

Extreme

Ex switchgear



// SWITCH CONTROL UNDER EXTREME CONDITIONS

Catalogue



4 The Company

PRODUCTS



8 Ex wireless switchgear

- 12 Wireless position switches
- 22 Wireless command devices
- 30 Wireless foot switches
- 32 Wireless pull-wire switches
- 34 Radio receivers / repeater



40 Ex solenoid interlocks

- 44 Series Ex STM 295
- 46 Series Ex AZM 415
- 48 Series Ex AZP 415



56 Ex safety switches with separate actuator

- 60 Series Ex ST 14
- 62 Series Ex 95 AZ
- 64 Series Ex AZ 16
- 70 Series Ex 335 AZ
- 74 Series Ex 355 AZ
- 78 Series Ex ST 61



80 Ex safety sensors

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- 86 Series Ex RC Si 56
- 88 Series Ex HS Si 4
- 90 Series SRM 21 RT2
- 92 Series SRM 21 Multi



94 Ex safety switches for hinged guard doors

- 98 Series Ex 95 T.C
- 99 Series Ex 13 SB
- 100 Series Ex 95 SB
- 101 Series Ex 335 V.S
- 102 Series Ex 355 V.S



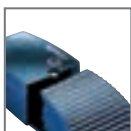
106 Ex position switches with/without safety function

- 112 Series Ex 13
- 124 Series Ex/ExM 14
- 134 Series Ex 95
- 144 Series Ex T 356
- 148 Series Ex 12
- 160 Series Ex 335
- 166 Series Ex 355
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180 Ex command devices

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- 205 Series Ex GFSI
- 206 Series Ex GF 2
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- 228 Series Ex ZS 75
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- 254 Series Ex ZS 75 SR
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268 Ex magnetic sensors

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308 Ex Junction / Terminal boxes

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Legend



// SAFE SWITCHGEAR FOR DEMANDING AND CRITICAL APPLICATIONS



»Safe switchgear for demanding and critical applications«. True to this motto, steute has been providing its customers with innovative, practical and durable switchgear solutions – for over 50 years.

When our customers are successful, so are we. Because we always focus on our customers, our company has grown steadily and sustainably over the last decades. Steute is committed to continuing this growth – in close cooperation with our customers.

We are situated in East Westphalia, a key region for machine building and electrical goods manufacturing. It is home to qualified specialists committed to developing and manufacturing innovative products. It is also the location of renowned universities, research and educational institutions to which we maintain healthy contacts.

Markets are no longer restricted by national borders. This is why our products are developed and tested for extreme conditions all over the world. We take care to ensure that our products are always certified according to the latest international standards. In every industrial or emerging nation in the world, steute has access to qualified specialists who can guarantee competent support and a quick service.

As a medium-sized company we are able to react with speed to customer wishes and market trends. We are continually developing innovative products and using new technologies as we consistently open up new fields of application for our switchgear.

steute is currently active in four different business fields, producing switchgear, sensors and control units for use in industry and in medical equipment:

Wireless

Cable free switchgear and sensors for use in machinery and process plants. These industrial-strength wireless switches communicate with higher level control systems via reliable radio transmission. »Energy harvesting« can play a major role in these products.

Automation

Standard and customised switchgear for machinery and process plants. Tried and tested electromechanical and non-contact technologies for classical applications in industrial automation and process control – always with a view to the latest global requirements.

Extreme

Switchgear and sensors for use in extreme environments or under extreme conditions. Certified products for use in hazardous areas worldwide (e. g. ATEX, IECEx, GOST).

Meditec

A comprehensive range of standard and customised foot and hand controls for medical devices, meeting the highest ergonomic and availability requirements. Produced in accordance with the certified EN ISO 13485 quality management system for medical products.

The following information provides an overview of our standard range of switchgear for complex and demanding applications. We will be happy to provide you with any additional information you require. If you cannot find the solution for your application: just get in touch. We have already helped numerous customers by developing »tailor-made« switchgear for their individual needs.

Marc Stanesby
Managing Director
steute Schaltgeräte GmbH & Co. KG



Ex wireless switchgear

Wireless position switches

// Series Ex RF 95

from page 12

// Series Ex RF 335

from page 18

Wireless command devices

// Series Ex RF BF 80

from page 22

// Series Ex RF 95

from page 26

Wireless foot switches

// Series Ex RF GFI

from page 30

// Series Ex RF GFSI

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Wireless pull-wire switches

// Series Ex RF 95 WH/90°

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Wireless receivers/repeater

// Series RF Rx EN868-1

from page 34

// Series RF Rx EN868-4

from page 35

// Series RF Rx EN868-2W-RS232

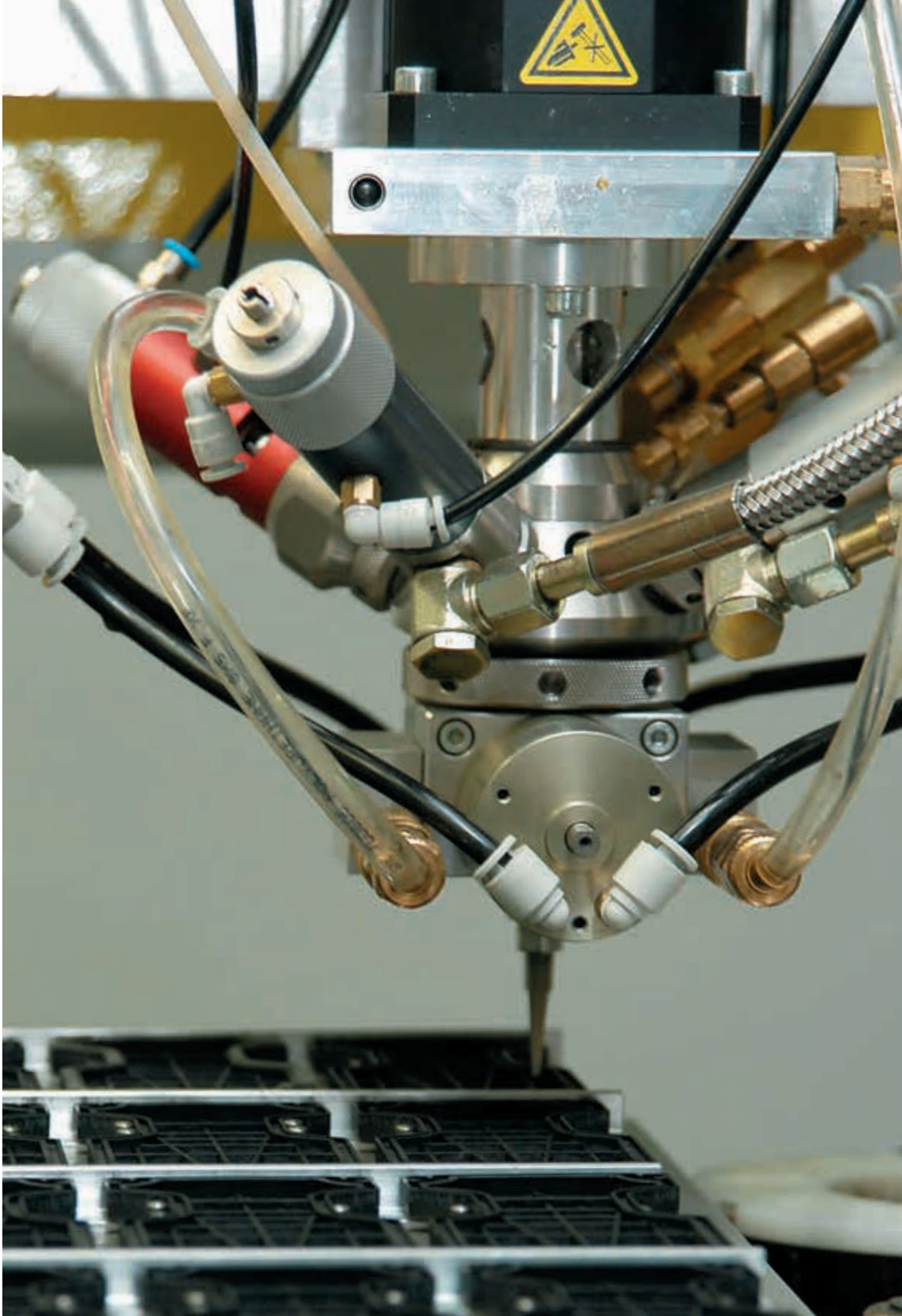
from page 36

// Series RF RxT EN868-1K

from page 37

Accessories

from page 38



Ex wireless switchgear

Range of application

The Ex wireless switchgear are suitable for the most various indoor and outdoor applications. There are position, pull-wire, foot switches and command in different versions available. The wireless switchgear can be used for endstop functions, command signals or security tasks in explosive-endangered areas. All applications where wireless is of big advantage. Wireless and self-sufficient switches possess a high potential to optimize the entire machinery and plant industry, e.g. more flexible constructions for movable or self-sufficient plant parts, as well as easier, more favourable installations, especially upgrades. In potentially explosive atmospheres, wireless switchgear devices offer particular advantages for every wired connection is a potential risk. The wireless switchgear transmits signals wireless and generates the necessary energy itself, according to the »Energy Harvesting« principle. This means: no cable, no connectors, no battery!

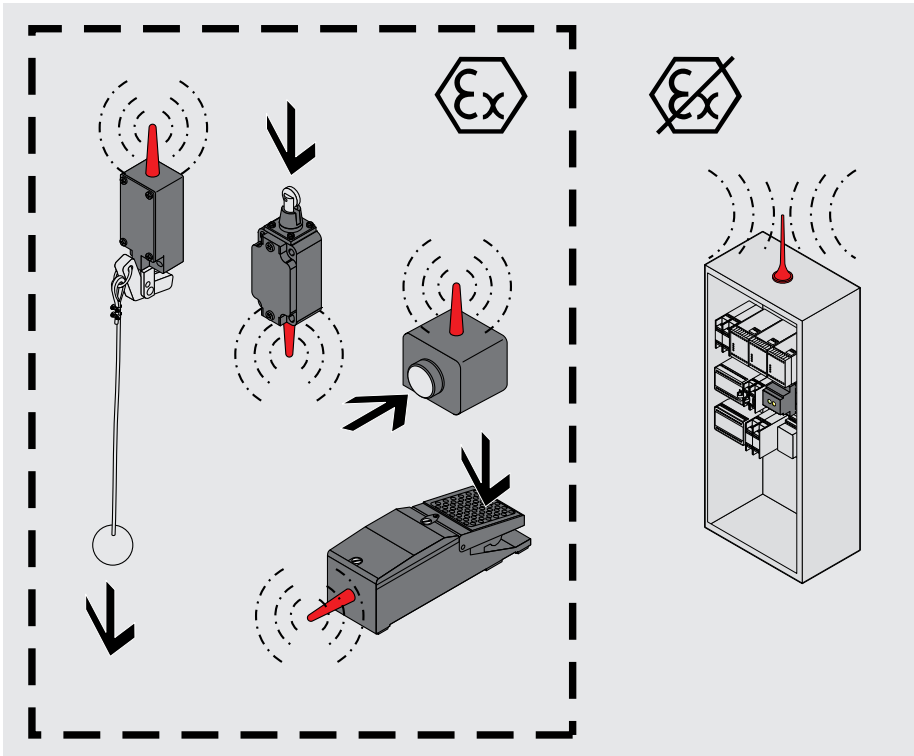
The Ex switches are suitable for application in zone 1 and 2, as well as zone 21 and 22 according to ATEX 94/9/EC.

Design and operating principle

The Ex wireless switchgear is based on the EnOcean wireless technology. The energy required for the wireless technology is generated from the electro-dynamic energy generator. For example the energy is drawn from the actuation of the switch itself. Through this method switchgear can be operated without any batteries. They are self-sufficient and are therefore wireless and maintenance-free. The signal transmission is carried out on the licence-free SRD band (Short Range Devices) at 868 MHz at 10 mW transmission power. On actuation of the switchgear a very short telegram is spontaneously sent out that contains an individual 32 bit identification number and the usable information. The wireless signals are processed by receiver units. The degree of protection of all the Ex wireless switchgear is IP 65/67. The wireless switchgear can be fitted in any desired mounting position.

All Ex wireless switchgear shown in this chapter bear the CE mark according to ATEX 94/9/EC.

