force-travel diagram

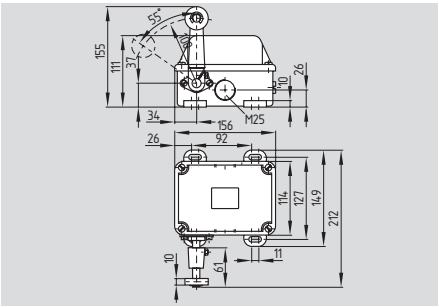


Ordering details

see page 72
EX-certified screwed cable gland **EX-KLE-M25x1.5**
EX-certified screw plug **EX-VS-M25x1.5**

see page 76
Actuator selection (actuators must be ordered separatedly)

EX-M. 064 L



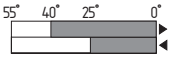
- Ex certified
- Metal enclosure
- 3 or 4 contact, snap action with double break
- Actuating direction always 55° left-hand side rotation
- 2 cable entries M25
- Protection class IP65, IP66 and IP67
- Splined shaft and lever available with 10° toothing

Technical data

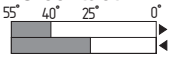
Equipment category:	Ⓔx II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1, EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	snap action with double break
Contact type:	change-over contact, galvanically separated contact bridges
Connection:	screw terminals M 5
Cable section:	max. 4 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	25 A
I_e/U_e:	25 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	25 A gG D-fuse
Allowed horsepower:	at 400 V 3-phase 5.5 kW (squirrel-cage rotor n = 1500 rpm)
Contact break:	max. 2 x 4 mm
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	30000 operations
Switching frequency:	max. 1000/h
Actuating speed:	max. 3 m/s, min. 0.05 m/s
Actuating angle:	max. 30°
Weight:	approx. 3.7 kg
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm
	Ⓔx II 2D

Contact variants

Roller lever
1 NC contacts



1 NO contact



Approvals

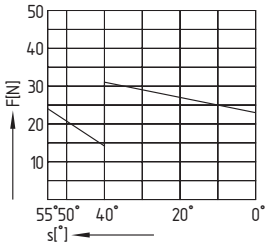
Ⓔx IECEx CE

Ordering details

EX-M. 064-①Y-L-1276-2②

No.	Option	Description
①	03	3 NC contacts
	12	1 NO/2 NC
	21	2 NO/1 NC
	04	4 NC contacts
	13	1 NO/3 NC
	22	2 NO/2 NC contacts
②	1877	Toothed shaft

Force-travel diagram

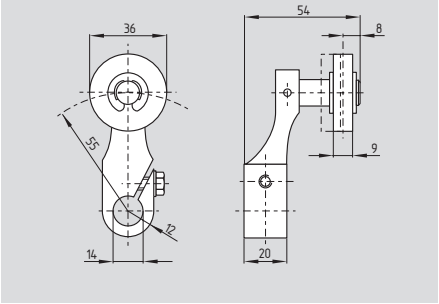


Ordering details

see page 72
EX-certified screwed cable gland **EX-KLE-M25x1.5**
EX-certified screw plug **EX-VS-M25x1.5**

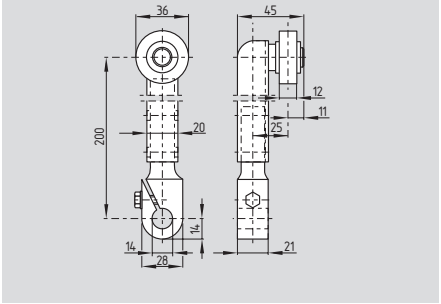
see page 76
Actuator selection (actuators must be ordered separatedly)

Roller lever L



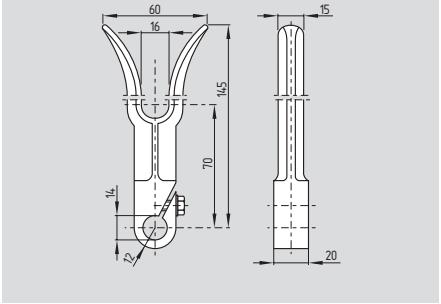
- Actuating speed max. 3 m/s with an actuating angle of a and b = 30°
- Plastic roller
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing
- Available with metal roller
- Available with rubber roller, ordering suffix -1

Roller lever V



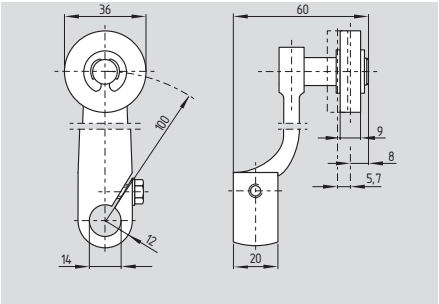
- Actuating speed max. 3 m/s with an actuating angle of a and b = 30°
- Plastic roller
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing
- Available with metal roller
- Available with rubber roller, ordering suffix -1

Fork lever C



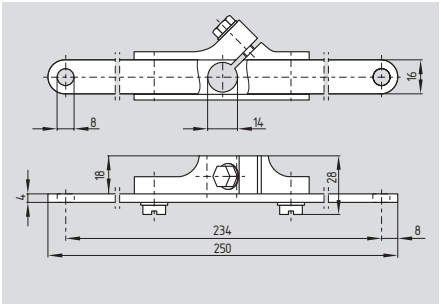
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing

Roller lever A



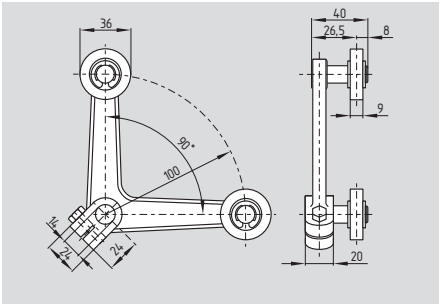
- Actuating speed max. 3 m/s with an actuating angle of a and b = 30°
- Plastic roller
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing
- Available with metal roller
- Available with rubber roller, ordering suffix -1

Pull lever Z



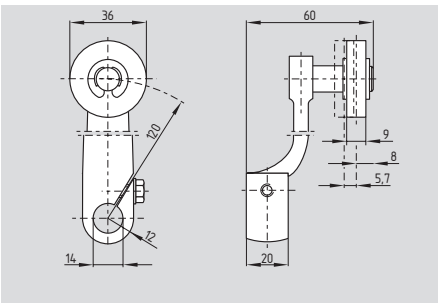
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing

Offset roller lever 4D



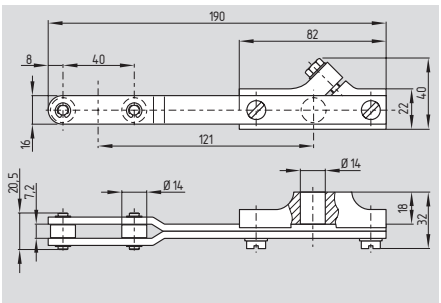
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing

Roller lever 2A



- Actuating speed max. 3 m/s with an actuating angle of a and b = 30°
- Plastic roller
- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing
- Available with metal roller
- Available with rubber roller, ordering suffix -1

Pull lever 2Z



- Continuous adjustment of lever position 360°
- Splined shaft and lever available with 10° toothing

Legend

α: Actuating angle from right of switch axis

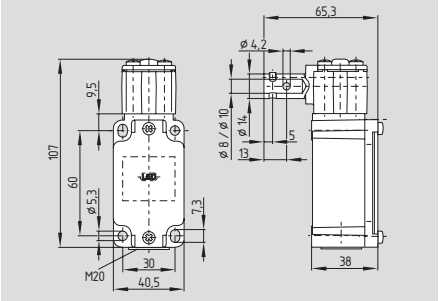
β: Actuating angle from left of switch axis

Safety switch for hinged guards

The position switches with safety function are suitable for hinged guards, which need to be closed in order to ensure the required operational safety.

Content

EX-TV.S 335-3D



- Metal enclosure
- Good resistance to oil and petroleum spirit
- The actuator can be turned by 4 x 90° using Torx T 20 screwdriver with pin
- Actuator shaft can be turned 360°
- 1 Cable entry M20
- Shaft bore Ø 8 and 10 mm

Approvals

Technical data

Equipment category:	⟨Ex⟩ II 3D
Ex protection:	Ex tD A22 IP67 T90°C X
Standards:	EN 60947-5-1; EN 61241-0; EN 61241-1; BG-GS-ET-15
Enclosure:	light-alloy diecast, paint finish
Actuator:	stainless steel 1.4301
Max. impact energy:	4 J
Actuating speed:	max. 1 m/s
Protection class:	IP67 to EN 60529
Contact material:	Silver
Contact types:	Change-over contact with double break type Zb, 3 NC contacts with galvanically separated contact bridges
Switching system:	⊖ EN 60947-5-1, slow action, positive break NC contact
Connection:	screw terminals
Cable section:	max. 2.5 mm², min. 0.75 mm² (incl. conductor ferrules)
Cable entry:	M20
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	10 A
Utilisation category:	AC-15; DC-13
I_e/U_e:	4 A / 230 VAC 4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break travel:	10.7 mm
Positive break force:	each NC contact 5 N
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	> 1 million operations
Switching frequency:	max. 1000/h
Shaft bore:	Ø 8 mm / 10 mm
Positive break angle:	7°
Positive break torque:	0.6 Nm
B_{10d} value to EN ISO 13849-1:	20 million
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	⟨Ex⟩ II 2D

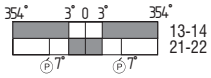
Classification:

Standards:	EN ISO 13849-1
B_{10d} Opener (NC):	20,000,000
Service life:	20 years

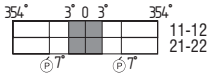
$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

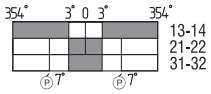
1 NO contact
1 NC contacts



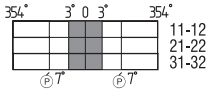
2 NC contacts



1 NO contact
2 NC contacts



3 NC contacts



Ordering details

Ex-TV①S 335-②Z-③

No.	Option	Description
①	8	Shaft bore Ø 8 mm
	10	Shaft bore Ø 10 mm
②	02	2 NC contacts
	03	3 NC contacts
	11	1NO/1NC contact
	12	1NO/2NC contacts
③		Cable entry M20

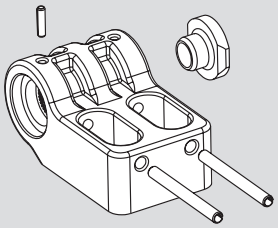
Note

Closed guard device = 0° in contact switch travel diagrams.
The switch is in resting position.

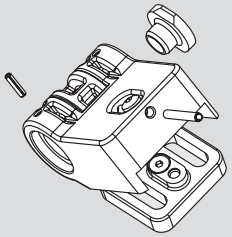
- Adjustment tool: locking screw to fix, shaft pre-drilled to pin
- Universal joint available to compensate for axial displacement only for Ø 10 mm

Safety switch for hinged guards

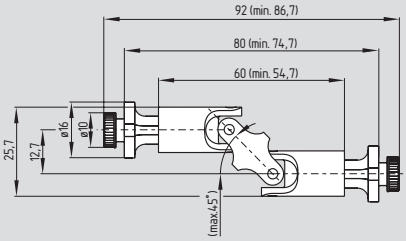
System components



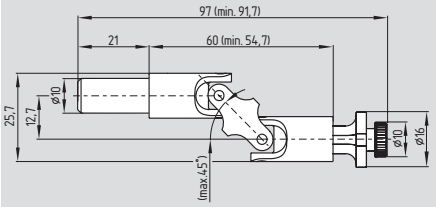
Fixed hinge F



Adjustable hinge L

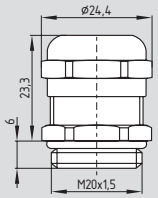


Universal joint K1



Universal joint K2

System components



EX-certified screwed cable gland

Ordering details

Fixed hinge F	**101138414**
Adjustable hinge L	**101138413**
Universal joint K1 (in combination with hinge F or L) only for TV8S 521	**101138412**
Universal joint K2 for ES 13 SB, ES 95 SB-10mm, TV 10S 335 and TV10S 355	**101147448**

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**

Ordering details

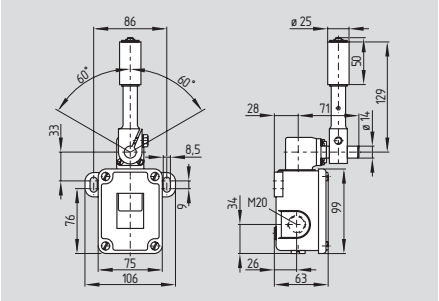
Detailed technical information at:
www.schmersal.com

Belt alignment switch / Slack-wire switch

Belt alignment switches and slack-wire switches are suitable for use on material handling equipment. The belt alignment switch is actuated, when the conveyor belt becomes misaligned. Depending on the plant set-up, this signal can be used to switch off the machinery or plant either to provide an automatic correction of the belt alignment.

Content

EX-T/M 441-...



- Ex certified
- Metal enclosure
- Slow action, change-over contact with double break
- Snap action, change-over contact with double break
- 2 cable entries M20
- Belt alignment lever available with different roller lengths
- Protection class IP65, IP66 and IP67
- Suitable for heavy duty

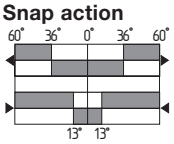
Technical data

Equipment category:	⟨Ex⟩ II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1; EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Switching system:	Snap- and slow action with double break
Contact types:	Slow action: positive break NC contact ⊖; double break of 2 separated contact bridges
Connection:	screw terminals M 4
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
U_{imp}:	snap action: 4 kV; slow action: 6 kV
U_i:	slow action: 250 V; snap action: 400 V
I_{the}:	16 A
I_e/U_e:	Snap action: 4 A / 230 V; Slow action: 4 A / 400 V
Utilisation category:	AC-15
Max. fuse rating:	16 A gG D-fuse
Contact break:	Snap action: max. 2 × 2.5 mm; Slow action: max. 2 x 6.0 mm
Switchover time:	Snap action: 35 ms
Bounce duration:	Snap action: 5 ms
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	10 million operations
Switching frequency:	max. 3000/h
Cable cross-section of the cable glands:	min. Ø 7 mm; max. Ø 12 mm; ⟨Ex⟩ II 2D

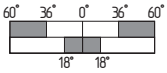
Contact variants

1 NO contact
1 NC contacts

Snap action



Slow action



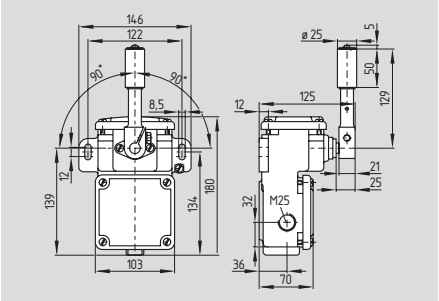
Approvals

Ordering details

EX-①441-11Y-②-③-1276-2

No.	Option	Description
①	M.	Snap action
	T.	Slow action
②	UE	Slow action with overlapping contacts
③	Actuator selection, see page 84	

EX-T/M 250-...