Application



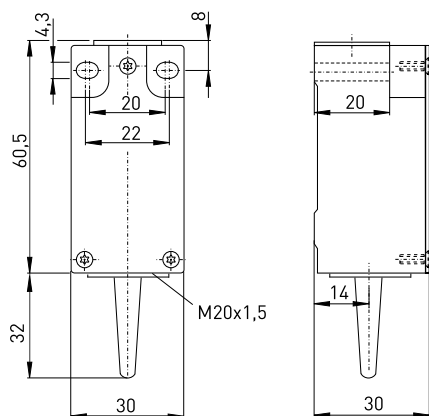
Ex wireless switchgear

// Ex wireless position switches series Ex RF 95

Features/options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Transversely slotted mounting holes
- To EN 50 047
- Output signal can be individually configured at the receiver
- EnOcean-protocol
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

// EX RF 95



Technical Data

Standards	EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3; EN 60079-0, EN 60079-11, EN 61241-11
Enclosure	Glassfibre reinforced thermoplastic, self-extinguishing UL 94-V0
Cover	Glassfibre reinforced thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 67 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature Ta	-20 °C ... +65 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Channel bandwidth	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mechanical life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T6 Gb, II 2D Ex ib IIIC T80°C Db IECEx Ex ib IIC T6 Gb, Ex ib IIIC T80°C Db
Approvals	BVS 08 ATEX E111; IECEx BVS 08.0048

Type code

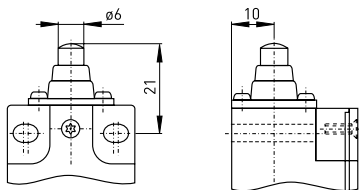
Ex RF 95 WR EN868

Wireless frequency 868 MHz
EnOcean standard
Actuator R (H, D, DS, etc. ...)
Watertight collar
Series
Wireless technology
Ex certified component

Ex wireless switchgear

// Ex wireless position switches series Ex RF 95, actuators

// Plunger W



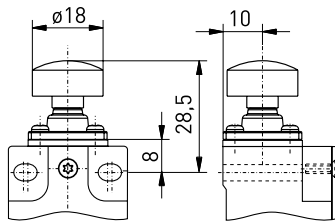
Features/options

- Actuator type B per DIN EN 50 047
- Watertight collar for protection against penetration of dirt

Part number
Ex RF 95 W EN868

Order number
95902301

// Cap WK



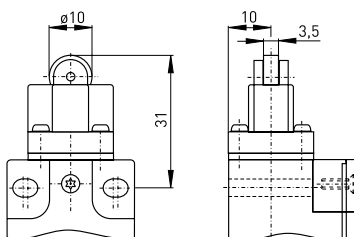
Features/options

- Cap made of thermoplastic
- Suitable for manual actuation

Part number
Ex RF 95 WK EN868

Order number
95908901

// Roller plunger R



Features/options

- Actuator type C per DIN EN 50 047
- Wear-resistant thermoplastic roller
- Metal roller available on request
- Actuator head can be repositioned by 4 x 90°

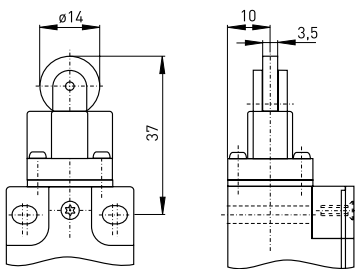
Part number
Ex RF 95 R EN868

Order number
95909301

Ex wireless switchgear

// Ex wireless position switches series Ex RF 95, actuators

// Long Roller plunger RL



Features/options

- Wear-resistant thermoplastic roller
- Metal roller available on request
- Actuator can be repositioned by 90°

Part number

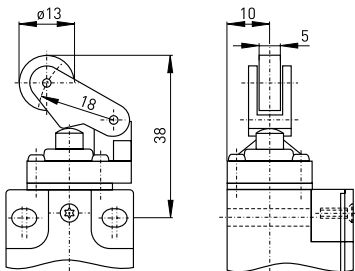
Ex RF 95 RL EN868

Order number

95911301

14

// Roller lever WH



Features/options

- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Actuator type E to DIN EN 50 047
- Watertight collar for protection against penetration of dirt
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by 4 x 90°
- Metal roller available on request

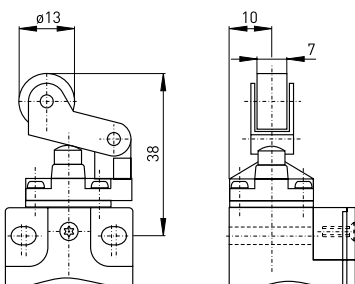
Part number

Ex RF 95 WH EN868

Order number

95914301

// Metal roller lever WHM



Features/options

- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Watertight collar for protection against penetration of dirt
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by 4 x 90°
- Metal roller available on request

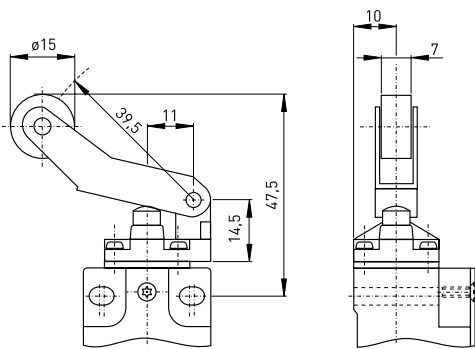
Part number

Ex RF 95 WHM EN868

Order number

95914303

// Long metall roller lever WHLM



Features/options

- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$
- Watertight collar for protection against penetration of dirt
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by 4 x 90°
- Metal roller available on request

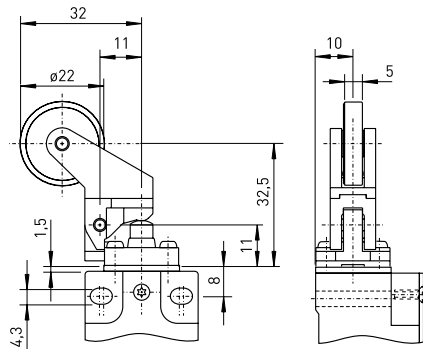
Part number

Ex RF 95 WHLM EN868

Order number

95916301

// Thermoplastic roller lever 4K



Features/options

- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$
- Watertight collar for protection against penetration of dirt
- Actuator head can be repositioned by 4 x 90°
- Metal roller available on request

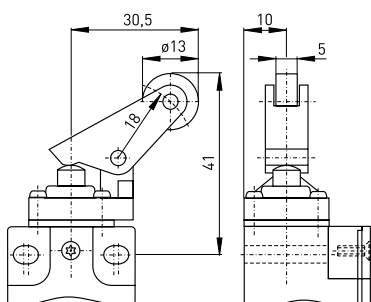
Part number

Ex RF 95 4K EN868

Order number

95964301

// Parallel roller lever WPH



Features/options

- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 30^\circ$
- Watertight collar for protection against penetration of dirt
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by 4 x 90°
- Actuation from below parallel to plunger axis
- Metal roller available on request

Part number

Ex RF 95 WPH EN868

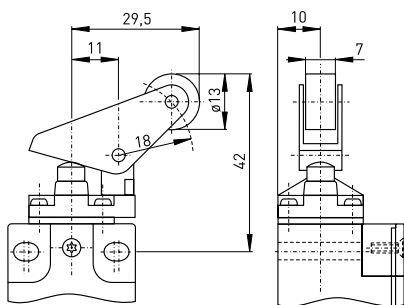
Order number

95920301

Ex wireless switchgear

// Ex wireless position switches series Ex RF 95, actuators

// Metal parallel roller lever WPHM



Features/options

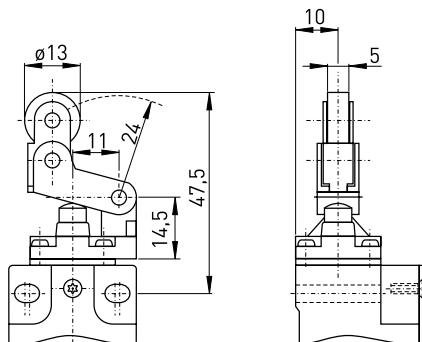
- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 30^\circ$
- Watertight collar for protection against penetration of dirt
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by $4 \times 90^\circ$
- Actuation from below parallel to plunger axis
- Metal roller available on request

Part number
Ex RF 95 WPHM EN868

Order number
95920302

16

// Rocking offset roller lever WHKM



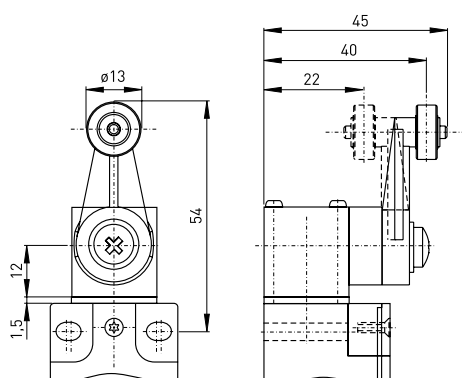
Features/options

- Actuating speed 0.5 m/s with a vertical actuating angle of $\alpha = 30^\circ$
- Watertight collar for protection against penetration of dirt
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by $4 \times 90^\circ$
- Actuation only possible from one side
- Free movement of actuator from other side
- Metal roller available on request

Part number
Ex RF 95 WHKM EN868

Order number
95918301

// Rocking roller lever D



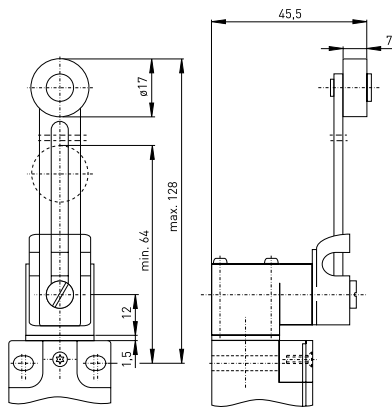
Features/options

- Lever angle adjustable in 10° steps
- Wear-resistant thermoplastic roller
- Actuator head can be repositioned by $4 \times 90^\circ$
- Metal roller available on request

Part number
Ex RF 95 D EN868

Order number
95921301

// Adjustable rocking lever DS



Features/options

- Position of roller can be adjusted
- Wear-resistant thermoplastic roller
- Actuator can be repositioned by 4 x 90°
- Metal roller available on request

Part number

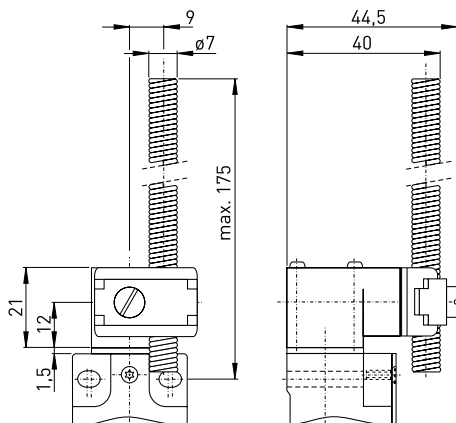
Ex RF 95 DS EN868

Order number

95929301

17

// Spring-rod lever DF



Features/options

- Lever angle adjustable in 10° steps
- Actuator can be repositioned by 4 x 90°

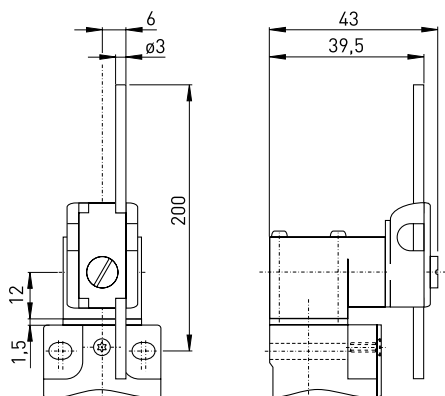
Part number

Ex RF 95 DF EN868

Order number

95927301

// Rod lever DD



Features/options

- Lever angle adjustable in 10° steps
- Actuator can be repositioned by 4 x 90°

Part number

Ex RF 95 RL EN868

Order number

95925301

Ex wireless switchgear

// Ex wireless position switches series Ex RF 335

Features/options

- Ex zone 1 and 21
- Metal enclosure
- To EN 50041
- Output signal can be individually configured at the receiver
- EnOcean-protocol
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

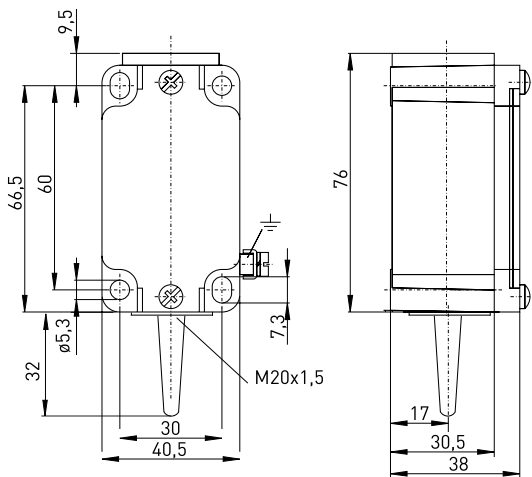
// EX RF 335



Technical Data

Standards	EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3; EN 60079-0, EN 60079-11, EN 61241-11
Enclosure	Zinc die-cast, enamelled
Cover	steel, enamelled
Protection class	IP 67 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature Ta	-20 °C ... +65 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Bandwidth channel	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mechanical life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T6 Gb, II 2D Ex ib IIIC T80°C Db IECEx Ex ib IIC T6 Gb, Ex ib IIIC T80°C Db
Approvals	BVS 09 ATEX E 003; IECEx BVS 09.0001

18



Type code

Ex RF 335 S EN868

Wireless frequency 868 MHz
EnOcean standard
Actuator R (S, 1 K, 3 K etc. ...)
Series
Wireless technology
Ex certified component