- Ex certified
- Metal enclosure
- Slow action, change-over contact with double break
- Snap action, change-over contact with double break
- 2 cable entries M25
- Belt alignment lever available with different roller lengths
- Protection class IP65, IP66 and IP67
- Suitable for heavy duty

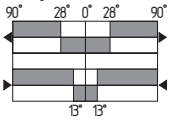
Technical data

Equipment category:	Ⓔx II 2D
Ex protection:	Ex tD A21 IP67 T90°C X
Standards:	EN 60947-5-1; EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, galvanized and painted
Protection class:	IP65, IP66 and IP67 to EN 60529
Contact material:	silver, gold-flashed
Contact types:	snap action, change-over contact, slow action positive break NC contact ⊖ double break with 2 separate contact bridges
Switching system:	Snap- and slow action
Connection:	screw terminals M 4
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	16 A
I_e/U_e:	4 A / 400 VAC
Utilisation category:	AC-15
Max. fuse rating:	16 A gG D-fuse
Contact break:	Snap action: max. 2 × 2.5 mm Slow action: max. 2 x 2 mm
Switchover time:	35 ms
Bounce duration:	5 ms
Ambient temperature:	– 20 °C … + 60 °C
Mechanical life:	10 million operations
Switching frequency:	max. 3000/h
Cable cross-section of the cable glands:	min. Ø 14 mm max. Ø 18 mm
	Ⓔx II 2D

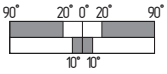
Contact variants

1 NO contact
1 NC contacts

Snap action

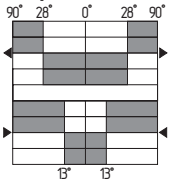


Slow action

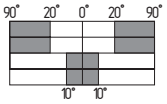


2 NO contact
2 NC contacts

Snap action



Slow action



Approvals

Ⓔx IECEx CE

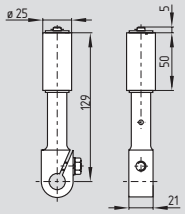
Ordering details

EX-①250-②Z-③-1276-2

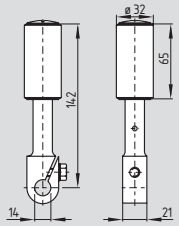
No.	Option	Description
①	M.	Snap action
	T.	Slow action
②	11	1 NO/1 NC contact
	22	2 NO/2 NC contacts
③	Actuator selection, see page 84	

Belt alignment switch / Slack-wire switch

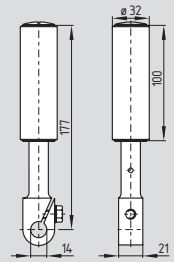
System components



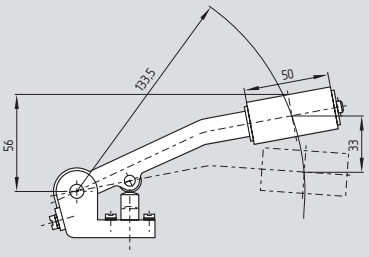
Belt alignment lever 243



Belt alignment lever 966

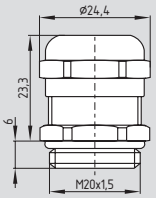


Belt alignment lever 1224

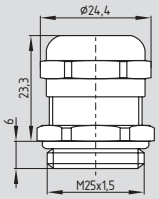


Slack-wire lever type 14

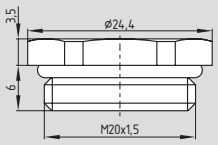
System components



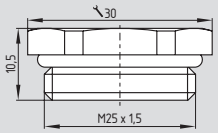
EX-certified screwed cable gland M20



EX-certified screwed cable gland M25



EX-certified screw plug M20



EX-certified screw plug M25

Ordering details

Belt alignment lever	
243	**Ordering suffix -243**
966	**Ordering suffix -966**
1224	**Ordering suffix -1224**
Slack-wire lever (only in combination with EX-T/M 441) type 14	**suffix -type 14**

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screwed cable gland	**EX-KLE-M25x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**
EX-certified screw plug	**EX-VS-M25x1.5**

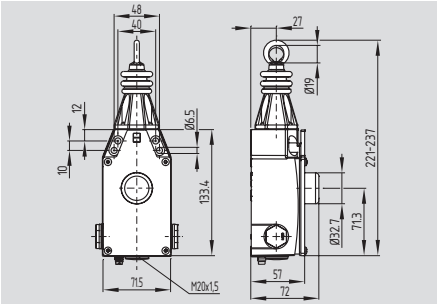
Pull-wire emergency-stop switches

Pull-wire emergency stop switches are mounted on machines and sections of plants which cannot be protected by guards. In contrast to mushroom head emergency stop push buttons, on pull-wire switches the emergency stop command can be initiated from any point on the wire.

Content

Pull-wire emergency-stop switches

Ex-ZQ 900-3D



- to EN ISO 13850 / IEC 60947-5-5
- Metal enclosure
- 4 contacts
- position indication
- Robust design
- Large wiring compartment
- 3 cable entries M20
- One tension force for wire lengths from 5 to 50 m
- Wire up to 50 m long
- Reset pushbutton
- Twisting of towing eye not possible
- External watertight collar
- Wire pull and breakage detection
- Stainless
- Including Ex-certified screwed cable gland
- Including Ex-certified screw plug

Approvals

Technical data

Equipment category:	Ⓔx II 3D
Ex protection:	Ex tD A22 IP67 T100°C
Standards:	IEC/EN 60947-5-1; IEC/EN 60947-5-5; EN 61241-0 EN 61241-1; EN ISO 13850
Enclosure:	zinc die-cast, enamel finish
Cover:	Steel
Max. impact energy:	7 J
Protection class:	IP67 to IEC/EN 60529
Contact material:	Silver
Contact types:	1 NC / 1 NO or 2 NC / 2 NO or 3 NC / 1 NO or 2 NC or 4 NC
Switching system:	⊖ IEC 60947-5-1 snap action, NC contacts with positive break
Connection:	Screw terminals
Cable section:	max. 2.5 mm² (incl. conductor ferrules)
Cable entry:	3x M20
U_{imp}:	6 kV
U_i:	500 V
I_{the}:	4 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	4 A / 230 VAC; 1 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Ambient temperature:	– 20 °C … + 55 °C
Mechanical life:	> 1 million operations
Max. wire length:	50 m (Please observe the ambient temperature range and the wire supports)
Features:	wire pull and breakage detection
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm
	Ⓔx II 2D

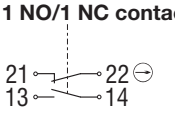
Classification:

Standards:	EN ISO 13849-1
B_{10d} Opener (NC):	100.000
Service life:	20 years

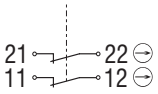
$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

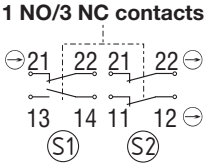
1 NO/1 NC contact



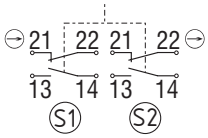
2 NC contacts



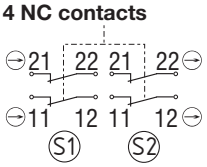
1 NO/3 NC contacts



2 NO/2 NC contacts



4 NC contacts



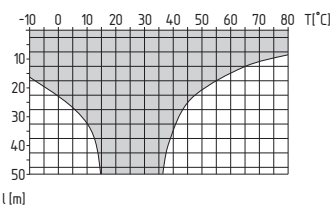
Ordering details

EX-ZQ 900-①-3D

No.	Option	Description
①	11	1 NO/1 NC contact
	13	1 NO/3 NC contacts
	22	2 NO/2 NC contacts
	02	2 NC contacts
	04	4 NC contacts

Note

Recommended cable lengths for pull-wire Emergency-Stop switches in relation to the range of ambient temperature.
At 5 m distance intermediate wire supports are required, see accessories



Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screw plug (not represented)	**EX-VS-M20x1.5**

Pull-wire emergency-stop switches

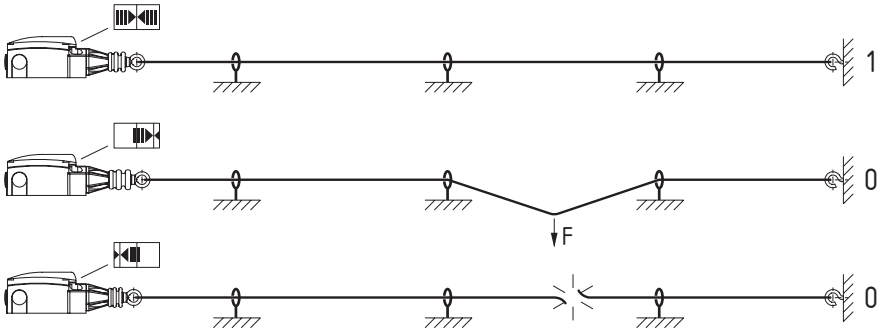
Mode of operation

Wire pull and breakage detection

Not actuated

Wire pull detection

Wire breakage detection

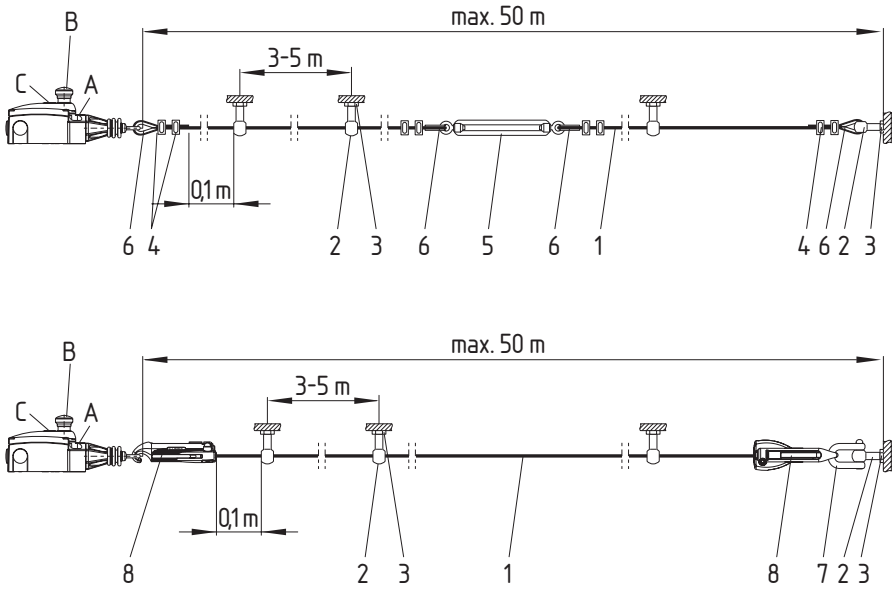


Mounting instructions

One-side operation

1 = Wire rope
2 = eyebolt
3 = nut
4 = Wire clamp
5 = tensioner
6 = wire thimble
7 = shackle
8 = wire tensioner

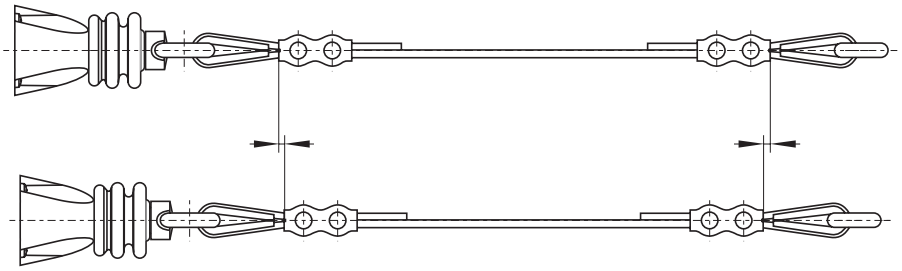
A = position indication
B = emergency-stop button



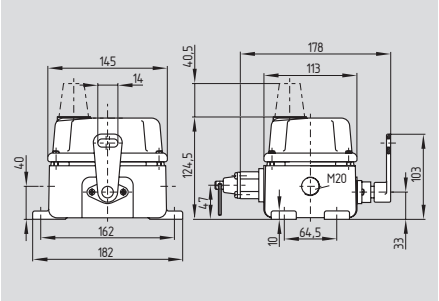
Mounting instructions

Thimble deformation

Note:
As the thimbles are subject to deformation in case of wire pull, the wire should be pulled several times after fitting.
After that, the wire must be re-tensioned using the eyebolt or the tensioner.



EX-T3Z 068-...



- Ex certified
- to EN ISO 13850 / EN 60947-5-5
- Metal enclosure
- Up to 6 contacts
- Robust design
- 2 cable entries M20
- Low actuating force
- Wire up to 2 x 50 m long
- Reset by pull ring

Approvals

Technical data

Equipment category:	⟨Ex⟩ II 2D
Ex protection:	Ex tD A21 IP65 T90°C X
Standards:	EN 60947-5-1; EN 60947-5-5; EN ISO 13850; EN 61241-0, EN 61241-1
Enclosure:	Grey cast iron, painted
Cover:	Grey cast iron, painted
Protection class:	IP65 and IP66 to EN 60529
Contact material:	silver, gold-flashed
Contact types:	Change-over contact with double break, max. 3 NO and 3 NC contacts
Switching system:	⊖ IEC 60947-5-1 snap action, NC contacts with positive break
Connection:	Screw terminals
Cable section:	max. 1.5 mm², min. 0.75 mm² solid and stranded wire with conductor ferrules
Cable entry:	2 x M 20
U_{imp}:	4 kV
U_i:	250 VAC
I_{the}:	10 A
Utilisation category:	AC-15, DC-13
I_e/U_e:	2.5 A / 230 VAC 6 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Positive break torque:	1.8 Nm
Angle for positive break travel:	32°
Positive break force:	50 N
Actuating force:	max. 50 N, (30 N in wire direction)
Ambient temperature:	– 20 °C ... + 60 °C
Mechanical life:	50000 operations
Max. wire length:	2 x 50 m
Features:	wire pull and breakage detection
Cable cross-section of the cable glands:	min. Ø 7 mm max. Ø 12 mm ⟨Ex⟩ II 2D

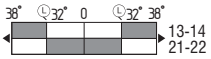
Classification:

Standards:	EN ISO 13849-1
B_{10d} Opener (NC):	100,000
Service life:	20 years

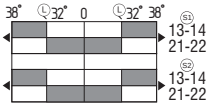
$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

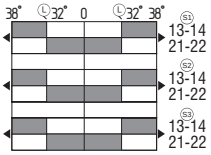
1 NO contact
1 NC contacts



2 NO contact
2 NC contacts



3 NO contact
3 NC contacts



Ordering details

EX-T3Z 068-①YR-1637

No.	Option	Description
①	11	1NO/1NC contact
	22	2NO/2NC contacts
	33	3NO/3NC contacts

Note

At 3 m distance intermediate wire supports are required, see accessories

Ordering details

EX-certified screwed cable gland	**EX-KLE-M20x1.5**
EX-certified screw plug	**EX-VS-M20x1.5**

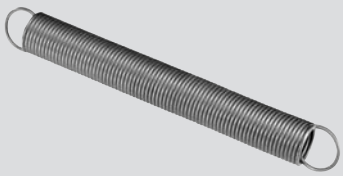
System components

Eyebolt

System components

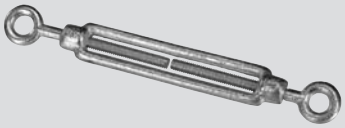
Pulley

System components



Tension spring

Wire clamp



Tensioner

S 900 wire tensioner

Duplex wire clamp

Wire rope

Shackle

Wire thimble

Wire unit complete

Ordering details

Eyebolt	
BM 10 x 40	**101084928**
BM 8 x 70 (stainless steel)	**101192471**
Wire clamp 3 mm (stainless steel)	**101203477**
Duplex wire clamp 3 mm (stainless steel)	**101190917**
Wire thimble 4 mm (stainless steel)	**101203475**
Egg-shaped wire clamp (without Images)	**101077072**

Ordering details

Pulley (stainless steel)	**101192433**
Tensioner M6	**101087930**
Wire rope per m	**on request**
Wire unit complete	**on request**

Ordering details

Tension spring	**101186696**
S 900 wire tensioner	**101186704**
Shackle (stainless steel)	**101186490**

Ordering details

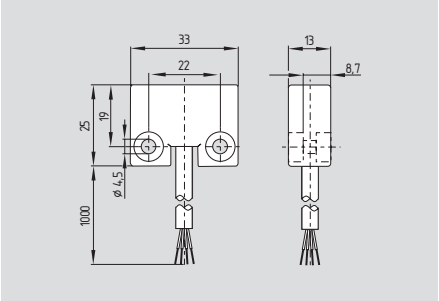
Detailed technical information at:
www.schmersal.com

Safety sensors

The use of magnetic safety sensors is of particular advantage, in cases where extremely dirty conditions can occur. This is provided by the simplicity of cleaning of the devices.
Another advantage is the possibility of concealed mounting behind non-magnetic materials. Working surfaces and storage areas can be designed without dust-collecting edges or other functional cut-outs and structures.
In applications, where a precise approach is not possible and larger tolerances are required, the magnetic safety sensors of the BNS series can also be used.

Content

EX-BNS 250-…-3G/D



- Ex certified
- Thermoplastic enclosure
- with coding
- Smallest design
- long life, no mechanical wear
- Protection class IP67
- Actuation only possible with EX-BPS 250
- Intensitive to transverse misalignment
- Concealed mounting possible
- Intensitive to soiling

Approvals

Technical data

Equipment category:	Ex II 3GD
Explosion protection:	
EX-BNS 250:	Ex nC IIC T6 X Ex tD A22 IP67 T80°C X
EX-BPS 250:	c 80°C
Standards:	EN 60947-5-3, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15, BG-GS-ET-14
Design:	rectangular
Enclosure:	glass-fibre reinforced thermoplastic
Max. impact energy:	1 J
Protection class:	IP67 to EN 60529
Connection:	Boflex cable
Cable section:	4 x 0.25 mm²
	Ordering suffix -2187: 6 x 0.25 mm²
Operating principle:	magnetic
Actuating magnet:	EX-BPS 250, coded
S_{ao}:	4 mm
S_{ar}:	14 mm
Switching condition indication:	LED only with ordering suffix G
Max. switching voltage	
without LED:	24 VDC
with LED:	24 VDC
Max. switching current	
without LED:	100 mA
with LED:	10 mA
Max. switching capacity	
without LED:	1 W
with LED:	240 mW
Ambient temperature:	– 25 °C … + 70 °C
Storage and transport temperature:	– 25 °C … + 70 °C
Max. switching frequency:	5 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55Hz, Amplitude 1 mm

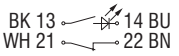
Classification:

Standards:	EN ISO 13849-1
B_{10d} NC/NO contact:	25.000.000 at 20% contact load
Service life:	20 years

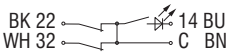
$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

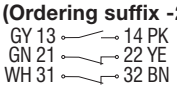
1 NO / 1 NC contacts



1 NO / 2 NC contacts



1 NO / 2 NC
(Ordering suffix -2187 without LED)

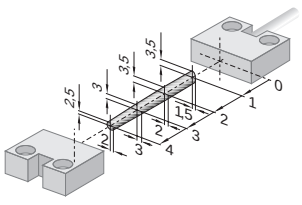


Ordering details

EX-BNS 250-①z②-③-3G/D

N°	Option	Description
①	11	1 NO / 1 NC contacts
	12	1 NO / 2 NC contacts
②		without LED
	G	with LED
③	2187	Individual contact outlet (only with 1 NO / 2 NC)

Note



Enabling zone

The actuators for the magnetic safety sensors must be ordered separately.

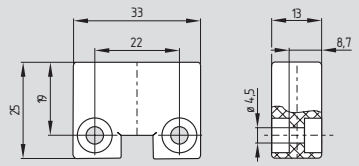
Note

Contact symbols shown for the closed condition of the guard device.

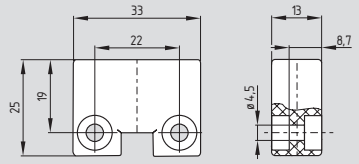
The contact configuration for versions with or without LED is identical.

The LED is illuminated when the guard door is open.

System components



Actuating magnet EX-BPS 250

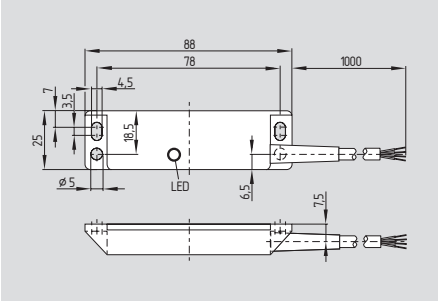


Spacer BNS 250

Ordering details

Actuating magnet	**EX-BPS 250**
Spacer	**BNS 250**

EX-BNS 33-…-3G/D



- Ex certified
- Thermoplastic enclosure
- with coding
- long life, no mechanical wear
- Protection class IP67
- Actuation only possible with EX-BPS 33
- Intensitive to transverse misalignment
- Concealed mounting possible
- Intensitive to soiling

Approvals

Technical data

Equipment category:	Ex II 3GD
Explosion protection:	
EX-BNS 33:	Ex nC IIC T6 X Ex tD A22 IP67 T80°C X
EX-BPS 33:	c 80°C
Standards:	EN 60947-5-3, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15, BG-GS-ET-14
Design:	rectangular
Enclosure:	glass-fibre reinforced thermoplastic
Max. impact energy:	1 J
Protection class:	IP67 to EN 60529
Connection:	Boflex cable
Cable section:	4 x 0.25 mm²
Ordering suffix ..-12-2187:	6 x 0.25 mm²
Operating principle:	magnetic
Actuating magnet:	EX-BPS 33, coded
S_{ao}:	5 mm
S_{ar}:	15 mm
Switching condition indication:	LED only with ordering suffix G
Max. switching voltage	
without LED:	100 VAC/DC
with LED:	24 VDC
Max. switching current	
without LED:	max. 400 mA
Ordering suffix -2187:	250 mA
with LED:	10 mA
Max. switching capacity	
without LED:	10 W
Ordering suffix ...-2187:	3 W
with LED:	240 mW
Ambient temperature:	– 25 °C … + 70 °C
Storage and transport temperature:	– 25 °C … + 70 °C
Repeat accuracy R:	≤ 0.1 x s_{ao}
Max. switching frequency:	ca. 5 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55Hz, Amplitude 1 mm

Classification:

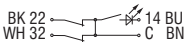
Standards:	EN ISO 13849-1
B_{10d} NC/NO contact:	25.000.000 at 20% contact load
Service life:	20 years

$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

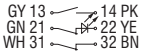
Contact variants

1 NO / 1 NC contacts

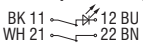
1 NO / 2 NC contacts



1 NO / 2 NC (Ordering suffix -2187)



2 NC (Ordering suffix -2187)

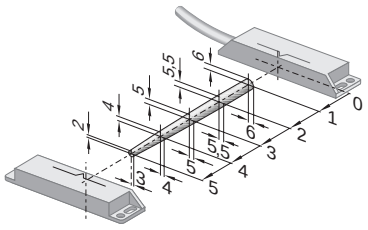


Ordering details

EX-BNS 33-①z②-③-3G/D

N°	Option	Description
①	11	1 NO / 1 NC contacts
	12	1 NO / 2 NC contacts
	02	2 NC contacts
②		without LED
	G	with LED
③	2187	Individual contact outlet (not possible for 1 NO/1 NC)

Note



Enabling zone

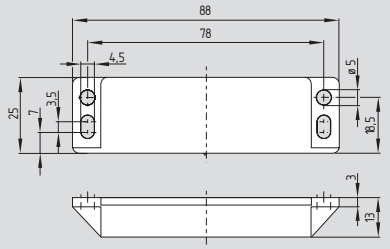
The actuators for the magnetic safety sensors must be ordered separately.

Note

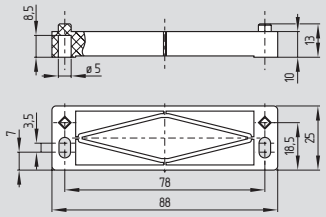
Contact symbols shown for the closed condition of the guard device.

The contact configuration for versions with or without LED is identical.

System components



Actuating magnet EX-BPS 33

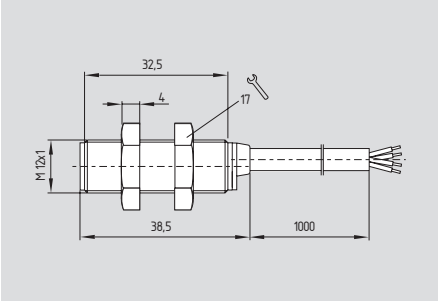


Spacer BN 31/BNS 33

Ordering details

Actuating magnet	**EX-BPS 33**
Spacer	**BN 31/BNS 33**

EX-BNS 120-...-3G/D



- Ex certified
- Thermoplastic enclosure
- long life, no mechanical wear
- Protection class IP67
- Intensitive to transverse misalignment
- Intensitive to soiling
- Particularly large switching distance
- Suitable for food processing industry

Technical data

Equipment category:	Ⓔx II 3GD
Ex protection:	Ex nC IIC T6 X Ex tD A22 IP67 T80°C X
Standards:	EN 60947-5-3, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15, BG-GS-ET-14
Design:	cylindrical
Enclosure:	glass-fibre reinforced thermoplastic, tightening torque A/F 17 max. 90 Ncm
Max. impact energy:	1 J
Protection class:	IP67 to EN 60529
Connection:	Boflex cable
Cable section:	4 x 0.25 mm²
Operating principle:	magnetic
Actuating magnet:	BP 6, BP 8, BP 10, BP 15 SS, not coded
S_{ao}:	10 mm (BP 6 / BP 8) 20 mm (BP 10 / BP 15 SS)
S_{ar}:	22 mm (BP 6 / BP 8) 32 mm (BP 10 / BP 15 SS)
Switching condition indication:	–
Switching voltage max. :	100 VAC/DC
Switching current max. :	250 mA
Switching capacity max. :	02z: 3 W -11z, -12z: 5 W
Ambient temperature:	– 25 °C ... + 70 °C
Storage and transport temperature:	– 25 °C ... + 70 °C
Max. switching frequency:	5 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55Hz, Amplitude 1 mm

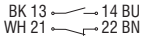
Classification:

Standards:	EN ISO 13849-1
B_{10d} NC/NO contact:	25.000.000 at 20% contact load
Service life:	20 years

$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

1 NO / 1 NC contacts



1 NO / 2 NC contacts

2 NC contacts

Approvals

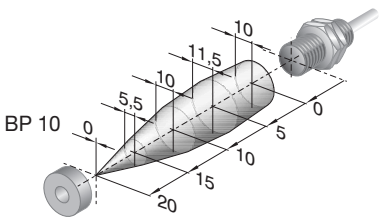
Ⓔx CE

Ordering details

EX-BNS 120-①z-3G/D

N°	Option	Description
①	11	1 NO / 1 NC contacts
	12	1 NO / 2 NC contacts
	02	2 NC contacts

Note



Enabling zone

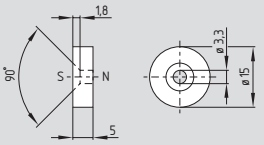
The actuators for the magnetic safety sensors must be ordered separately.