Ex wireless switchgear

// Ex wireless position switches series Ex RF 335, actuators

// Plunger S

Features/options

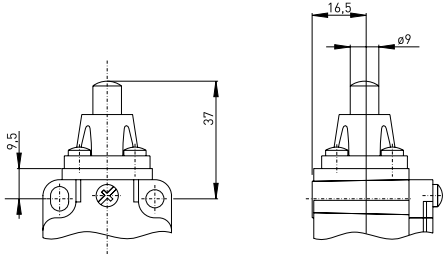
- Actuator type B to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 0^\circ$

Part number

Ex RF 335 S EN868

Order number

93901301



// Roller plunger R

Features/options

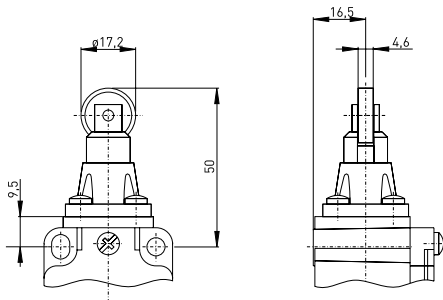
- Actuator type C to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$

Part number

Ex RF 335 R EN868

Order number

93909301



// Roller lever 1K

Features/options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from right
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

Note

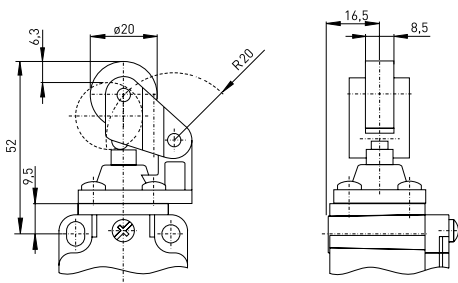
Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

Part number

Ex RF 335 1K EN868

Order number

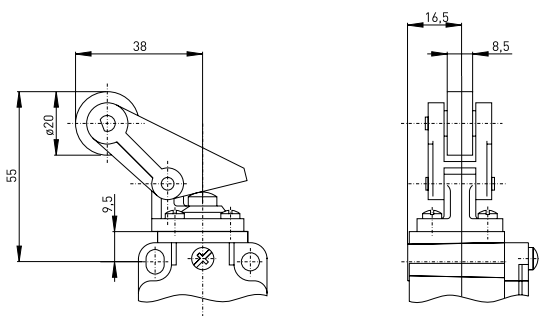
93913301



Ex wireless switchgear

// Ex wireless position switches series Ex RF 335, actuators

// Angled roller lever 3K



Features/options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

Part number

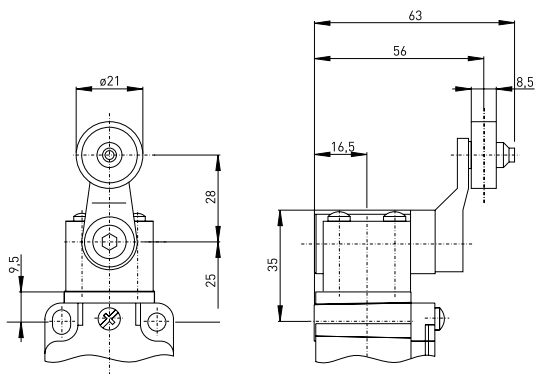
Ex RF 335 3K EN868

Order number

93919301

20

// Rocking roller lever 4VH



Features/options

- Actuator type A to DIN EN 50 041
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

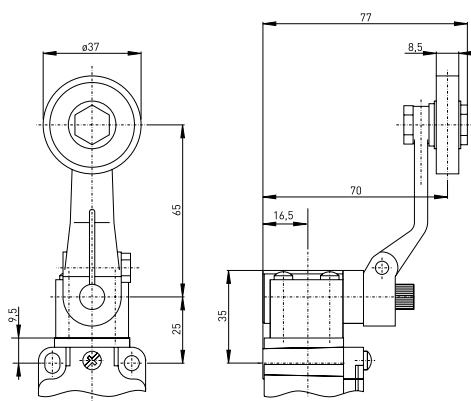
Part number

Ex RF 335 4VH EN868

Order number

93921301

// Long rocking roller lever 4V3H



Features/options

- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

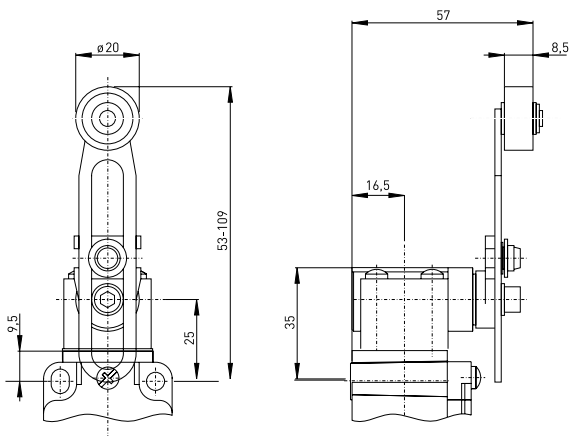
Part number

Ex RF 335 4V3H EN868

Order number

93923301

// Adjustable rocking lever 4V7H



Features/options

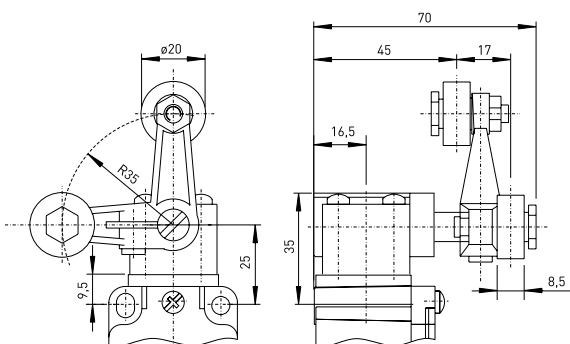
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

Part number
Ex RF 335 4V7H EN868

Order number
93929301

21

// Forked lever latching 3V4D



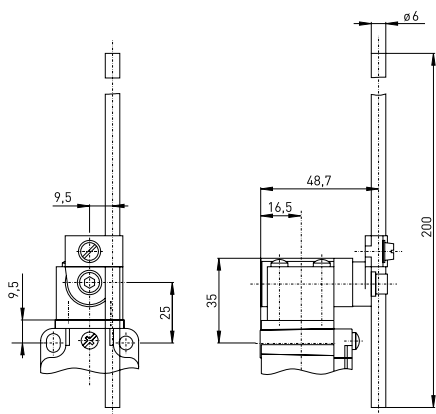
Features/options

- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

Part number
Ex RF 335 3V4D EN868

Order number
93967301

// Rod lever 4V10H



Features/options

- Actuating speed 2.5 m/s
- Actuator type D to EN 50041

Part number
Ex RF 335 4V10H EN868

Order number
93925301

Ex wireless switchgear

// Ex wireless command devices series Ex RF BF 80

Features/options

- Ex zone 1 and 21
- Polyester resin enclosure
- Output signal can be individually configured at the receiver
- EnOcean-protocol
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

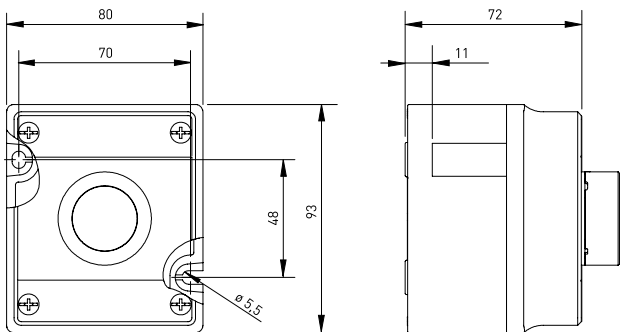
// EX RF BF 80



Technical Data

Standards	EN 60947-5-1; EN 60079-0, EN 60079-11; EN 61241-0, EN 61241-11
Enclosure	Polyester resin (glass fibre-reinforced)
Protection class	IP 66 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature Ta	- 20 °C ... + 60 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Bandwidth channel	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mech. life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T6 Gb, II 2D Ex ib IIIC T80°C Db IECEx Ex ib IIC T6 Gb, Ex ib IIIC T80°C Db
Approval	BVS 10 ATEX E 075, IECEx in 2012

22



Type code

Ex RF BF 80 3 DT/DT/DT EN868

868 MHz wire-
less frequency
EnOcean standard
Actuator DT (WS, SLS,
PZDTSW)
3 enclosure (1=single,
2=double, 3=triple)
Series
Command device
Wireless technology
Ex certified component

Ex wireless switchgear

// Ex wireless command devices series Ex RF BF 80, actuators

// Push-button DT



Push-button
Ex RF BF 80 1 DT EN868

Order Number
6810013101

// Black mushroom push-button PZDTSW



Features/Options
- Black mushroom push-button

Mushroom push-button
Ex RF BF 80 1 PZDTSW EN868

Order Number
6810033101

// Key switch SLS



Version 0 -I
Ex RF BF 80 1 SLS 0 - I EN868

Order Number
6810083101

Ex wireless switchgear

// Ex wireless command devices series Ex RF BF 80, actuators

// Selector switch WS

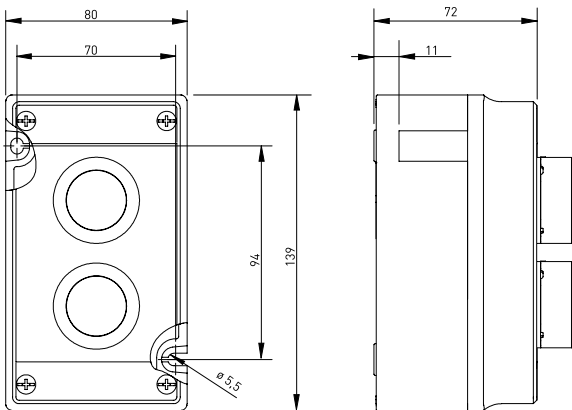


Version 0 -I
Ex RF BF 80 1 WS 0 - I EN868

Order Number
6810043101

24

// Version with 2 push-buttons

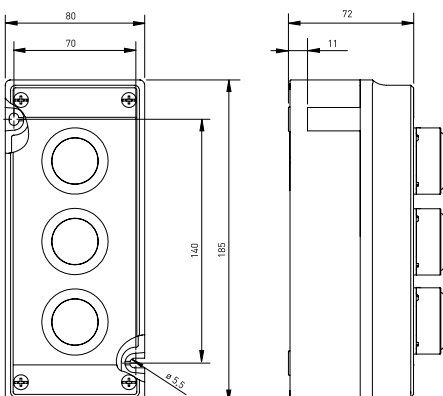


Features/Options
- 1 radio switch insert per push-button

2 push-buttons
Ex RF BF 80 2 DT/DT EN868

Order Number
6820223101

// Version with 3 push-buttons



Features/Options
- 1 radio switch insert per push-button

3 push-buttons
Ex RF BF 80 3 DT/DT/DT EN868

Order Number
6830253101

PRODUCTION PROCESS
ASSEMBLY OF COMPONENTS



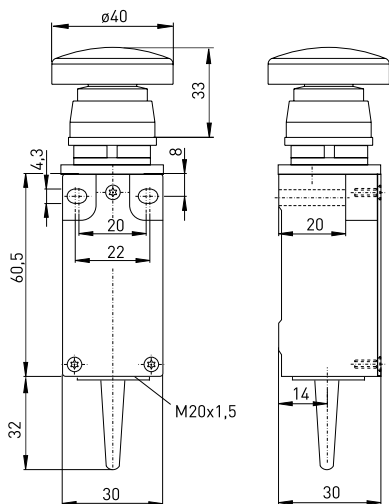
Ex wireless switchgear

// Ex wireless command devices series Ex RF 95

Features/options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Mountings to EN 50 047
- Output signal can be individually configured at the receiver
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

// EX RF 95 RS SW



Technical Data

Standards	EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3; EN 60079-0, EN 60079-11, EN 61241-11
Enclosure	Glassfibre reinforced thermoplastic, self-extinguishing UL 94-V0
Cover	Glassfibre reinforced thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 65 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature Ta	- 20 °C ... + 65 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Bandwidth channel	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mechanical life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T6 Gb, II 2D Ex ib IIIC T80°C Db IECEx Ex ib IIC T6 Gb, Ex ib IIIC T80°C Db
Approvals	BVS 08 ATEX E111; IECEx BVS 08.0048

Type code

Ex RF 95 RS SW EN868

868 MHz wireless frequency
EnOcean standard
Actuator RS SW (different push-buttons available)
Series
Wireless technology
Ex certified component

Ex wireless switchgear

// Ex wireless command devices series Ex RF 95, actuators

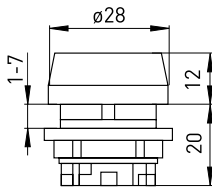
// Push-button RT

Features/Options

- IP 67 for actuators with diaphragm
- Available with actuator made of stainless steel