Note

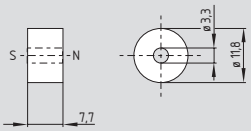
Contact symbols shown for the closed condition of the guard device.

The safety sensor is to be installed in such a way that operation with a magnet is not possible (covered installation in accordance with EN 1088).

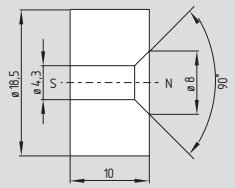
System components



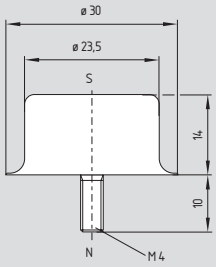
BP 6



BP 8



BP 10

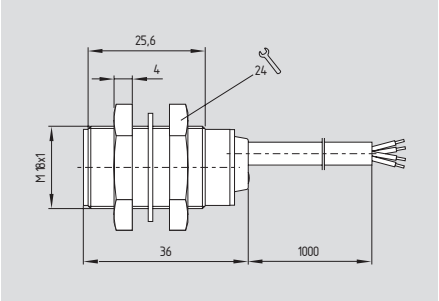


BP 15 SS

Ordering details

Actuating magnets:	
unenclosed	**BP 6**
unenclosed	**BP 8**
unenclosed	**BP 10**
stainless steel	**BP 15 SS**

EX-BNS 180-...-3G/D



- Ex certified
- Thermoplastic enclosure
- long life, no mechanical wear
- Protection class IP67
- Intensitive to transverse misalignment
- Intensitive to soiling
- Particularly large switching distance
- Suitable for food processing industry

Approvals

Technical data

Equipment category:	II 3GD
Ex protection:	Ex nC IIC T6 X Ex tD A22 IP67 T80°C X
Standards:	EN 60947-5-3, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15, BG-GS-ET-14
Design:	cylindrical
Enclosure:	glass-fibre reinforced thermoplastic, tightening torque A/F 24 max. 500 Ncm
Max. impact energy:	1 J
Protection class:	IP67 to EN 60529
Connection:	Boflex cable
Cable section:	6 x 0.25 mm²
Operating principle:	magnetic
Actuating magnet:	BP 6, BP 8, BP 10, BP 15 SS, not coded
S_{ao}:	8 mm (BP 6 / BP 8) 18 mm (BP 10 / BP 15 SS)
S_{ar}:	20 mm (BP 6 / BP 8) 28 mm (BP 10 / BP 15 SS)
Switching voltage max. without LED:	120 VAC/DC
Switching current:	max. 250 mA
Switching capacity:	max. 5 W
Ambient temperature:	– 25 °C ... + 70 °C
Storage and transport temperature:	– 25 °C ... + 70 °C
Max. switching frequency:	5 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55Hz, Amplitude 1 mm

Classification:

Standards:	EN ISO 13849-1
B_{10d} NC/NO contact:	25.000.000 at 20% contact load
Service life:	20 years

$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

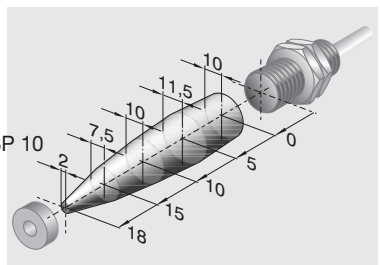
1 NO / 2 NC contacts

GY 13 — 14 PK
GN 21 — 22 YE
WH 31 — 32 BN

Ordering details

EX-BNS 180-12z-2187-2-3G/D

Note



Enabling zone

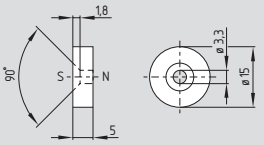
The actuators for the magnetic safety sensors must be ordered separately.

Note

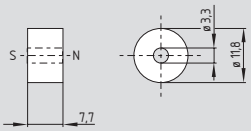
Contact symbols shown for the closed condition of the guard device.

The safety sensor is to be installed in such a way that operation with a magnet is not possible (covered installation in accordance with EN 1088).

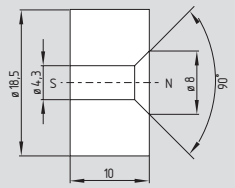
System components



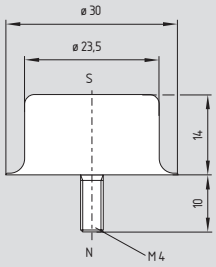
BP 6



BP 8



BP 10

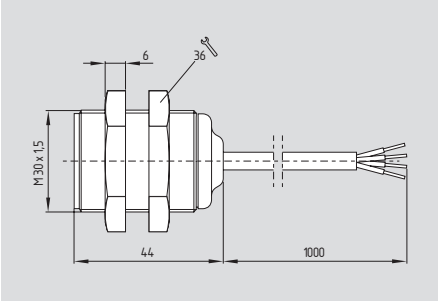


BP 15 SS

Ordering details

Actuating magnets:	
unenclosed	**BP 6**
unenclosed	**BP 8**
unenclosed	**BP 10**
stainless steel	**BP 15 SS**

EX-BNS 303-...-3G/D



- Ex certified
- Thermoplastic enclosure
- with coding
- long life, no mechanical wear
- Protection class IP67
- Intensitive to transverse misalignment
- Intensitive to soiling
- Suitable for food processing industry
- LED version available

Approvals

Technical data

Equipment category:	II 3GD
Ex protection:	Ex nC IIC T6 X Ex tD A22 IP67 T80°C X
Standards:	EN 60947-5-3, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15, BG-GS-ET-14
Design:	cylindrical
Enclosure:	glass-fibre reinforced thermoplastic, tightening force A/F 36 mm max. 300 Ncm
Max. impact energy:	1 J
Protection class:	IP67 to EN 60529
Connection:	Boflex cable
Cable section:	6 x 0.25 mm²
Operating principle:	magnetic
Actuating magnet:	BPS 300, BPS 303, BPS 303 SS, coded
S_{ao}:	5 mm
S_{ar}:	15 mm
Switching condition indication:	LED only with ordering suffix G
Max. switching voltage	
without LED:	max. 100 VAC/DC
with LED:	max. 24 VDC
Max. switching current	
without LED:	max. 400 mA
with LED:	10 mA
Max. switching capacity	
without LED:	10 W
with LED:	240 mW
Ambient temperature:	– 25 °C ... + 70 °C
Storage and transport temperature:	– 25 °C ... + 70 °C
Max. switching frequency:	5 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55Hz, Amplitude 1 mm

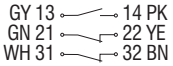
Classification:

Standards:	EN ISO 13849-1
B_{10d} NC/NO contact:	25.000.000 at 20% contact load
Service life:	20 years

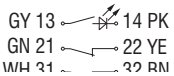
$$MTTF_d = \frac{B_{10d}}{0{,}1 \times n_{op}} \qquad n_{op} = \frac{d_{op} \times h_{op} \times 3600\ s/h}{t_{cycle}}$$

Contact variants

1 NO contacts
2 NC contacts



1 NO contacts
2 NC contacts with LED

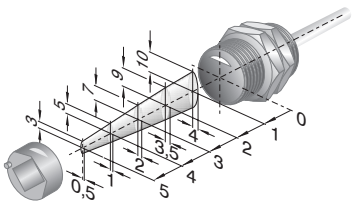


Ordering details

EX-BNS 303-12z①-2187-3G/D

N°	Option	Description
①		without LED
	G	with LED

Note



Enabling zone

The actuators for the magnetic safety sensors must be ordered separately.

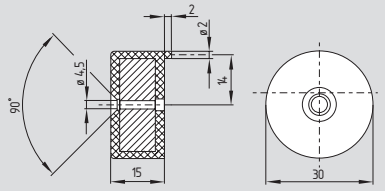
Note

Contact symbols shown for the closed condition of the guard device.

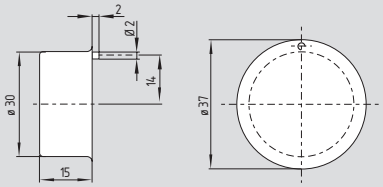
The contact configuration for versions with or without LED is identical.

The LED is illuminated when the guard door is open.

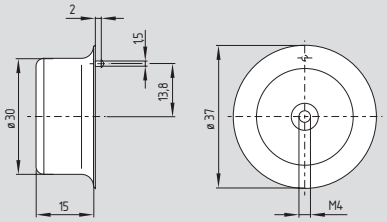
System components



BPS 300



BPS 303

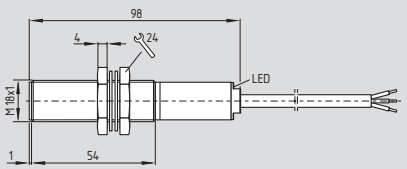


BPS 303 SS

Ordering details

Actuating magnet:	
with plastic enclosure	**BPS 300**
with plastic enclosure for food-processing industry	**BPS 303**
Stainless steel for food-processing industry	**BPS 303 SS**

EX-CSS 180-...-3G/D



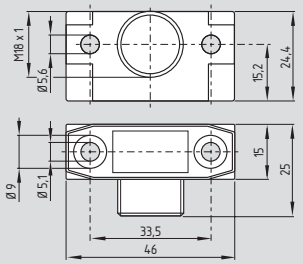
- Ex certified
- Thermoplastic enclosure
- Category 4 to EN 954-1
- Classification PDF-M to EN 60947-5-3
- Fit for SIL 3 applications to IEC 61508, PFH value < 6.1 x 10^{-9}
- Electronic contact-free, coded system
- Large switching distance
- Misaligned actuation possible
- High repeat accuracy of the switching points
- Self-monitored series-wiring of max. 16 sensors
- Max. length of the sensor chain 200 m
- Comfortable diagnostics through sensor LED and electronic signalling output
- Early warning when operating near the limit of the sensor's hysteris range
- 2 short-circuit proof PNP safety outputs (24 VDC per 500 mA)

Approvals

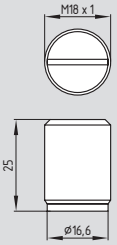
Technical data

Equipment category:	Ⓔx II 3GD
Ex protection:	Ex nA IIC T6 X Ex tD A22 IP67 T70°C X
Standards:	EN 60947-5-3, EN 954-1, IEC 61508, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15
Design:	cylindrical
Enclosure:	glass-fibre reinforced thermoplastic
Max. impact energy:	1 J
Protection class:	IP65 and IP67
Termination:	Cable
Cable section:	7 x 0.25 mm²
Cable length:	max. 200 m
Operating principle:	inductive
Actuator:	CST-180-1, CST-180-2
Category:	4 to EN 954-1
Classification:	up to PDF-M to IEC 60947-5-3
SIL classification:	suitable for SIL 3 applications to IEC 61508, PFH < 6.1 x 10^{-9}
Rated switching distance S_n:	8 mm
S_{ao}:	7 mm
S_{ar}:	10 mm
Hysteresis:	≤ 0.7 mm
Repeat accuracy R:	≤ 0.2 mm
Response time:	< 30 ms
Duration of risk:	≤ 30 ms
U_e:	24 VDC – 15 % / + 10 %
I_e:	1.0 A
I_o:	0.05 A
Leakage current I_r:	≤ 0.5 mA
Protection class:	II
Overvoltage category:	III
Degree of pollution:	3
U_{imp}:	0.8 kV
U_i:	32 VAC/DC
Safety outputs:	short-circuit proof, p-type
Output current:	max. 0.5 A each output
U_d:	max. 0.5 V
I_e/U_e:	0.5 A / 24 VDC
Signalling output:	short-circuit proof, p-type
I_e/U_e:	0.05 A / 24 VDC
Utilisation category:	AC-12, DC-13
Ambient temperature:	– 20 °C ... + 40 °C
Storage and transport temperature:	– 25 °C ... + 85 °C
Switching frequency f:	ca. 3 Hz
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55Hz, Amplitude 1 mm

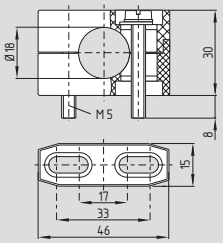
System components



CST -180-1 actuator



CST -180-2 actuator

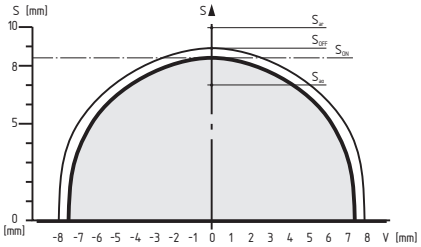


H 18 clamp

Ordering details

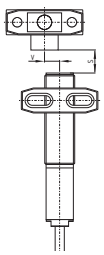
EX-CSS 8-180-2P+D-M-L-3G/D

Note



Legend

S	switching distance
V	axial misalignment
s_{on}	switch-on point
s_{off}	switch-off point
S_h	hysteresis range
S_{ao}	assured switch-on point
S_{ar}	Assured release point to EN 60947-5-3



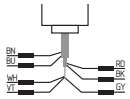
Ordering details

Actuator	**CST 180-1**
Actuator	**CST 180-2**
Clamp	**H 18**

Actuators must be ordered separately.

Connection

Sensor with multifunctional connection:
EX-CSS 8-180-2P+D-M-L-3G/D



Connecting cable:
2 m length;
cable section 7 poles: 7 x 0.25 mm^2

Wiring

Lead colours Connecting cable	Wiring
BN (brown)	A1 Ue
BU (blue)	A2 GND
VT (violet)	X1 Safety input 1
WH (white)	X2 Safety input 2
BK (black)	Y1 Safety output 1
RD (red)	Y2 Safety output 2
GY (grey)	Signalling output

Safety-monitoring module

Requirements for the safety monitoring module
2-channel p-type safety input. The safety monitoring module must tolerate internal functional tests of the sensors in milliseconds (max. 2 ms).

A range of suitable **safety monitoring modules** for these applications can be found in the „Electronic Safety Sensors and Solenoid Interlocks“ brochure.

Note

- Series-wiring of sensors:
  16 self-monitoring CSS 180 safety sensors can be wired in series without loss of control category 4 to EN 954-1. The redundant output of the first sensor is wired into the input of the next sensor.
- The voltage drop over a long sensor chain should be taken into account when planning cable routing. It depends on several factors which are operating voltage, cable length, ambient temperature, number of sensors series connected, and input load of the safety control monitor.

Ordering details

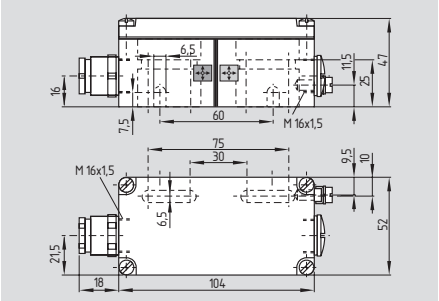
Detailed technical information at:
www.schmersal.com

Magnetic reed switches

Magnetic reed switches are often used to replace mechanically actuated limit switches with plungers, roller and turning levers.

Content

EX-BN 20-...-3G/D



- Ex certified
- Aluminium enlosure
- Long life
- Non-contact principle
- 1 Reed contact
- Particularly resistant to vibration
- Available for actuation from front or side
- Actuating distance up to 50 mm depending on actuating magnet and version
- Screw connection
- Protection class IP67
- 2 cable entries M 16
- Including Ex-certified screwed cable gland

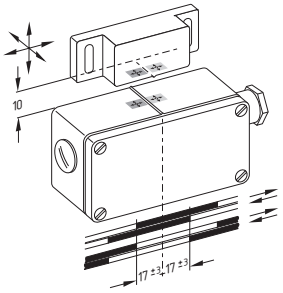
Technical data

Equipment category:	Ⓔx II 3GD
Ex protection:	Ex nC IIC T5 X Ex tD A22 IP67 T90°C X
Standards:	EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-15
Enclosure:	Al Si12 die-casting, painted
Max. impact energy:	4 J
Protection class:	IP67 to EN 60529
Connection:	screw terminals
cable entry:	2x M16
Operating principle:	magnetic
Switching voltage:	max. 250 VAC/DC
Switching current:	max. 3 A
Switching capacity:	max. 120 VA/W
Dielectric strength:	> 600 VAC (50 Hz)
Switching speed:	max. 18 m/s
Switching frequency:	max. 300 S/s
Switching time	
"Close":	0.3 ms ... 1.5 ms
"Open":	max. 0.5 ms
Bounce duration:	0.3 ms ... 0.6 ms
Ambient temperature:	– 15 °C ... + 70 °C
Storage temperature:	– 25 °C ... + 70 °C
Mechanical life:	10^8 operations
Electrical life:	1 million - 1 billion operations, depending on load
Resistance to vibration:	50 g on sine wave oscillation
Switching point accuracy:	± 0.25 mm, T = constant
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 55 Hz Amplitude 1 mm
Cable cross-section of the cable glands:	min. Ø 6 mm max. Ø 10 mm

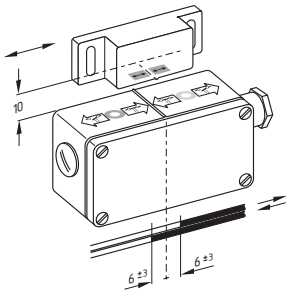
Switching distances, refer to next page.

Contact variants

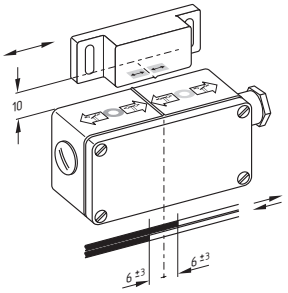
1 NO contact EX -BN 20 - 10 z
1 NC contact EX - BN 20-01z
with N -S actuating magnet BP 2



1 bistable contact EX-BN 20-rz
with N actuating magnet BP 20N



1 bistable contact EX-BN 20-rz
with S actuating magnet BP 20S



Approvals

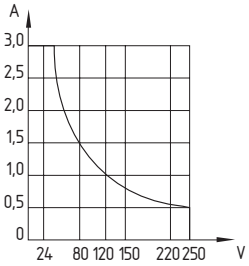
Ⓔx CE

Ordering details

EX-BN 20-①Z-3G/D

N°	Insert	Description
①	01	1 NC contacts
	02	2 NC contacts
	10	1 NO contacts
	20	2 NO contacts
	11	1 NC / 1 NO contact
	R	1 bistable contact
	2R	2 bistable contact
	11R	2 bistable contact 1 NC / 1 NO

Note



Switching capacity

Note

In version -10 and -01: When the switches and actuators come together, the colours must coincide: Red (S) to red (S) and green (N) to green (N).

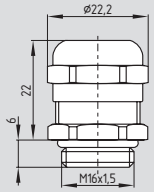
The actuators for the magnetic safety sensors must be ordered separately.

On the next pages, a range of suitable actuating magnets is presented.

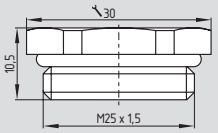
Switch distances

Actuating magnet	EX-BN 20-10z EX-BN 20-20z EX-BN 20-01z EX-BN 20-02z EX-BN 20-11z	EX-BN 20-rz EX-BN 20-2rz EX-BN 20-11rz
BP 10 N		5
BP 10 S		5
2 x BP 10	12	
2 x BP 10 N		10
2 x BP 10 S		10
BP 15 N		7
BP 15 S		7
2 x BP 15/2	12	
2 x BP 15/2 N		15
2 x BP 15/2 S		15
BP 34 N		10-25
BP 34 S		10-25
BP 20	15	
BP 20 N		15
BP 20 S		15
BP 31	15	
BP 31 N		15
BP 31 S		15
BP 11	15	
BP 11 N		5
BP 11 S		5
2 x BP 11 N		15
2 x BP 11 S		15
BP 12	25	
BP 12 N		10
BP 12 S		10
2 x BP 12 N		5-20
2 x BP 12 S		5-20
BP 21	20-45	
BP 21 N		10-35
BP 21 S		10-35
2 x BP 21 N		15-50
2 x BP 21 S		15-50

System components



EX-certified screwed cable gland

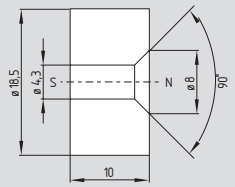


EX-certified screw plug

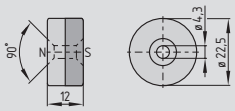
Ordering details

EX-certified screwed cable gland	**EX-KLE-M16x1.5**
EX-certified screw plug	**EX-VS-M16x1.5**

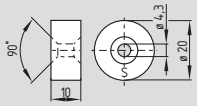
System components



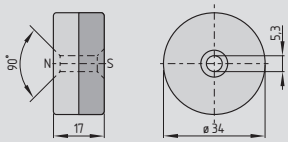
BP 10



BP 15

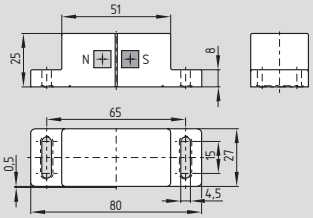


BP 15/2

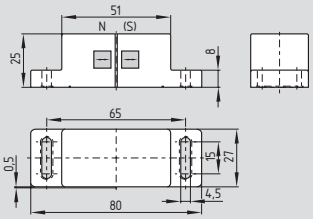


BP 34

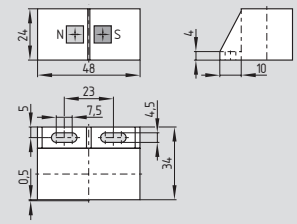
System components



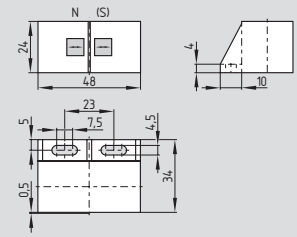
BP 20



BP 20 N / BP 20 S

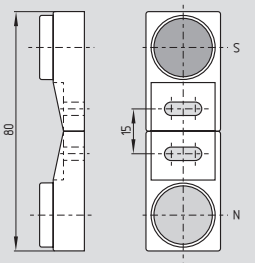


BP 31

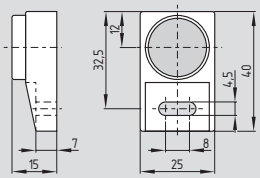


BP 31 N / BP 31 S

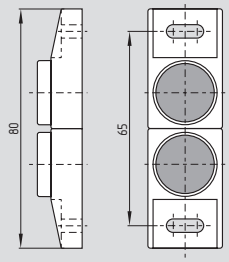
System components



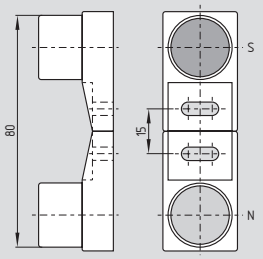
BP 11



BP 11 N / BP 11 S



2x BP 11 N / 2x BP 11 S



BP 12

Ordering details

Actuating magnet	
Unenclosed, N-S	**BP 10**
Thermoplastic enclosure, N-S	**BP 15**
Unenclosed, N-S	**BP 15/2**
Thermoplastic enclosure, N-S	**BP 34**

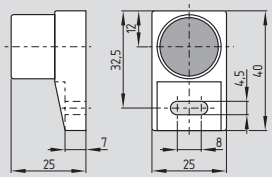
Ordering details

Actuating magnet	
metal enclosure Al, N-S	**BP 20**
metal enclosure Al, N	**BP 20 N**
metal enclosure Al, S	**BP 20 S**
Thermoplastic enclosure, N-S	**BP 31**
Thermoplastic enclosure, N-S	**BP 31 N**
Thermoplastic enclosure, N-S	**BP 31 S**

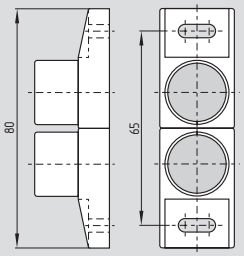
Ordering details

Actuating magnet	
metal enclosure Al, N-S	**BP 11**
metal enclosure Al, N	**BP 11 N**
metal enclosure Al, S	**BP 11 S**
metal enclosure Al, 2x N	**2x BP 11 N**
metal enclosure Al, 2x S	**2x BP 11 S**
metal enclosure Al, N-S	**BP 12**

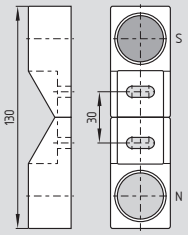
System components



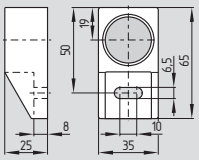
BP 12 N / BP 12 S



2x BP 12 N / 2x BP 12 S

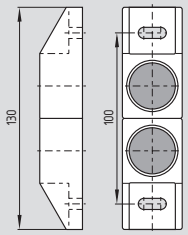


BP 21



BP 21 N / BP 21 S

System components



2x BP 21 N / 2x BP 21 S

Ordering details

Actuating magnet	
metal enclosure Al, N	**BP 12 N**
metal enclosure Al, S	**BP 12 S**
metal enclosure Al, 2x N	**2x BP 12 N**
metal enclosure Al, 2x S	**2x BP 12 S**
metal enclosure Al, N-S	**BP 21**
metal enclosure Al, N	**BP 21 N**
metal enclosure Al, S	**BP 21 S**

Ordering details

Actuating magnet	
metal enclosure Al, 2x N	**2x BP 21 N**
metal enclosure Al, 2x S	**2x BP 21 S**

Ordering details

Detailed technical information at:
www.schmersal.com

Control devices and indicator lights

The entire EX-R programme has a modular structure. Each control device \and allows a great diversity of variants: various versions of push-buttons and illuminated buttons, indicator lights, emergency-stop buttons, selector switches and key-operated selector switches are available.

Content

Control devices and indicator lights

General description

Concept
With the development of the new programme of 22 mm Ex control devices and indicator lights, Elan provides the user with a state-of-the-art switchgear concept that is compliant to EN 61241 and EN 60 079, featuring additional device functionality, reliability and spatial use beyond the usual standard. The EX-RF/RLDE contact and light element system makes a special contribution here.
Well-tried and proven features and material from earlier Elan designs (metal front parts, caps in high-quality shock-proof thermoplastic) have been retained and improved.

The equipment is suitable for the Ex category II 2GD. The explosion protection or the type of protection of the devices is:
• Ex ib IIC T4 X
• Ex tD A21 IP65 T110°C X

Control devices and indicator light heads
A large diversity of fully insulated pushbuttons/ impact buttons/illuminated buttons/pivoting pushbuttons etc. is offered. The front part of the actuating head is in chrome-plated brass. The programme is characterised by large actuating surfaces of at least 28 mm. The material of the button is brass-coated. The caps or lens covers of the illuminated pushbuttons and indicator lights are in shock-proof thermoplastic. In addition to the high mechanical strength, this material selection permits a more than average degree of resistance to heat and chemical effects.

Protection class
The front seal of these devices corresponds to protection class IP65 to EN DIN 60 529. The design features of the device sealing guarantee the maximum of protection over a long period of time, even in extreme conditions.

Mechanical protection
Mechanical tests are carried out in accordance with EN 60079-0. The enclosures or the exterior part of the enclosure, pushbuttons must withstand a high impact energy.

Programme structure
A control and indicator device consists of an actuator, a mounting flange and a contact or light element. The type designation of this type series starts with EX-R…, e. g. EX-RDT for a pushbutton. The mounting flange (divided into two, type EX-RLM) is included in the delivery of the device heads, both for the operating and the display elements.

Per control device, a maximum of 2 contact elements is provided.

One-hole fixing
The devices are designed for mounting holes of 22.3 mm + 0.4 mm according to DIN EN 60 947-5-1 Pt. 6.3.1. An additional cut-out to prevent rotation is not required.