Push-button
Ex RF 95 RT EN868

Order Number
95955303



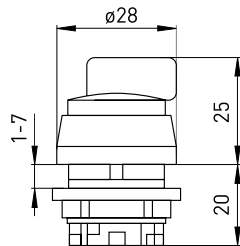
// Control switch RST

Features/Options

- IP 65
- RST with spring return

Control switch
Ex RF 95 RSTA 0<-I EN868

Order Number
95957301



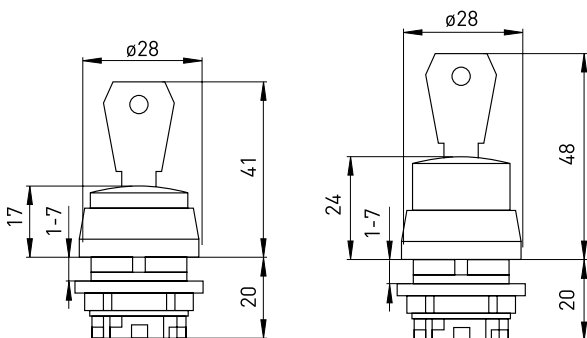
// Key switch RSSA

Features/Options

- IP 65
- RSSA key switch with safety cylinder lock (locks against turning)
- Standard version always has same key number

Key switch
Ex RF 95 RSSA 14 EN868

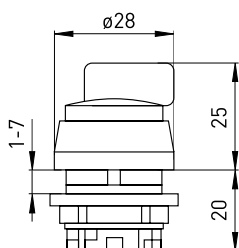
Order Number
95958301



Ex wireless switchgear

// Ex wireless command devices series Ex RF 95, actuators

// Selector switch RW



Features/Options

- IP 65

Seklektor switch

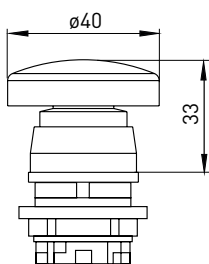
Ex RF 95 RWA 0-I EN868

Order Number

95957302

28

// Push-button RS SW



Features/Options

- IP 65

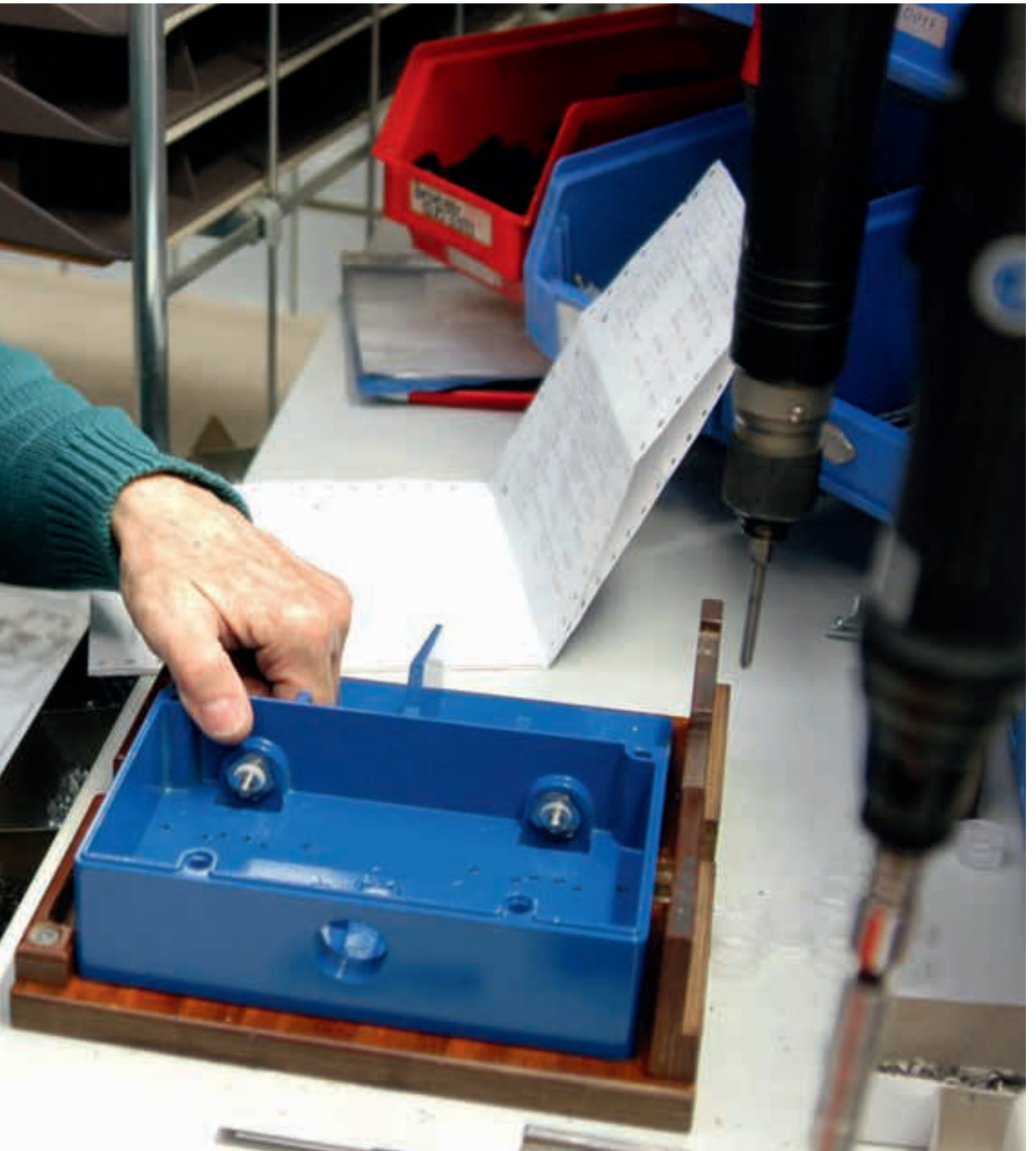
Push-button

Ex Ex RF 95 RS SW EN868

Order Number

95955301

PRODUCTION PROCESS
ASSEMBLY OF A FOOT SWITCH



Ex wireless switchgear

// Ex wireless foot switches series Ex RF GFI

Features/options

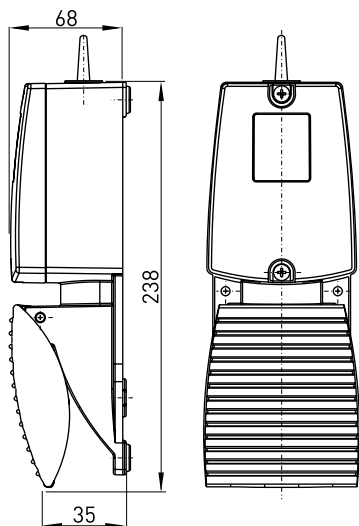
- Ex zone 1 and 21
- Metal enclosure
- Available with special finish in RAL colour tones
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

// EX RF GFI



Technical Data

Standards	EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3; EN 60079-0, EN 60079-11, EN 61241-0, EN 61241-11
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Cover	aluminium die-cast, enamel finish, RAL 2004
Pedal	aluminium die-cast, enamel finish, RAL 5011
Protective shield	-
Protection class	IP 67 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature	-20 °C ... +65 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Bandwidth channel	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mechanical life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T ₆ , II 2D Ex ibD 21 T ₈₀ °C
Approvals	BVS 09 ATEX E149



Part number
Ex RF GFI EN868

Order Number
53191201

Type code

Ex RF GFI EN868

868 MHz wireless frequency
EnOcean standard
Series
Wireless technology
Ex certified component

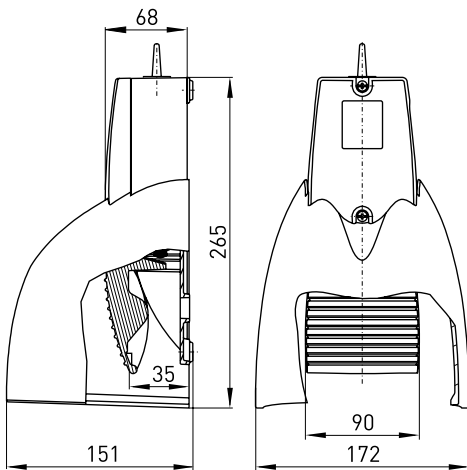
Ex wireless switchgear

// Ex wireless foot switches series Ex RF GFSI

Features/options

- Ex zone 1 and 21
- Metal enclosure
- Available with special finish in RAL colour tones
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

// EX RF GFSI



Part number
Ex RF GFSI EN868

Order Number
53291201

Technical Data

Standards	EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3; EN 60079-0, EN 60079-11; EN 61241-0, EN 61241-11
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Pedal	aluminium die-cast, enamel finish, RAL 5011
Protective shield	aluminium die-cast, enamel finish, RAL 2004
Protection class	IP 67 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature	-20 °C ... +65 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Bandwidth channel	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mechanical life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T6, II 2D Ex ibD 21 T80°C
Approvals	BVS 09 ATEX E149

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Type code

Ex RF GFSI EN868

868 MHz Funkfrequenz
EnOcean standard
Series
Wireless technology
Ex certified component

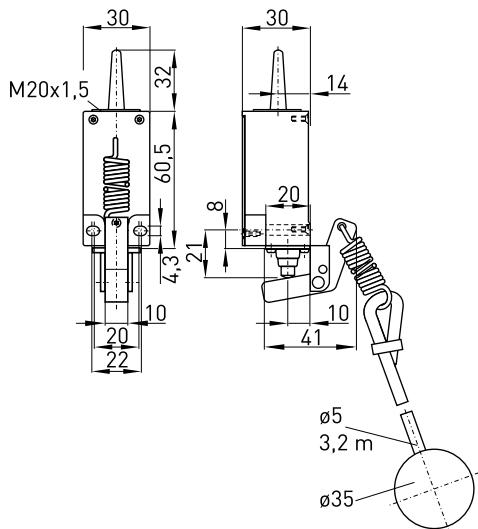
Ex wireless switchgear

// Ex wireless pull-wire switch series Ex RF 95 WH/90°

Features/options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Transversely slotted mounting holes
- Mountings to EN 50 047
- Output signal can be individually configured at the receiver
- EnOcean-protocol
- Data rate 120 kbps
- No power supply, no wiring and pipe laying required
- Multi-network capable
- Easy programming of receiver

// EX RF 95 WH/90°



Part number

Ex RF 95 WH/90° EN868

Order Number

95914302

Technical Data

Standards	EN 60947-5-1, EN 61000-6-2, EN 301 489-1, EN 301 489-3, EN 300 220-3; EN 60079-0, EN 60079-11, EN 61241-11
Enclosure	Glassfibre reinforced thermoplastic, self-extinguishing UL 94-V0
Cover	Glassfibre reinforced thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 67 to IEC/EN 60529
Protocol	EnOcean
Ambient temperature Ta	-20 °C ... +65 °C
Switching frequency	approx. 9000 telegrams at repetitions/h
Voltage supply	Electrodynamic energy generator
Frequency	868.3 MHz
Transmission power	max. 10 mW
Data rate	120 kbps
Bandwidth channel	280 kHz
Sensing range	max. 300 m outside, max. 30 m inside
Mechanical life	> 1 million operations
Actuating time	min. 80 ms
Note	no presence signal available
Ex marking	⊕ II 2G Ex ib IIC T6 Gb, II 2D Ex ib IIIC T80°C Db IECEx Ex ib IIC T6 Gb, Ex ib IIIC T80°C Db
Approvals	BVS 08 ATEX E 111; IECEx BVS 08.0048

Type code

Ex RF 95 WH/90° EN868

868 MHz wireless frequency
EnOcean standard
Actuator H/90°
Watertight collar
Series
Wireless technology
Ex certified component

QUALITY MANAGEMENT PROCESS

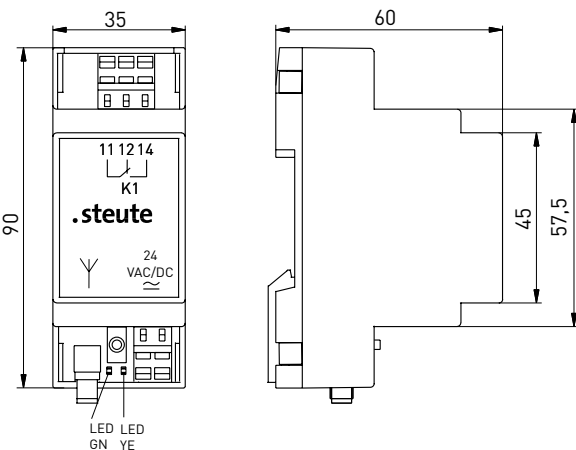
VERIFICATION OF DIMENSION OF DELIVERED COMPONENTS



Ex wireless switchgear

// Wireless receiver series RF Rx EN868-1

// RF RX EN868-1



Part number

- RF Rx EN868-1W 24 VDC
- RF Rx EN868-PNP 24 VDC
- RF Rx EN868-NPN 24 VDC
- RF Rx EN868-1W 24 VAC/DC

Order Number

- 90590001
- 90590003
- 90590002
- 90590005

Features/options

- Thermoplastic enclosure
- EnOcean standard
- 1-channel: potential-free relay outputs
- DC version: 1 change-over contacts, NPN- or PNP output
- AC version: 1 change-over contacts
- Transmitter/receiver assignment by teaching mode
- LEDs for indication of switching state
- SMA plug-in connector for external antenna

Technical Data

Standards	EN 60947-5-1; EN 61000-6-2; EN 61000-6-3; EN 60068-2-6; EN 60068-2-27; EN 301 489-1; EN 301 489-3; EN 300 220-3
Number of channels	1
Mounting	DIN rail mounting
Connection	terminals with CAGE CLAMP WAGO Series 236: 0.08 ... 2.5mm ² AWG 28-14 (incl. conductor ferrules)
Degree of protection	IP 20 per EN 60529
Inputs	1 radio channel, max. 10 transmitters per channel
Outputs	1 change-over contact (Relay), NPN or PNP (transistor)
Rated operating current I_e	max. 0.22A AC, 0.08A DC
Rated operating voltage U_e	24 VAC/DC -15% ... +10%
I_e/U_e of output contacts	6A / 250 VAC; 2A / 24 VDC
Utilisation category	AC-15; DC-13
U_i	250 VAC
U_{imp}	2.5 kV
Frequency	868.3MHz
Display	green LED for control voltage, yellow LED for switching conditions
Switching frequency	approx. 9000 telegrams at repetitions/h
Degree of pollution	2 per DIN VDE 0110
Ambient temperature	0 °C ... +55 °C
Storage and transport-temperature	-25 °C ... +85 °C
Vibration resistance	NO contact 20g, NC contact 5g
Schock resistance	max. 100g
External antenna	always required for optimum sensing range
Note	inductive loads (contactors, relays etc.) are to be suppressed by suitable circuitry.

Type code

RF Rx EN868-1W

- Change-over contact (NPN, PNP transistor output)
- Radio frequency 868 MHz
- EnOcean standard
- Radio receiver
- Radio technology

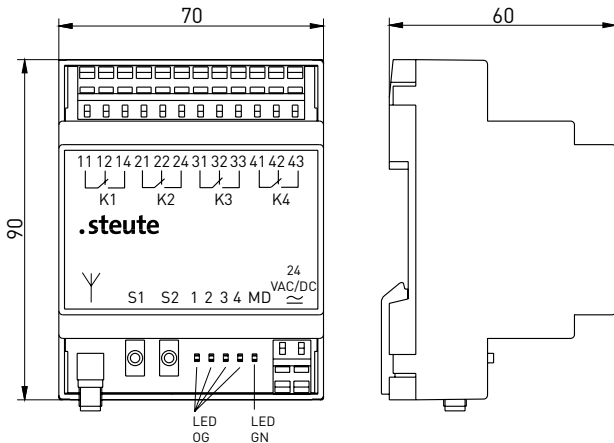
RF magnet antenna with SMA plug-in connector available as accessory, order-No. 01.08.0386.

Mobile field strength indicator EPM 300 for radio field planning is available, order-No. 90598005.

Ex wireless switchgear

// Wireless receiver series RF Rx EN868-4

// RF RX EN868-4



Part number
RF Rx EN868-4W

Order Number
90590006

Features/options

- Thermoplastic enclosure
- EnOcean standard
- 4-channel: potential-free relay outputs
- 4 NO contacts, max. 16 A, 4 change-over contacts, max. 8 A
- Transmitter/receiver assignment by teaching mode
- LEDs for indication of switching state
- SMA plug-in connector for external antenna

Technical Data

Standards	EN 60947-5-1; EN 61000-6-2; EN 60068-2-6; EN 60068-2-27; EN 301 489-1; EN 301 489-3; EN 300 220-3
Standards	4
Mounting	DIN rail mounting
Connection	terminals with CAGE CLAMP WAGO Series 236: 0.08 ... 2.5mm ² AWG 28-14 (incl. conductor ferrules)
Degree of protection	IP 20 per EN 60529
Inputs	4 radio channels, max. 10 transmitters per channel
Outputs	4 change-over contacts (Relays)
Rated operating current I_e	max. 0.25A AC, 0.1A DC
Rated operating voltage U_e	24 VAC/DC -15% ... +10%
I_e/U_e of output contacts	6A / 250 VAC; 2A / 24 VDC
Utilisation category	AC-15; DC-13
U_i	250 VAC
U_{imp}	2.5 kV
Radio frequency	868.3 MHz
Display	green LED for supply voltage, yellow LED for switching conditions
Switching frequency	approx. 9000 telegrams at repetitions/h
Degree of pollution	2 per DIN VDE 0110
Ambient temperature	0 °C ... +55 °C
Storage and transport-temperature	-25 °C ... +85 °C
Vibration resistance	NO contact 20g, NC contact 5g
Schock resistance	max. 100g
External antenna	always required for optimum sensing range
Note	inductive loads (contactors, relays etc.) are to be suppressed by suitable circuitry.

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Type code

RF Rx EN868-4W

4 change-over contacts
Radio frequency 868 MHz
EnOcean standard
Radio receiver
Radio technology

RF magnet antenna with SMA plug-in connector available as accessory, order-No. 01.08.0386.

Mobile field strength indicator EPM 300 for radio field planning is available, order-No.90598005.

Ex wireless switchgear

// Wireless repeater series RF RxT EN868-1K

Features/options

- EnOcean standard
- LEDs for indication of switching state
- SMA plug-in connector for external antenna

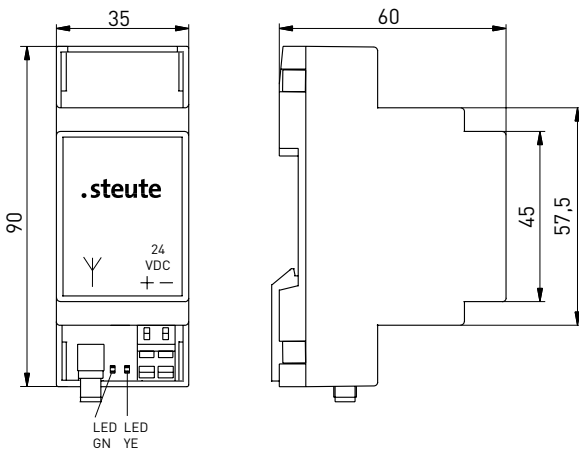
// RF RXT EN868-1K



Technical Data

Standards	EN 60947-5-1; EN 61000-6-2; EN 61000-6-3; EN 60068-2-6; EN 60068-2-27; EN 301 489-1; EN 301 489-3, EN 300 220-3
Mounting	DIN rail mounting
Connection	terminals with CAGE CLAMP WAGO Series 236: 0.08 ... 2.5mm ² AWG 28-14 (incl. conductor ferrules)
Degree of protection	IP 20 per EN 60529
Rated operating voltage U_e	24VDC -15 % ... +20 %
Rated operating current I_e	max. 0.08 A DC
Frequency	868.3 MHz
Display	green LED for control voltage, orange LED: confirmation of telegram
Switching frequency	approx. 9000 telegrams at repetitions/h
Degree of pollution	2 per DIN VDE 0110
Ambient temperature	0 °C ... +55 °C
Storage and transport-temperature	-25 °C ... +85 °C
Schock resistance	max. 100g
External antenna	always required for optimum sensing range

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Part number
RF RxT EN868-1K

Order Number
90590004

Type code

RF Rx EN868-1K

1-channel,
simple cascading
Radio frequency 868 MHz
EnOcean standard
Radio repeater
Radio technology

RF magnet antenna with SMA plug-in connector available as accessory, order-No. 01.08.0386.

Mobile field strength indicator EPM 300 for radio field planning is available, order-No.90598005.

// Field strength indicator EPM 300



Features/options

- Mobile field strength indicator EPM 300 for link range testing
- To measure and indicate the electrical field strength
- Battery not included, requires AA/LR06 cell
- Repeater mode can be selected

Part number
EPM 300

Order Number
90598005

// RF Magnet antenna



Features/options

- RF magnet antenna with straight SMA plug-in connector without ferrite core
- Cable length 2.5 m
- Order unit: 1 piece

Note

The antenna must be mounted on a metal plate of min. 250 x 250 mm size.

Part number
RF Magnet antenna

Order Number
01.08.0386

// RF Sperrtopf antenna



Features/options

- RF Sperrtopf antenna suitable for mast mounting up to max. 41 mm diameter
- 260 mm length
- N-connector socket
- 5 dbi gain
- internally grounded as lightning protection
- Order unit: 1 piece

Part number
RF Sperrtopf antenna
RF SMA N antenna connecting cable 5 m
RF SMA N antenna connecting cable 10 m

Order Number
90598003
90598004
90598008

// RF SMA antenna socket



Features/options

- RF SMA antenna socket with 0.5 m extension cable
- Order unit: 1 piece

Part number

RF Magnet antenna

Order Number

90598001

// RF SMA antenna extension



Features/options

- RF SMA antenna extension cable with straight SMA plug-in connector
- Cable length 3 m or 5 m
- Order unit: 1 piece

Part number

RF SMA antenna extension cable 3 m

RF SMA antenna extension cable 5 m

Order Number

90598002

90598004

// Antenna arrangement

Arrangement of receiver and switch antenna

Optimum mounting

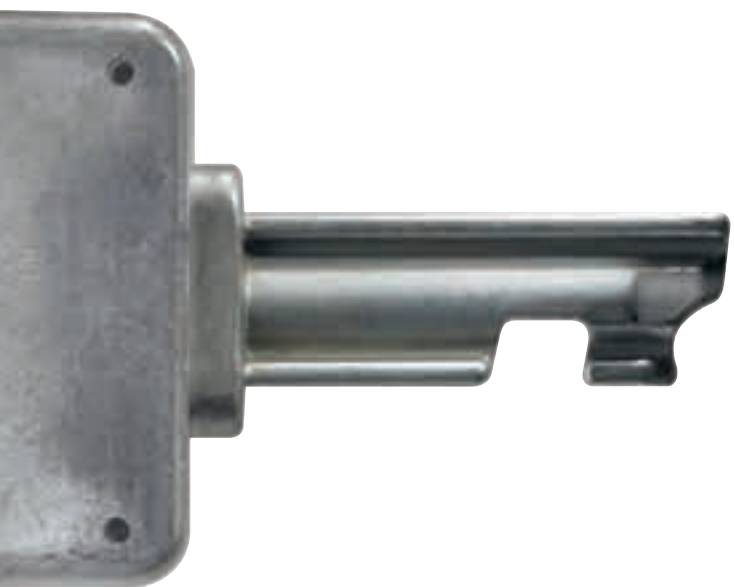


Possible mounting



Unsuitable mounting







Ex solenoid interlocks

Thermoplastic enclosure

// Series Ex STM 295

from page 44

Metal enclosure

// Series Ex AZM 415

from page 46

// Series Ex AZP 415

from page 48



Ex solenoid interlocks

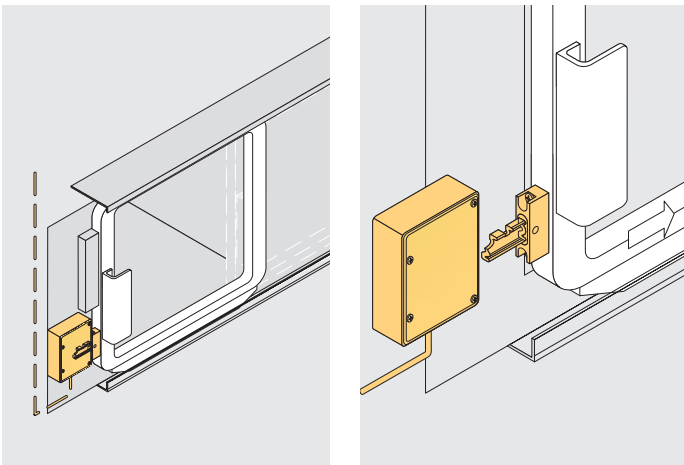
Range of application

The Ex solenoid and pneumatic interlocks ensure that sliding, hinged and removable guarding devices, such as grids, hoods or doors, cannot be opened until dangerous conditions (e.g. run-on movements) have been terminated. This takes place in co-ordination with the control system of a machine. Fail-safe standstill monitors or delay timers monitor run-on movements or time sequences. These Ex solenoid and pneumatic interlocks are also used for cases in which the opening of a guarding device represents a non-permissible intrusion in a production process.