Spacing
It is possible to install several devices with minimum dimensions in the following way:

Minimum distance between the mounting holes to DIN EN 60 947-5-1:
• horizontal: 40 mm
• vertical: 50 mm

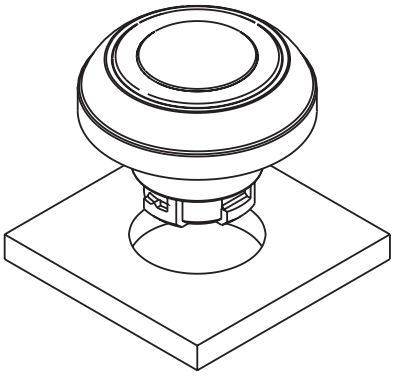
Exceptions:
Selector switches/pushbuttons with long knob, emergency stop buttons EX-RDRZ45...:
• horizontal: 50 mm
• vertical: 60 mm

Mechanical protection to EN 60 079-0

Risk of mechanical hazard	High		Low	
Group	**I**	**II**	**I**	**II**
Enclosure and external accessible parts of the enclosure	20 Nm	7 Nm	7 Nm	4 Nm
Translucent parts without safety guard	7 Nm	4 Nm	4 Nm	2 Nm
	No further protective measures required		Mechanical protected fitting	

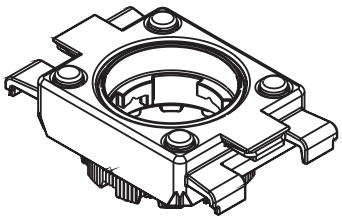
Assembly schematic

Pushbutton

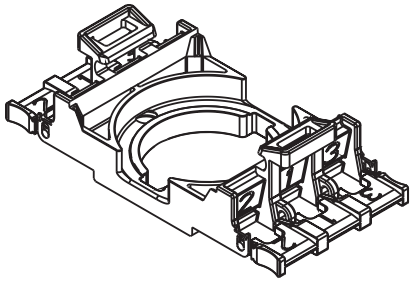


Fixing flange

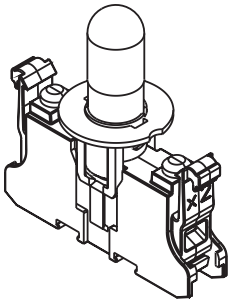
Mounting flange



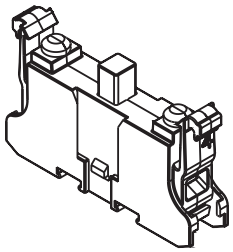
Contact carrier with contact lugs and 2 plunger elements

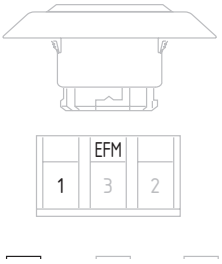


Light element with integrated multi-LED

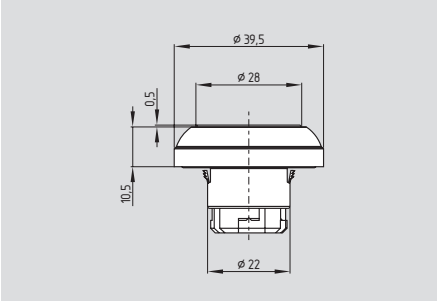


Contact elements



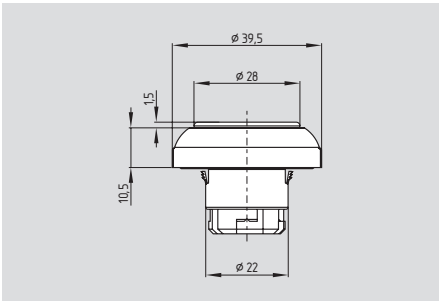


EX-RDT...



• Pushbutton

EX-RDM...



• Pushbutton with membrane

Technical data

Equipment category:	Ⓔx II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy (EN 60079-0):	7 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	40 × 50 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Designation:	identification plates, symbols
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	–20 °C … + 55 °C
Switching frequency:	1,000 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Membranes:	PC (good resistance to chemical agents)
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	4 mm
Actuating force:	without membrane approx. 1.5 N with membrane approx. 2 N
Mechanical life:	1×10^6 operations
Rohs conformity:	yes

Approvals

Ⓔx CE

Ordering details

Ex-RDT ① ②

N°	Option	Description
①	bk	black
	ye	yellow
	rd	red
	gn	green
	wh	white
	bu	blue
②	Identification plate, symbols: refer to page 128	

Approvals

Ⓔx CE

Ordering details

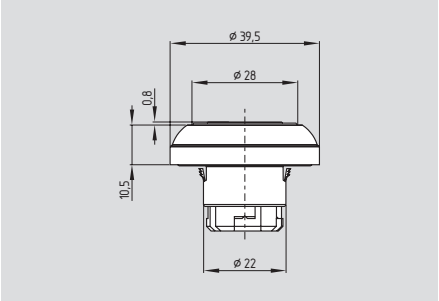
Ex-RDM ① ②

N°	Option	Description
①	bk	black
	ye	yellow
	rd	red
	gn	green
	wh	white
	bu	blue
②	Identification plate, symbols: refer to page 128	

Note

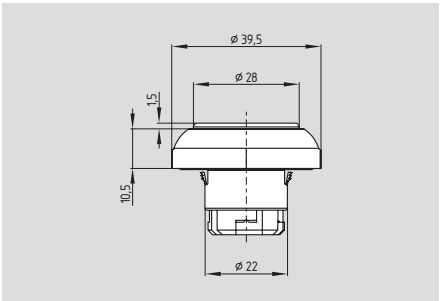
The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

EX-RDL...



• Illuminated pushbutton

EX-RDLM...



• Illuminated pushbutton with membrane

Technical data

Equipment category:	Ⓔx II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	40 × 50 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Designation:	identification plates, symbols
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	–20 °C … + 55 °C
Switching frequency:	1,000 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Membranes:	PC (good resistance to chemical agents)
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	4 mm
Actuating force:	ca. 1.5 N
Mechanical life:	1×10^6 operations
Rohs conformity:	yes

Approvals

Ⓔx CE

Ordering details

Ex-RDL ① ②

N°	Option	Description
①	bk	black
	ye	yellow
	rd	red
	gn	green
	wh	white
	bu	blue
②	Identification plate, symbols: refer to page 128	

Approvals

Ⓔx CE

Ordering details

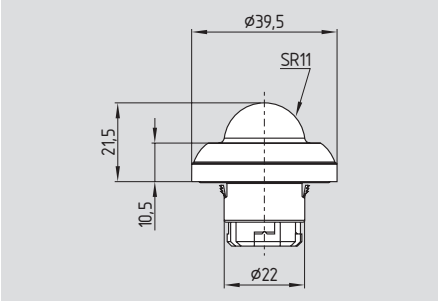
Ex-RDLM ① ②

N°	Option	Description
①	bk	black
	ye	yellow
	rd	red
	gn	green
	wh	white
	bu	blue
②	Identification plate, symbols: refer to page 128	

Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

EX-RMLH...



• Indicator light with domed cap

Technical data

Equipment category:	II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	40 × 50 mm
Front plate thickness:	1 ... 6 mm
Mounting position:	random
Designation:	identification plates, symbols
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	–20 °C ... + 55 °C
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Lens covers	PC (good resistance to chemical agents)
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Rohs conformity:	yes

Approvals

Ordering details

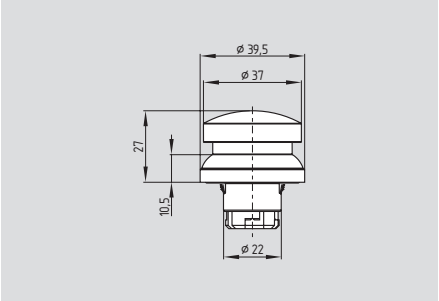
Ex-RMLH ① ②

N°	Option	Description
①	ye	yellow
	rd	red
	gn	green
	wh	white
	bu	blue
②	Identification plate, symbols: refer to page 128	

Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

EX-RDP40...



• Mushroom button without latching function

Technical data

Equipment category:	II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	50 × 60 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Designation:	identification plates, symbols
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	–20 °C … + 55 °C
Switching frequency:	1,000 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	4 mm
Actuating force:	approx. 2 N
Mechanical life:	1×10^6 operations
Rohs conformity:	yes

Approvals

Ordering details

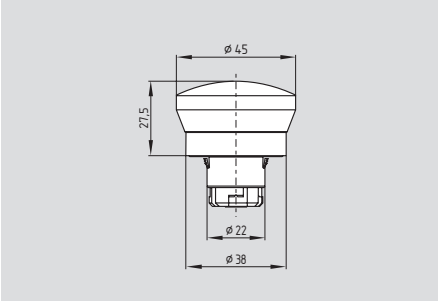
Ex-RDP40 ① ②

N°	Option	Description
①	bk	black
	ye	yellow
	rd	red
	gn	green
	wh	white
	bu	blue
②	Identification plate, symbols: refer to page 128	

Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

EX-RDRZ45...



• Mushroom button with latching function

Technical data

Equipment category:	⟨Ex⟩ II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	50 × 60 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	–20 °C … + 55 °C
Switching frequency:	600 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	5 mm
Actuating force:	approx. 2 N
Mechanical life:	1 × 10^5 operations
Rohs conformity:	yes

Approvals

⟨Ex⟩ CE

Ordering details

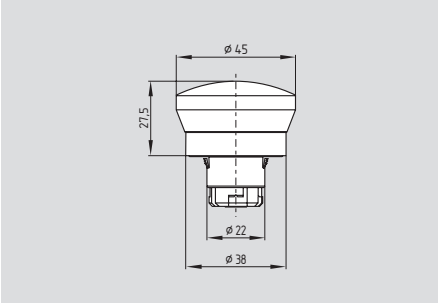
Ex-RDRZ45 ① ②

N°	Option	Description
①	bk	black
	ye	yellow
	gn	green
②	Identification plate, symbols: refer to page 128	

Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

EX-RDRZ45rt



• Emergency stop button to ISO 13850, 2006

Technical data

Equipment category:	II 2GD
Ex protection:	Ex ib IIC T4 X
	Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1; EN 60947-5-5
	EN 60947-1; EN 61241-1
	EN 60079-0; EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	50 × 60 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	–20 °C … + 55 °C
Switching frequency:	600 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	5 mm
Actuating force:	approx. 2 N
Mechanical life:	1×10^5 operations
Rohs conformity:	yes

Approvals

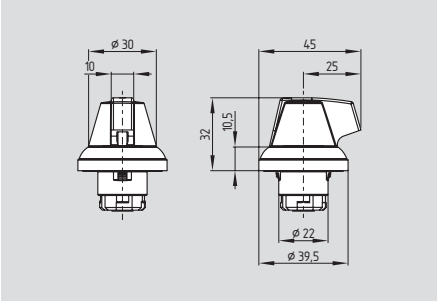
Ordering details

Ex-RDRZ45 rt

Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

EX-RW...21/32



- Maintained selector switch, spring return selector switch with short knob
- 2 or 3 positions

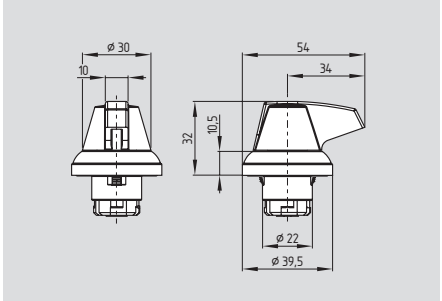
Approvals

Ordering details

Ex-RW① ②

N°	Option	Description
①	T	Selector switch
	S	Selector switch
	ST	Spring-return rotary selector switch
	TS	Maintained spring-return rotary selector switch
②	21	2 positions
	32	3 positions

EX-RW...21.1/32.1



- Maintained selector switch, spring return selector switch with long knob
- 2 or 3 positions

Approvals

Ordering details

Ex-RW① ②.1

N°	Option	Description
①	T	Selector switch
	S	Selector switch
	ST	Spring-return rotary selector switch
	TS	Maintained spring-return rotary selector switch
②	21	2 positions
	32	3 positions

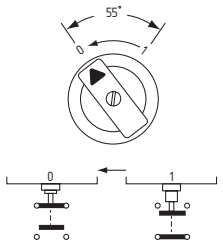
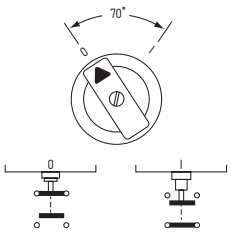
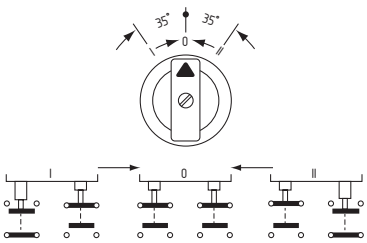
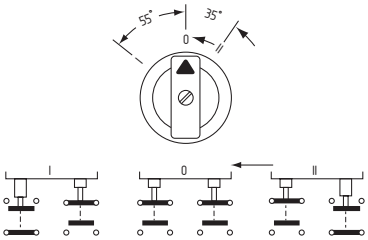
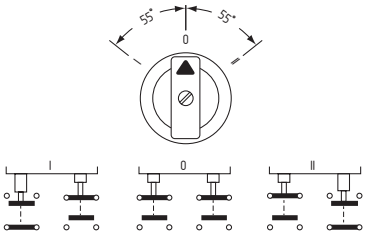
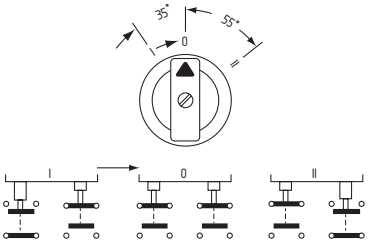
Technical data

Equipment category:	⟨Ex⟩ II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	50 × 60 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Designation:	identification plates, symbols
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	0 °C … + 55 °C
Switching frequency:	1,000 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Knob:	PC (good resistance to chemical agents)
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	6 mm
Actuating force:	approx. 0.2 N
Mechanical life:	3×10^5 operations
Rohs conformity:	yes

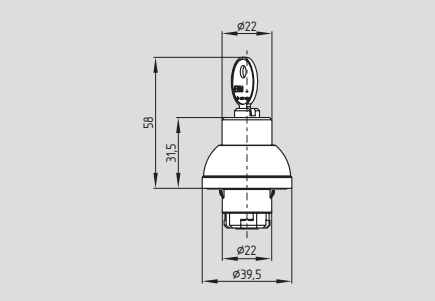
Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

Control devices and indicator lights

Brief description	Switching angle		Type
Spring-return rotary selector switch with 2 positions	1 × 55°		Ex-RWT 21 Ex-RWT 21.1
Selector switch with 2 latched positions	1 × 70°		Ex-RWS 21 Ex-RWS 21.1
Maintained spring-return rotary selector switch with 3 positions	2 × 35°		Ex-RWT 32 Ex-RWT 32.1
Selector switch with 3 positions; right: latching, left: switching	right 35 left 55°		Ex-RWST 32 Ex-RWST 32.1
Maintained spring-return rotary selector switch with 3 positions	2 × 55°		Ex-RWS 32 Ex-RWS 32.1
Maintained spring-return rotary selector switch with 3 positions, right: switching, left: latching	right 55 left 35°		Ex-RWTS 32 Ex-RWTS 32.1

EX-RS...