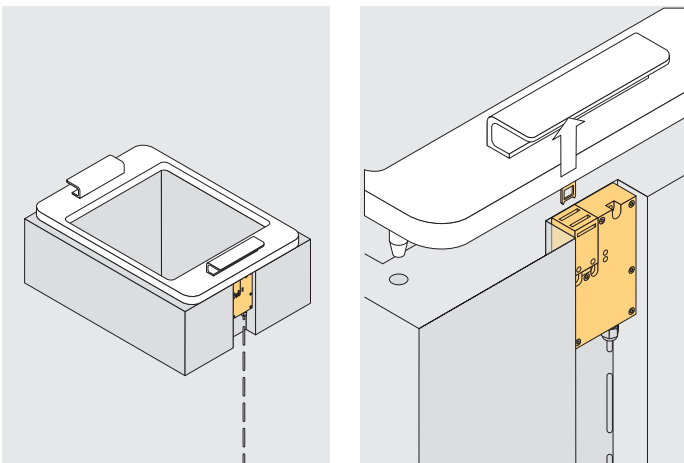
In combination with the SRM range safety relay module, the AZM and AZP range Ex solenoid and pneumatic interlocks achieve PL »e« per EN ISO 13849-1 or up to SIL 3 per EN 62061, subject to suitable circuit arrangements.

Application

on sliding guards



on removable guards

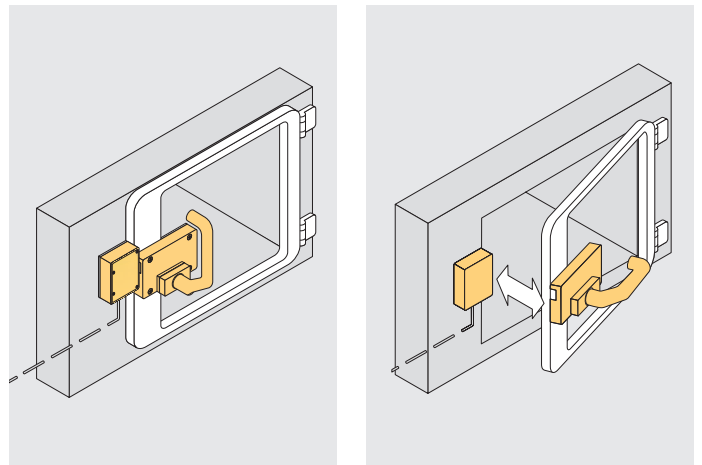


Design and operating principle

On the Ex solenoid and pneumatic interlocks, the switching element with interlock is not physically connected to the actuator but functionally united or separated on switching. When the guard device is opened in the uninterlocked condition, the actuator is separated from the base unit. In the process, NC contacts are positively opened and NO contacts closed. The machine control circuit is only activated when the actuator has been inserted into the interlock and is interlocked. The Ex solenoid and pneumatic interlocks operate on the principle of »actuated without power supply«, whereby the actuator is held in the interlock by spring pressure. When power/air is supplied to the solenoid/pneumatic cylinder, the interlock is released. The guarding device can then be opened. The Ex solenoid interlocks with the power-to-lock principle work in the opposite way.

The Ex solenoid interlocks shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC and according to ATEX 94/9/EC. The Ex solenoid interlocks per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

on hinged guards



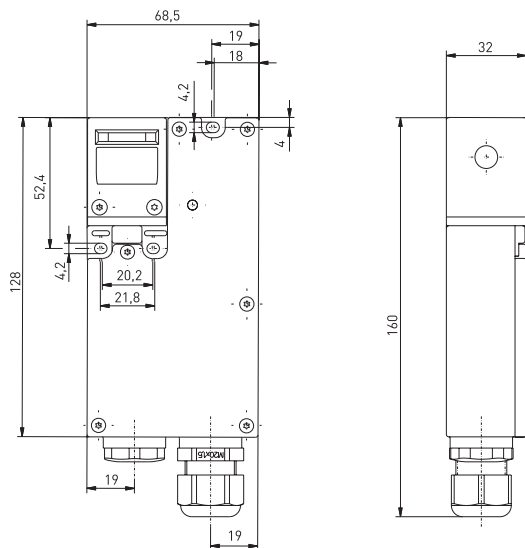
Ex solenoid interlocks

// Series Ex STM 295

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Double insulated □
- Two Ex switch inserts in one enclosure
- Spring-to-lock or power-to-lock principle
- Holding force 1000 N
- Wiring compartment
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX STM 295



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-18; EN 61241-0, EN 61241-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0 stainless steel 1.4301
Actuator	Ex 95
Switch insert	IP 64 to IEC/EN 60529
Protection class	IP 64 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	2 NC and 2 NO contacts with positive break, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entries	2 x M20 x 1.5 for cable section 5 ... 9 mm
B_{10d} (10 % load)	1 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	3 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15; DC-13
Max. fuse rating	6 A gG/gN fuse
I_e/U_e solenoid	0.08 A / 24 VDC +10%/-15%
Power consumption	max. 47 W (0.25s)
Ambient temperature	-20 °C ... +55 °C
Holding force F	max. 1000 N
Mechanical life	> 500 000 operations
Ex marking	⊕ II 2G Ex demb IIC T4 Gb, II 2D Ex tD A21 IP64 T100°C IECEx Ex demb IIC T4, Ex tD A21 IP64 T100°C
Approvals	BVS 10 ATEX E 053 X IECEx BVS 11.0030 X

Contact variants: switch travel/contacts

	Spring-to-lock principle	Power-to-lock principle
2 NC/2 NO contact	<p>Ex STM 295 2Ö/2S-R</p>	<p>Ex STM 295 2Ö/2S-A</p>

Type code

Ex STM 295 2Ö/2S-R-3G/D

Equipment Categ. 3G/D,
gas Ex zone 2 and dust
Ex zone 22
R Spring-to-lock
principle, (A Power-to-
lock principle)
Contact type 2 NC/2 NO contact
Series
Solenoid interlock
Ex certified component

Ex solenoid interlocks

// Series Ex STM 295, actuators

Features/Options

STM 295 AZ-B1

- Actuating radius on hinged guards
a = 350 mm and b = 700 mm
- Axial misalignment x = 11 mm

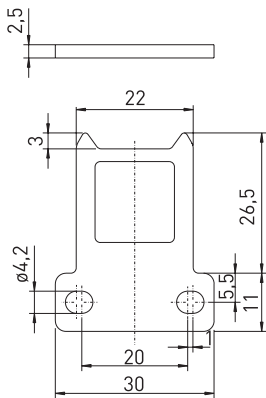
STM 295 AZ-B5

- Especially suitable for hinged guards
- Actuating radius on hinged guards
a = 350 mm and b = 700 mm
- Axial misalignment x = 13.5 mm

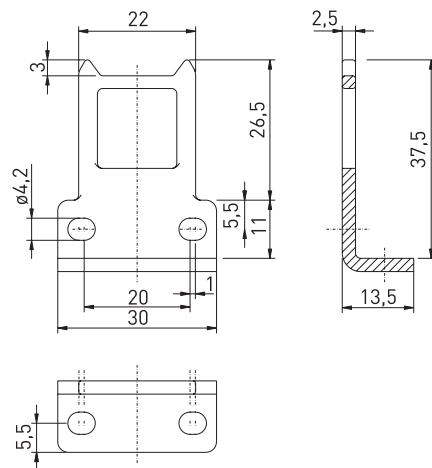
Note

The actuators are not included with the switches.

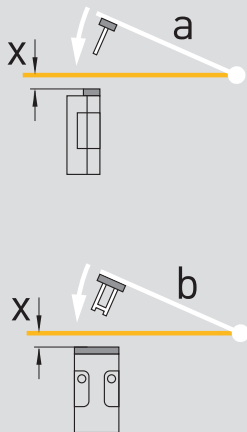
// Straight actuator STM 295 AZ-B1



// Angled actuator STM 295 AZ-B5



// Actuating radius



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment

Ex solenoid interlocks

// Series Ex AZM 415

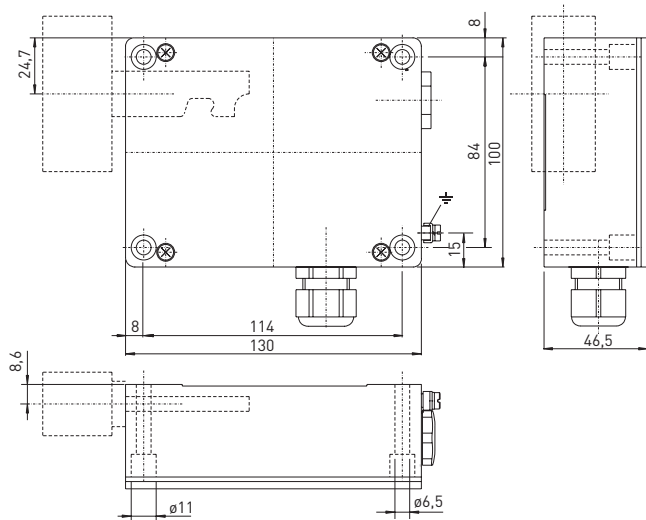
Features/Options

- Ex zone 1 and 21
- Two Ex switch inserts in one enclosure
- Spring-to-lock or power-to-lock principle
- Problem-free opening of stressed doors by means of bell-crank system
- High holding force 3.500 N
- Ball catch
- Special version only for dust Ex zone 22 available

// EX AZM 415



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Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-18; EN ISO 13849-1
Enclosure	aluminium die casting, enamelled
Cover	steel, enamelled
Actuator/locking bolt	metal zinc/aluminium
Switch insert	Ex 95
Protection class	IP 67; Ex AZM 415-TE, TEI, -FE: IP64 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 2.5 mm ² (incl. conductor ferrules)
Cable entries	2 x M20 x 1.5 for cable section 5 ... 9 mm
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15
Max. fuse rating	6 A gG/gN fuse
I_e/U_e solenoid	0.08 A / 24 VDC ±10%
Power consumption	max. 12 W (0.25s)
Amb. temperature T_a	T ₆ : -20 °C ... +40 °C; T ₅ : -20 °C ... +55 °C
Mechanical life	> 1 million operations
Holding force F	max. 3500 N
Holding force of integrated ball catch	50 - 200 N, adjustable
Ex marking	⊕ II 2G Ex demb IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex demb IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	DMT 02 ATEX E 255 X, IECEx BVS 07.0018X

Contact variants: switch travel/contacts

	Spring-to-lock principle	Power-to-lock principle
2 NC/2 NO contact	<p>Ex AZM 415 2Ö/2S-R</p>	<p>Ex AZM 415 2Ö/2S-A</p>

Type code

Ex AZM 415 2Ö/2S-R-TEI-FE-3D

Equipment. Cat. 3D, dust Ex zone 22 auxiliary unlocking emergency unlocking, device inside hazard. area (TE device outside haz. area)
R Spring-to-lock principle, (A Power-to-lock principle)
Contact type 2 NC/2 NO contacts
Series
Solenoid interlock
Ex certified component

Ex solenoid interlocks

// Series Ex AZM 415, variants

Features/Options

Ex AZM 415-FE

- With auxiliary unlocking for service, maintenance, etc.
- Unlocking with M5 triangular key

Ex AZM 415-TEI

- With emergency release, actuation in case of emergency
- Unlocking by pressing a push-button
- Mounting of the device inside a hazardous area

Features/Options

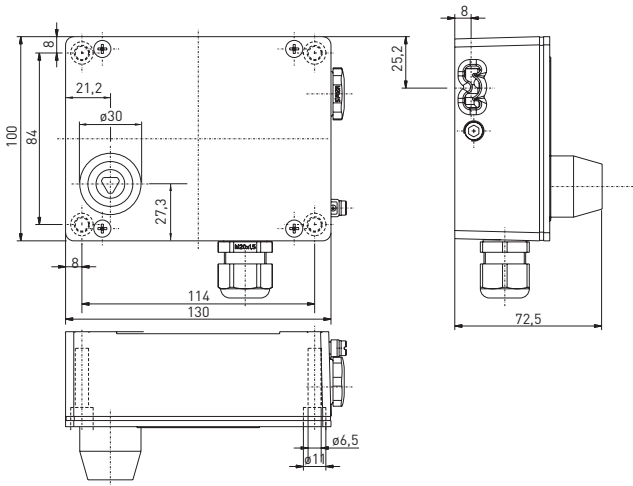
Ex AZM 415-TE

- With emergency release, actuation in case of emergency
- Unlocking by pressing a push-button
- Mounting of the device outside a hazardous area

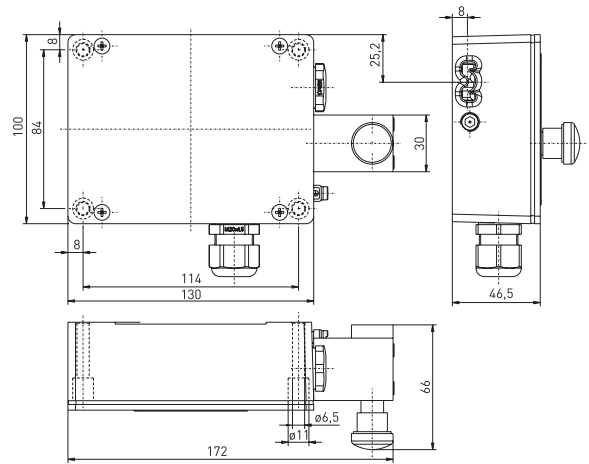
Ex AZM 415-TE-FE

- With emergency release and auxiliary unlocking
- Unlocking by pressing a push-button
- Auxiliary unlocking with M5 triangular key
- Mounting of the device outside a hazardous area

// Ex AZM 415-FE



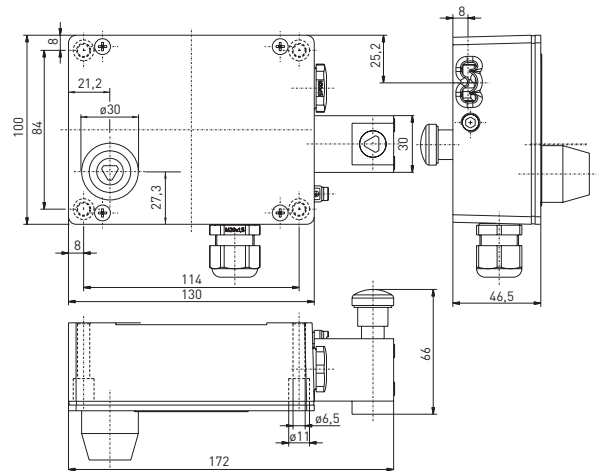
// Ex AZM 415-TEI



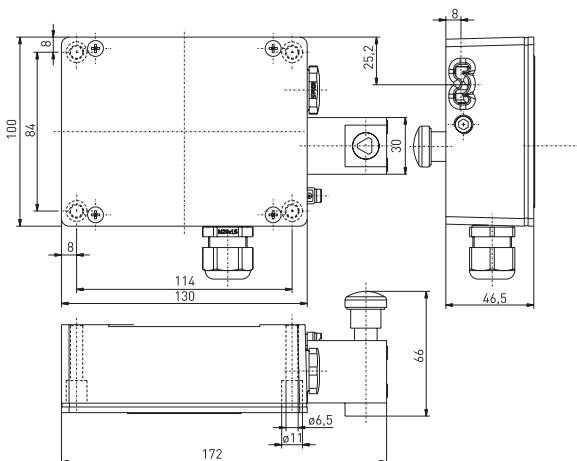
// Ex AZM 415-FE-TE



// Ex AZM 415-TE-FE



// Ex AZM 415-TE



Ex solenoid interlocks

// Series Ex AZP 415

Features/Options

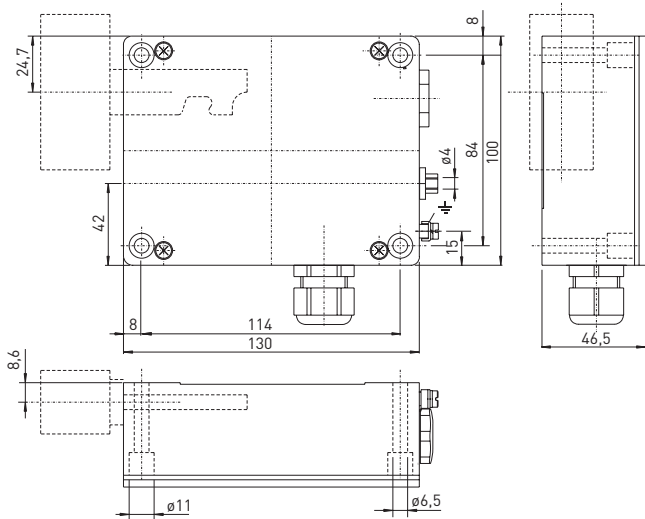
- Ex zone 1 and 21
- Two Ex switch inserts in one enclosure
- Release by means of pneumatic cylinder
- Problem-free opening of stressed doors by means of bell-crank system
- High holding force 3,500 N
- Ball catch
- Special version only for dust Ex zone 22 available

// EX AZP 415

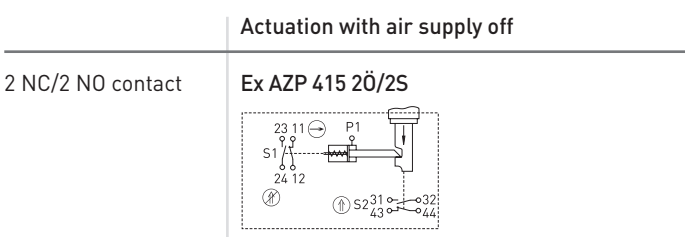


Technical data

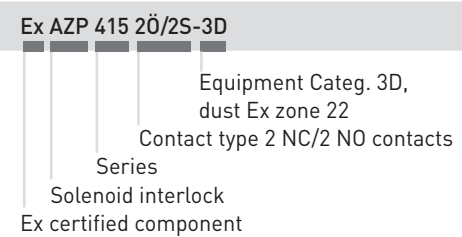
Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN ISO 13849-1
Enclosure	aluminium die casting, enamelled
Cover	steel, enamelled
Actuator/locking bolt	metal zinc/aluminium
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 2.5 mm ² (incl. conductor ferrules)
Cable entries	2 x M20 x 1.5 for cable section 5 ... 9 mm
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15
Max. fuse rating	6 A gG/gN fuse
Unlocking	Pneumatic cylinder, max. 3 - 7 bar permitted
Ambient temperature	T6: -20 °C ... +40 °C; T5: -20 °C ... +55 °C
Mechanical life	> 1 million operations
Holding force F	max. 3500 N
Holding force of integrated ball catch	50 - 200 N, adjustable
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	DMT 02 ATEX E 255 X; IECEx BVS 07.0018 X



Contact variants: switch travel/contacts



Type code



Ex solenoid interlocks

// Series Ex AZM/AZP 415, actuators

Features/Options

AZM 415-B1

- For sliding guards
- Actuator with return spring
- Tolerates up to max. 6 mm overtravel

AZM 415-B2

- Especially suitable for sliding and hinged guards
- Actuating radius on hinged guards
b = 250 mm, axial misalignment x = 36 mm

AZM 415-B3

- Especially suitable for sliding and hinged guards

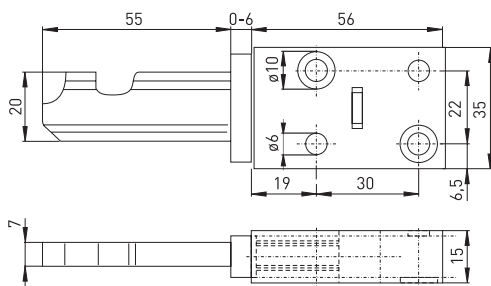
Features/Options

- Actuating radius on hinged guards
a = 250 mm, axial misalignment x = 36 mm

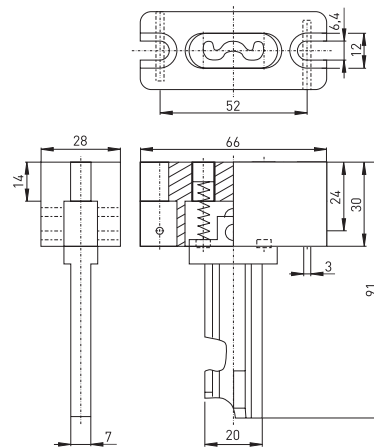
Note

- The actuators are not included with the switches.
- Removal of the actuator can be prevented by fitting dowel pins in the holes provided.
- The distance between the flange of the actuator and the switch enclosure must be less than 3 mm when the actuator is inserted.
- Adjustment on B2 and B3 or turning hexagonal screw

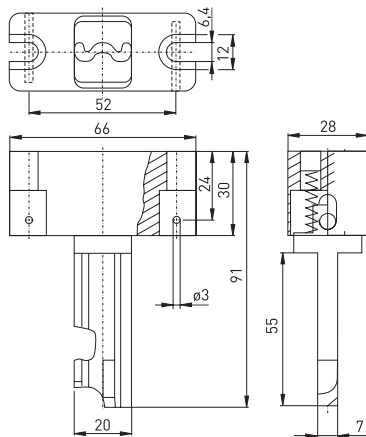
// Straight actuator AZM 415-B1



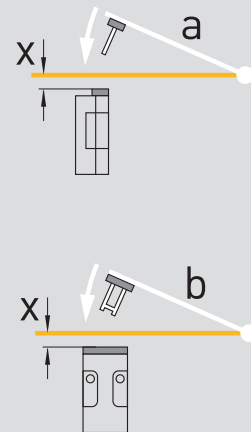
// Flexible actuator AZM 415-B2



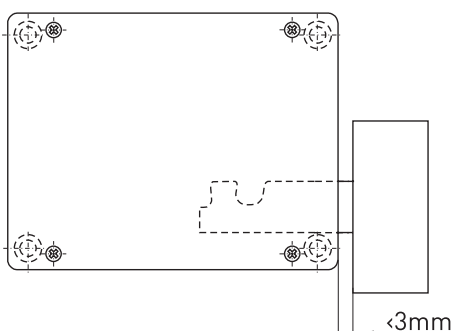
// Flexible actuator AZM 415-B3



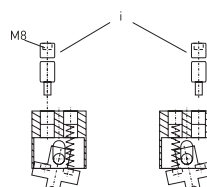
// Actuating radius



// Distance between actuator/enclosure



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment



Ex solenoid interlocks

// Series Ex AZM/AZP 415, actuators

Features/Options

AZM 415-B4pS

- Suitable for all types of guards, no further handles required
- Hinge radius not to be observed
- Shearing force 25,000 N
- Mounting plate to simplify mounting, see accessories
- Lockout tag SZ 415-B4pS to prevent unintentional closing, see accessories

AZM 415-B30

- Suitable for all guard types
- Hinge radius not to be observed
- No further handles/levers required on the guard

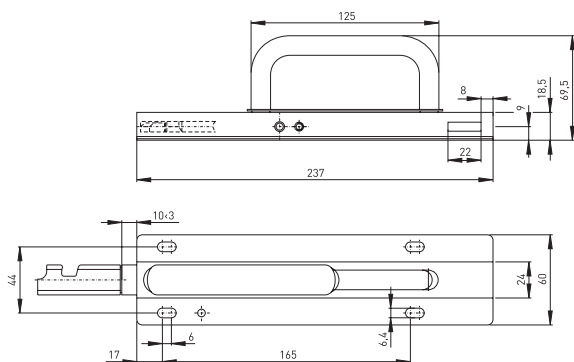
Features/Options

- Latching actuating handle
- Emergency handle to open guard from within the guarded area:
 1. Press push-button, 2. Turn emergency handle
- Shearing force 25,000 N
- Lockout tag SZ 415-1 or SZ 415-2 to prevent unintentional closing
- For door thickness max. 100 mm

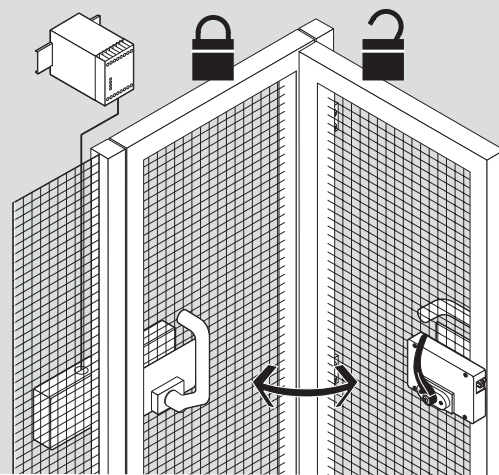
AZM 415-B30-01

- With emergency handle, door hinge on right-hand side
- Actuator mounted inside, see yellow marking in drawing
- Only to be used in combination with Ex AZM 415-2Ö/2S-TEI

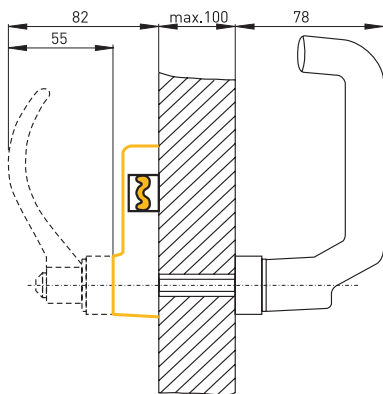
// Actuator AZM 415-B4pS with grip



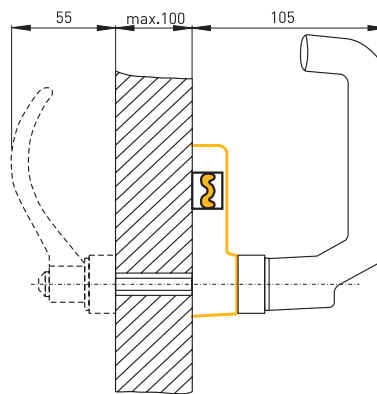
// Actuator AZM 415-B30



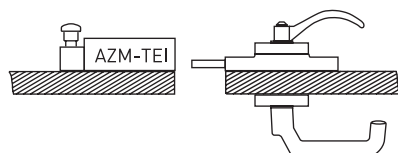
// Actuator mounted inside



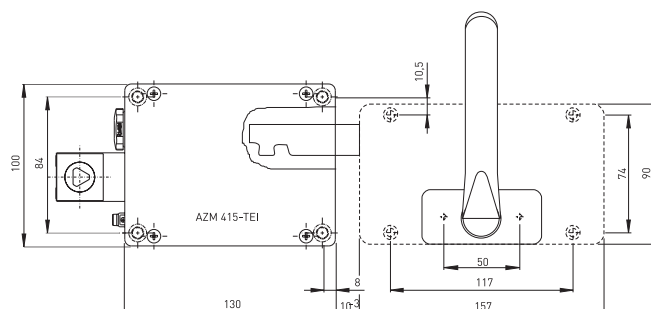
// Actuator mounted outside



// Mounting AZM 415-B30-01



// Actuator AZM 415-B30-01



Ex solenoid interlocks

// Series Ex AZM/AZP 415, actuators

Features/Options

AZM 415-B30-02

- Actuator mounted inside, see yellow marking in drawing page 44
- With emergency handle, door hinge on left-hand side
- Only to be used in combination with Ex AZM 415-20/2S-TEI