- Key-operated selector switch
- 1, 2 or 3 positions

Technical data

Equipment category:	⟨Ex⟩ II 2GD
Ex protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 60947-1, EN 61241-0, EN 61241-1, EN 60079-0, EN 60079-11
Max. impact energy:	4 J
Design:	round
Installation-ø:	22.3 mm
Grid dimensions:	40 × 50 mm
Front plate thickness:	1 … 6 mm
Mounting position:	random
Designation:	identification plates, symbols
Climatic resistance to DIN EN 60068:	Part 2-30
Ambient temperature:	0 °C … + 55 °C
Switching frequency:	1,000 s/h
Protection class to EN 60529:	IP65
Full insulation	yes
Materials:	
Front ring/buttons:	chrome-plated brass, powder-coated brass
Fixing:	with mounting flange
Max. tightening torque:	2 Nm
Resistance to shocks to EN 60068-2-27:	< 50 g
Resistance to vibrations to EN 60068-2-6:	5 g
Actuating stroke:	6 mm
Actuating force:	approx. 0.2 N
Mechanical life:	1×10^5 operations
Rohs conformity:	yes

Approvals

⟨Ex⟩ CE

Ordering details

Ex-RS①②③S④

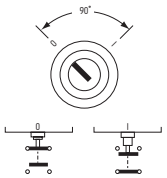
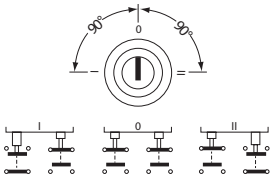
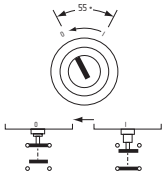
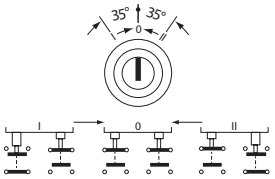
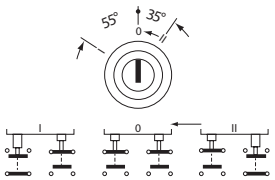
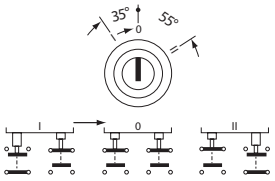
N°	Option	Description
①	S	Key-operated selector switch
	ST	Key-operated spring-return selector switch
②	2	position of the key
	3	
③	2	number of plungers
	3	
④	1	position for key retraction
	2	
	3	

Note

The EX-RLM fixing flange, consisting of mounting flange, contact carrier with contact lugs and 2 plunger elements, is not included in the delivery of the device heads
(refer to page127)

Control devices and indicator lights

Key-operated selector switches/selector switch pushbuttons, lock EKM 30

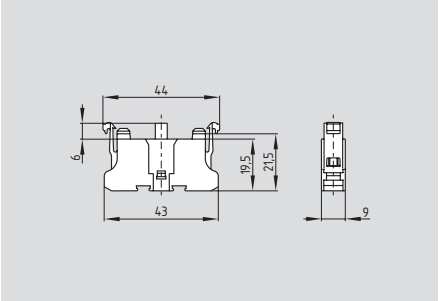
Brief description		Key-withdrawal position	Type
Key-operated selector switch with 2 latched positions		only left only right in both positions	Ex-RSS21S1 Ex-RSS21S2 Ex-RSS21S12
Key-operated selector switch with 3 latched positions		left middle right in all 3 positions	Ex-RSS32S1 Ex-RSS32S2 Ex-RSS32S3 Ex-RSS32S123
Key-operated spring-return selector switch with 1 touch position, automatic return to the zero position, latch position 55°		only left	Ex-RST21S1
Key-operated spring-return selector switch with 2 touch positions left and right, automatic return to the zero position		only middle	Ex-RST32S2
Key-operated selector switch pushbutton with 3 positions, touch position 35°, latch position 55° – left switching, right latching		S1 = only left S2 = only middle	Ex-RSST32S1 Ex-RSST32S2
Key-operated selector switch pushbutton with 3 positions, touch position 35°, latch position 55° – left switching, right latching		S2 = only middle S3 = only right	Ex-RSTS32S2 Ex-RSTS32S3
Spare key EKM 30 for CES lock (for EX-RSS../RST.., standard for the above listed versions)			SDS2

Special locks and master key function available: On request

Contact elements: See page 124

2 keys belong to the delivery range of the above listed devices

EX-RF 10...



- NC
- Screw connection
- Cable sections
  single-strand 2 × (0.5 … 2.5 mm²)
  multi-strand with conductor ferrules 2 × (0.5 … 1.5mm²)
- Protection class
  Connections: IP20 (finger-safe)
  Wiring compartments: IP40

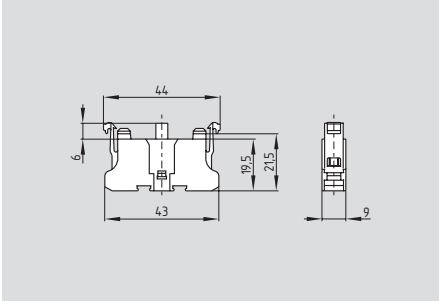
Approvals

Ordering details

Ex-RF ①

N°	Option	Description
①	10	Contact labelling 1, 2
	10.1	Contact labelling 11, 12

EX-RF 03...



- NO contacts
- Screw connection
- Cable sections
  single-strand 2 × (0.5 … 2.5 mm²)
  multi-strand with conductor ferrules 2 × (0.5 … 1.5mm²)
- Protection class
  Connections: IP20 (finger-safe)
  Wiring compartments: IP40

Approvals

Ordering details

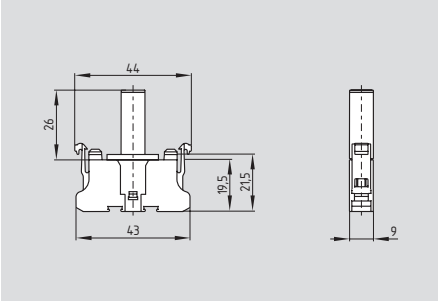
Ex-RF ①

N°	Option	Description
①	03	Contact labelling 3, 4
	03.1	Contact labelling 13, 14

Technical data

Equipment category:	⟨Ex⟩ II 2GD
Explosion protection:	Ex ib IIC T4 X Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1, EN 61241-0, EN 61241-1, EN 60079-11
U_i:	250 V
I_i:	3.3 A for Ex ib 5.0 A at Ex ic
C_i:	~ 0
L_i:	~ 0
U:	250 V
I:	5 A
P:	max. 1500 W
Contact reliability:	5 VDC/1 mA
Proof of positive opening:	2.5 kV impulse voltage
Positive opening path:	approx. 2 mm after achieving opening point
Air clearance and creepage distance to DIN EN 60 664-1:	4 kV/3
Switching frequency:	1.200 s/h
Switching points:	
NC contact:	approx. 1 mm
NO contact:	approx. 2.5 mm
Temperature range:	–20° C … + 55° C
Climate resistance to DIN EN 60068:	Part 2-20
Mounting position:	random
Mechanical life to EN 60 947-5-1:	10×10^6 operations
Actuating force at stroke end:	approx. 4.5 N
Terminal designations:	to EN 60947-1
Tightening torque for the connecting screw:	max. 1 Nm

EX-RLDE ws 24



- Light terminal block
- Screw connection
- Cable sections
  single-strand 2 × (0.5 … 2.5 mm²)
  multi-strand with conductor ferrules 2 × (0.5 … 1.5mm²)
- Protection class
  Connections: IP20 (finger-safe)
  Wiring compartments: IP40

Technical data

Equipment category:	⟨Ex⟩ II 2GD
Explosion protection:	Ex ib IIC T4 X
	Ex tD A21 IP65 T110°C X
Standards:	EN 60947-5-1,EN 61241-0,
	EN 61241-1, EN 60079-11
U_i:	30 V
I_i:	not relevant (max. 30 mA)
P_i:	not relevant (max. 30 mA)
C_i:	~ 0
L_i:	~ 0
U:	24 V +/-10%
I:	30 mA
P:	0.9 W
Temperature range:	–20° C … + 55° C
Climate resistance to DIN EN 60068:	Part 2-20
Mounting position:	random
Terminal designations:	to EN 60947-1
Tightening torque for the connecting screw:	max. 1 Nm

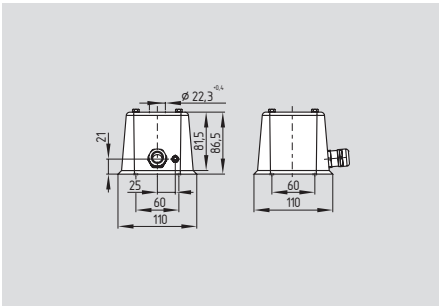
Approvals

⟨Ex⟩ CE

Ordering details

Ex-RLDE ws 24

EX-EBG 311.O



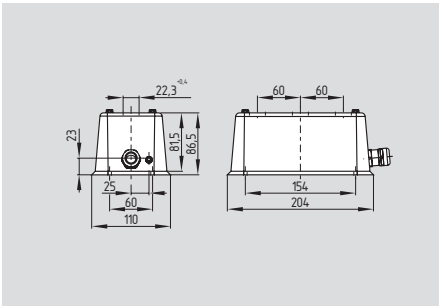
- Empty enclosure in V4A
- Version with 1 fitting hole for installation ø 22.3 m
- incl. 1 cable gland M20

Approvals

Ordering details

EX-EBG 331.O

EX-EBG 633.O



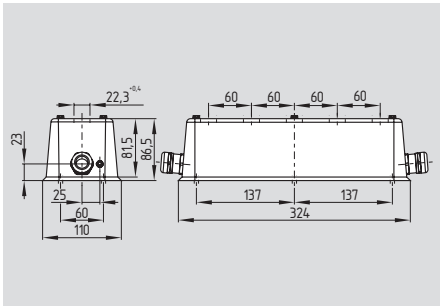
- Empty enclosure in V4A
- Version with 3 fitting holes for installation ø 22.3 mm
- incl. 1 cable gland M25

Approvals

Ordering details

EX-EBG 633.O

EX-EBG 665.O



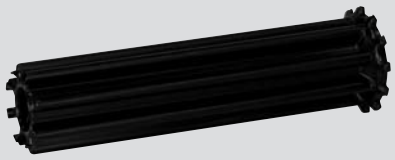
- Empty enclosure in V4A
- Versions with 5 fitting holes for installation ø 22.3 mm
- incl. 2 cable glands M25
- incl. 1 locking screw

Approvals

Ordering details

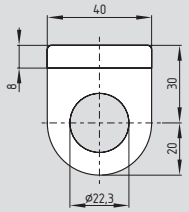
EX-EBG 665.O

System components

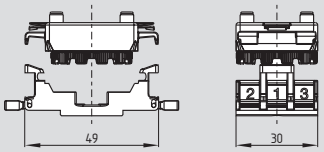


Mounting tool RMW

System components



Identification label EX-RZSO



Mounting flange EX-RLM

Ordering details

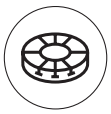
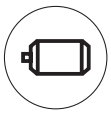
Mounting tool for mounting flange	**RMW**
Blanking plug	**EX-RB**

Ordering details

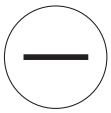
Identification label	**EX-RZSO**
Mounting flange	**EX-RLM**

Control devices and indicator lights – Symbols

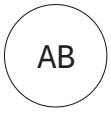
Drives

 **401** Electric motor	 **402** Pump general	 **403** Gear pump	 **405** Coolant
 **406** Oil lubrication	 **407** Rotary indexing table	 **408** Shuttle table forward	 **409** back
 **410** Brake fan	 **411** Caution – live	 **412** Clamp table rectangular	 **413** Electrical machine

Signals

 **501** On	 **502** Jog	 **503** Automatic	 **504** Off
 **505** Everything off	 **506** On – off	 **507** Increase of a variable	 **508** Decrease of a variable
 **509** Pause (time elapse)	 **510** Manual operation	 **511** Visual	 **512** Hydraulics

Words

 **513**	 **514**	 **515**	 **516**
 **517**	 **518**	 **519**	 **520**
 **521**	 **522**	 **523**	 **524**

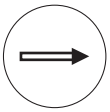
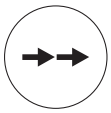
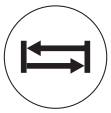
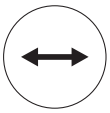
Letters[1]

 **901**	 **902**	 **903**	 **904**

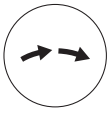
Other numerals available, e.g. for number 9 ordering code 709

Control devices and indicator lights – Symbols

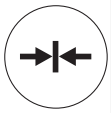
Linear motion

 **101** Working motion feed	 **102** Rapid motion or idling	 **103** Rapid motion	 **104** Feed
 **105** Interrupted motion jogging	 **106** Reciprocating motion		
 **107** Limited motion	 **108** Indexing	 **109** Motion in 2 directions	

Rotary motion

 **201** Continuous clockwise rotation	 **202** Anti-clockwise rotation	 **203** Clockwise rotation STOP	 **204** **Anti-clockwise** rotation STOP
 **205** 1 revolution clockwise	 **206** Anti-clockwise	 **207** **Rotary** indexing	 **208** Interrupted rotary motion
 **209** Clockwise motion restricted	 **210** Anti-clockwise motion restricted	 **211** Clockwise motion from a restriction	 **211** Anti-clockwise motion from a restriction

Additional options

 **301** Clamping, chucking	 **302** Release	 **303** Braking	 **304** Release brake
 **305** Unlock	 **306** **Lock**		

Arabic numerals

 **700**	 **701**	 **702**	
 **801**	 **802**	 **803**	

More details

Detailed technical information at:
www.schmersal.net

Key transfer system

The fundamental functional characteristic of a trapped key system is that, depending on the operating condition of the machine control, the key is trapped and cannot be withdrawn.

- in automatic mode (with the safety guard locked) in a control element, usually a key-operated selector switch or
- if the safety guard is open (in an electrically de-energised condition), in the guard locking device, i.e. a lock

Content

EX-Trapped key system

Mode of operation

The fundamental functional characteristic of a trapped key system is that, depending on the operating condition of the machine control, the key is trapped and cannot be withdrawn.
- in automatic mode (with the safety guard locked) in a control element, usually a key-operated selector switch or
- if the safety guard is open (in an electrically de-energised condition), in the guard locking device, i.e. a lock

In other words, a principle feature of the system is that the removable key is trapped either in the guard locking device or in the switch lock.

The locking device of the guard is designed in such a way that the trapped key can only be enabled if the guard is closed and locked (fail-safe). Only in this way can the key be transferred from here to the key-operated selector switch.

When the machine control system is switched on the key is trapped and cannot be removed for as long as the switch is set to ON.

If the transfer time between the opening of the key-operated selector switch and the locking of the guard is not sufficient for a hazardous machine motion to come to a standstill, a key-operated selector switch interlocking device may also be required.

Framework conditions

When using the EX-SHGV safety door interlokking system it must be ensured that
- the time between switching off at the control panel and access to the guard is greater than the stopping time of any hazardous motion, or that the key-operated selector switch interlocking device of the type SVE is used;
- only one key is used in the trapped key system and any spare keys available are stored carefully;
- the separate actuators of the EX-SHGV guard locking devices are fitted to the guard in such a way, e.g. with the non-reusable screws supplied with the equipment, that they cannot be released by simple means;
- the entry throat for the separate actuator is fitted in the guard locking device in a concealed position where at all possible. This recommendation applies generally to interlocking devices with separate actuator.

Please note:
- Owing to the trapped key system the systems are less suited to charging doors or moving guards with more frequent access.
- Even if key and lock barrel have 200 individual cuts / tumbler arrangements, a key can be copied in the same way as a separate actuator. Any damage caused as a result of such wilful manipulation of a guard no longer falls within the protection of statutory accident insurance (otherwise there would also be no BG test certificate for the SHGV system) for example.
- Every EX-SHGV system comes with a spare key should the original one be lost under the strict condition that it is kept carefully and not used in the operational key transfer procedure.

EX-Trapped key system

EX-SHGV/ESS key-operated selector switch
The EX-SHGV/ESS key-operated selector switch as control element to interrupt or switch off automatic mode.

EX-SVM key distribution station
The EX-SVM key distribution station is used when multiple guards must be operated with one key selector switch.

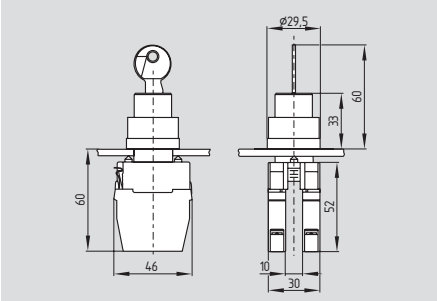
Guard locking device Type EX-SHGV

The design of the Guard locking device EX-SHGV is based on that of a position switch with separate actuator, but the function of the position monitoring and locking is based exclusively on a mechanical principle of operation using the integrated lock barrel and the positively connected mechanism as well as the interaction between actuator and the articulating mechanism in the device head.

Version with a second lock barrel

The version with a second lock barrel using which the operation of lock barrel 1 can be blocked if an operator needs to access a room and wishes to protect himself from unintentional start-up of the machine control system by a third party.

EX-SHGV-...-3G/D



- Key-operated selector switch
- Ex certified
- Mounting hole 22.3 mm
- Metal front ring
- Good resistance to oil and petroleum spirit

Technical data

Equipment category:	Ⓔx II 3GD
Ex protection:	Ex nL IIC T5 X
	Ex tD A22 IP65 T110°C X
Standards:	EN 60947-1
	EN 60947-5-1
	EN 61241-1
	EN 60079-0
	EN 60079-15
Mounting hole Ø:	22.3 mm
Front plate thickness:	1.5 ... max. 6 mm
Spacing:	50 x 50 mm
Max. impact energy:	1 J
Actuating speed:	max. 1 m/s
Protection class:	
Key-operated selector switch:	IP65
Contact element:	IP44
Contact type:	change-over contact with double break, type Zb, with galvanically separated contact bridges, NC contact with positive break
Contact material:	fine silver
Connection:	Screw terminals
U_i:	36 VDC
I_i:	100 mA
P_i:	0.9 W
C_i:	~ 0
L_i:	~ 0
Utilisation category:	AC-15, DC-13
I_e/U_e:	6 A / 250 VAC
	4 A / 24 VDC
Max. fuse rating:	6 A gG D-fuse
Ambient temperature:	0 °C ... + 70 °C
Mechanical life:	10 million operations

Contact variants

1 NO / 1 NC EF 103.1

EF 103.2

Approvals

Ⓔx CE

Ordering details

EX-SHGV/ESS21S2/①/11033-3G/D

No.	Option	Description
①	e.g. 201	individual key numbers

Note

Contact variants

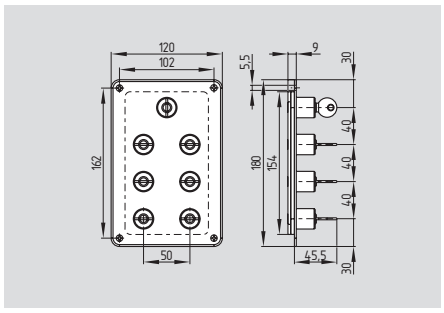
Contact element EF103.1	1 NC / 1 NO
Contact element EF103.2	1 NC / 1 NO

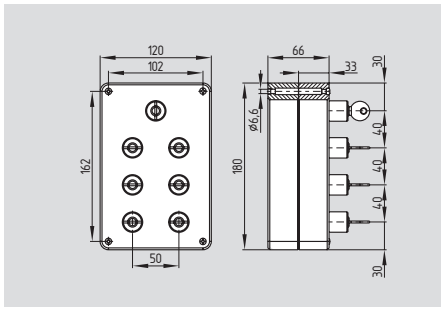
included in delivery.

If more contacts are needed, on request.

EX-Trapped key system

EX-SVM 1/..-6/../..-2G/D





- Key distribution station
- with 6 keys
- Ex certified
- Metal enclosure
- Good resistance to oil and petroleum spirit
- Metal front plate
- 6 Cylinder lock for solenoid keys EX-SHGV..

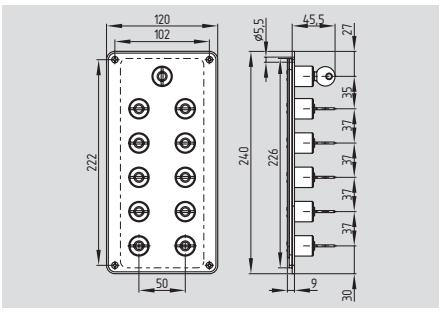
Approvals

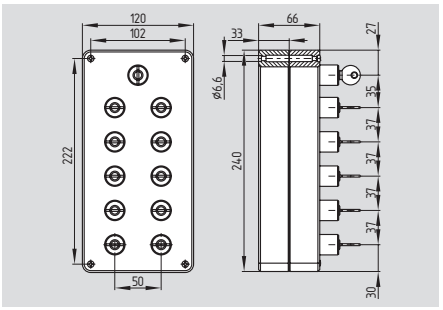
Ordering details

EX-SVM1/①-6②/③-2G/D

No.	Option	Description
①	e.g. 34	individual key number for main cylinder lock
②	…	individual key number for solenoid key EX-SHGV..
③	A	Enclosure for surface mounting
	E	Front plate mounting

EX-SVM 1/..-10/../..-2G/D





- Key distribution station
- with 10 keys
- Ex certified
- Metal enclosure
- Good resistance to oil and petroleum spirit
- Metal front plate
- 10 Cylinder lock for solenoid keys EX-SHGV..

Approvals

Ordering details

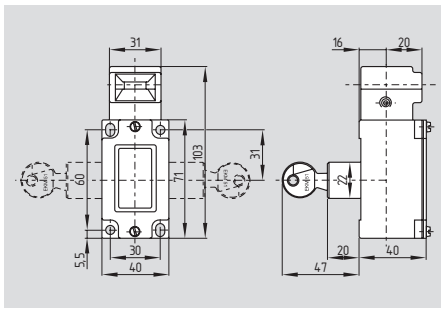
EX-SVM1/①-10②/③-2G/D

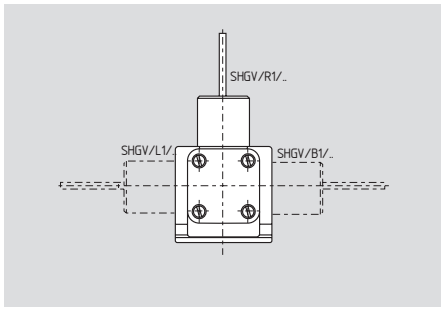
No.	Option	Description
①	e.g. 34	individual key number for main cylinder lock
②	…	individual key number for solenoid key EX-SHGV..
③	A	Enclosure for surface mounting
	E	Front plate mounting

Technical data

Equipment category:	II 2GD
Ex protection:	c 85°C X
Standards:	EN 13463-1, EN 61241-0
Design:	Enclosure for top mounting or front plate mounting
Material:	Enclosure for top mounting AlSi12 front plate 1.4301
Actuating speed:	max. 1 m/s
Mechanical life:	10 million operations

EX-SHGV-...-2G/D





- Interlock
- Ex certified
- Mounting details to EN 50041
- Metal enclosure
- Good resistance to oil and petroleum spirit

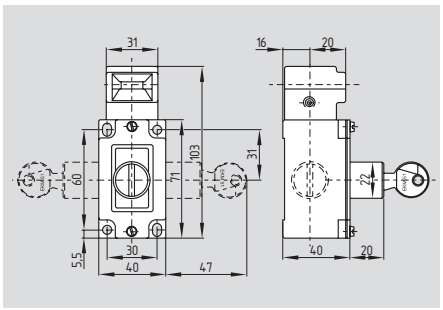
Approvals

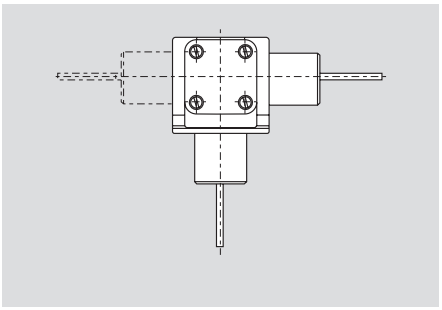
Ordering details

EX-SHGV/①01/②+③-2G/D

No.	Option	Description
①	B	Cylinder lock on the back
	L	Lock barrel to left
	R	Lock barrel to the right
②	e.g. 201	individual key numbers
③	e.g. BO	For the appropriate actuator see page 137

EX-SHGV-...-2G/D





- Interlock
- with a second lock barrel

Approvals

EX-SHGV/①D1/①/③+④-2G/D

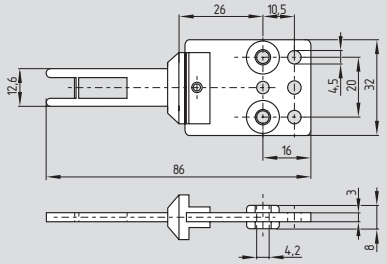
No.	Option	Description
①	L	Lock barrel to left
	R	Lock barrel to the right
②	e.g. 201	individual key number for LHS or RHS cylinder lock
③	e.g. 34	individual key number for second cylinder lock
④	e.g. BO	For the appropriate actuator see page 137

Technical data

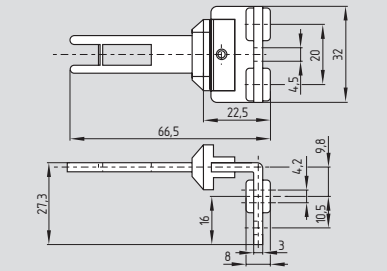
Equipment category:	II 2GD
Ex protection:	c 85°C X
Standards:	EN 13463-1, EN 61241-0
Design:	fixings to EN 50041
Enclosure:	Al Si12 die-casting, painted
Actuating speed:	max. 1 m/s
Mechanical life:	10 million operations

EX-Trapped key system

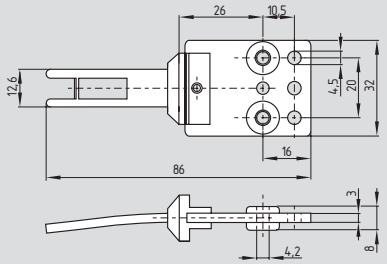
System components



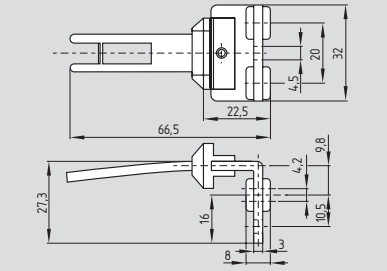
Straight actuator EX-BO



Angled actuator EX-BOW



Straight radius actuator EX-BOR



Angled radius actuator EX-BOWR

Ordering details

Straight actuator	**EX-BO**
Angled actuator	**EX-BOW**
Straight radius actuator	**EX-BOR**
Angled radius actuator	**EX-BOWR**

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