AZM 415-B30-03

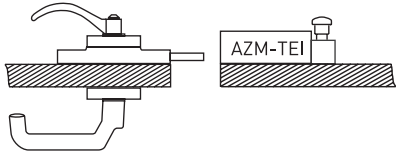
- Actuator mounted inside, see yellow marking in drawing page 44
- Door hinge on right-hand side

Features/Options

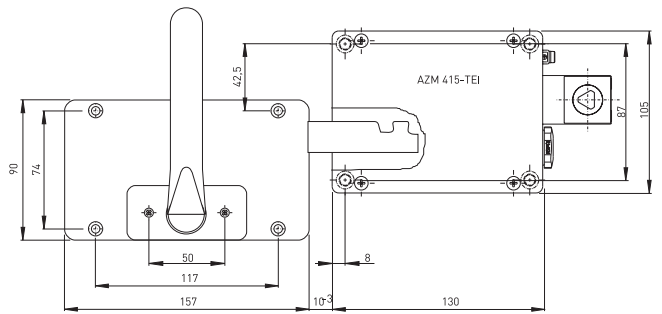
AZM 415-B30-04

- Actuator mounted inside, see yellow marking in drawing page 44
- Door hinge on left-hand side

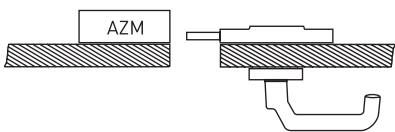
// Mounting AZM 415-B30-02



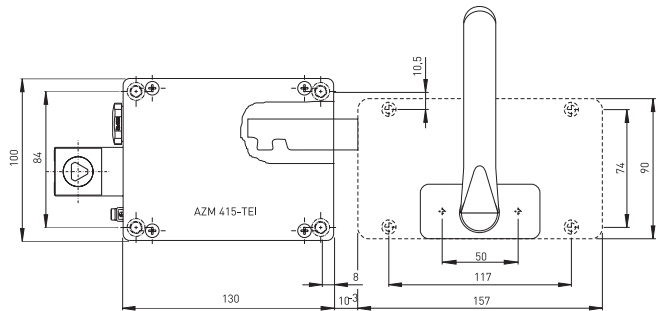
// Actuator AZM 415-B30-02



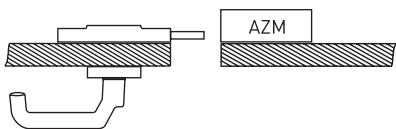
// Mounting AZM 415-B30-03



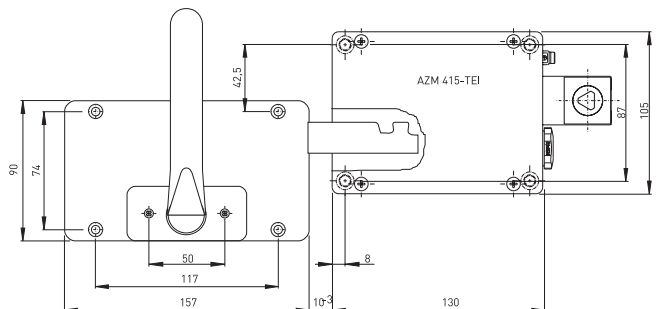
// Actuator AZM 415-B30-03



// Mounting AZM 415-B30-04



// Actuator AZM 415-B30-04



Ex solenoid interlocks

// Series Ex AZM/AZP 415, actuators

Features/Options

AZM 415-B30-05

- Actuator mounted outside, see yellow marking in drawing page 44
- Only to be used in combination with Ex AZM 415-2Ö/2S-TE
- Door hinge on right-hand side

AZM 415-B30-06

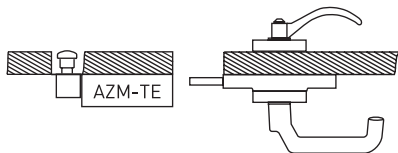
- Only to be used in combination with Ex AZM 415-2Ö/2S-TE
- Actuator mounted outside, see yellow marking in drawing page 44
- Door hinge on left-hand side

Features/Options

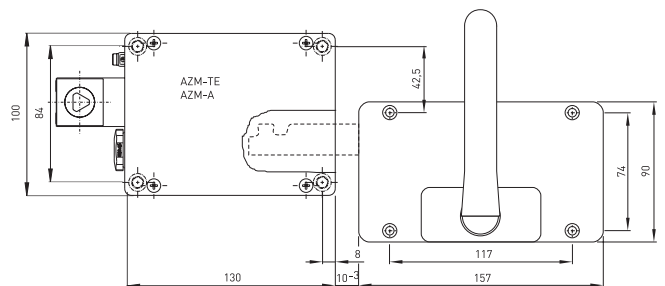
AZM 415-B30-07

- Actuator mounted outside, see yellow marking in drawing page 44
- Door hinge on right-hand side

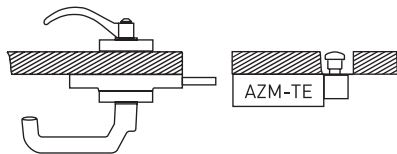
// Mounting AZM 415-B30-05



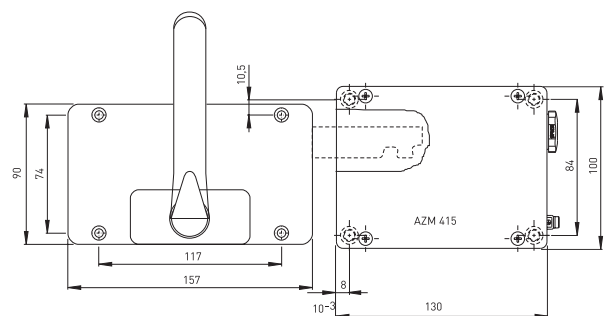
// Actuator AZM 415-B30-05



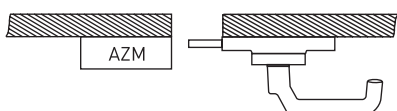
// Mounting AZM 415-B30-06



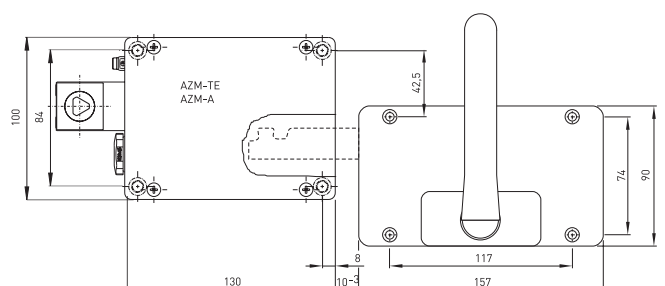
// Actuator AZM 415-B30-06



// Mounting AZM 415-B30-07



// Actuator AZM 415-B30-07



Ex solenoid interlocks

// Series Ex AZM/AZP 415, actuators and accessories

Features/Options

AZM 415-B30-08

- Actuator mounted outside, see yellow marking in drawing page 44
- Door hinge on left-hand side

Lockout tag SZ 415-1/-2

- To prevent inadvertent closing, e.g. during maintenance, by preventing actuating of the switch
- Suitable for mounting inside and outside the hazardous area
- SZ 415-1 for versions: AZM 415-B30-01, -03, -06 and -08
- SZ 415-2 for versions: AZM 415-B30-02, -04, -05 and -07
- Shown version SZ 415-1, version SZ 415-2 mirror-image

Features/Options

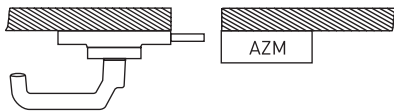
Lockout tag SZ 415-B4pS

- For actuator AZM 415-B4pS
- To prevent inadvertent closing, e.g. during maintenance, by preventing actuating of the switch
- With chain to fix on actuator, length of chain 500 mm

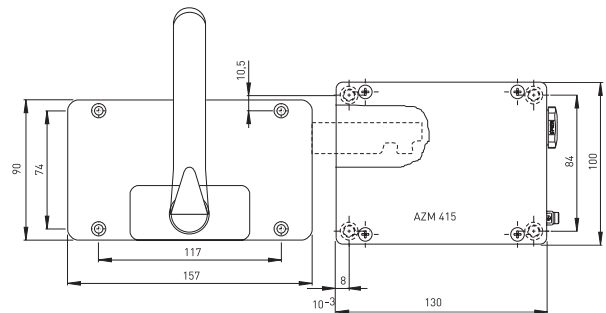
Mounting plate MP

- For simple mounting on profile systems, e.g. 40, 60 or 80 mm wide
- Thickness of plate 5 mm
- MP AZM 415-22: Mounting of AZM 415 or AZP 415
- MP AZM 415-B30: Mounting of a door or an emergency handle

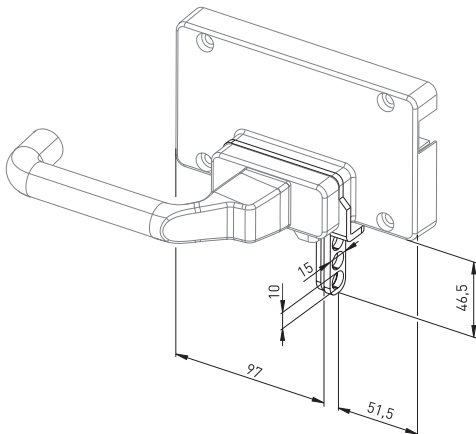
// Mounting AZM 415-B30-08



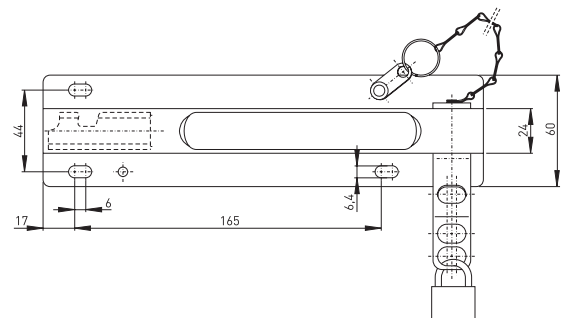
// Actuator AZM 415-B30-08



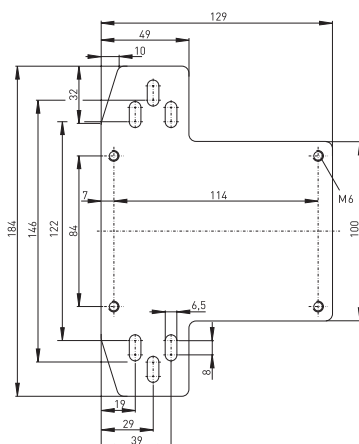
// Lockout tag SZ 415-1/-2



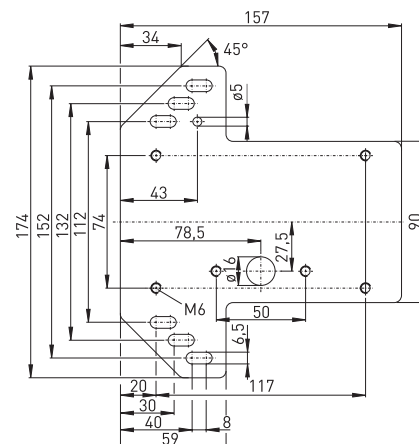
// Lockout tag SZ 415-B4pS



// Mounting plate MP AZM 415-22



// Mounting plate MP AZM 415-B30



Ex solenoid interlocks

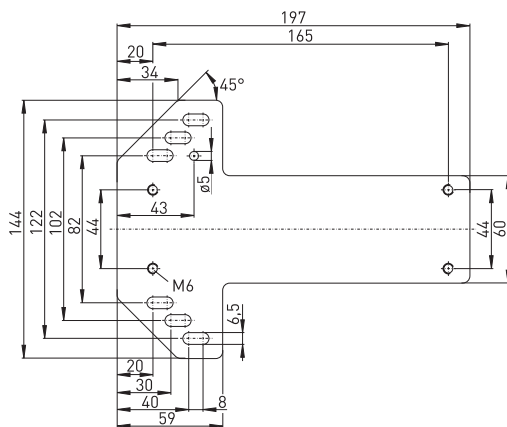
// Series Ex AZM/AZP 415, accessories

Features/Options

Mounting plate MP

- For simple mounting on profile systems, e.g. 40, 60 or 80 mm wide
- Thickness of plate 5 mm
- Mounting plate MP AZM 415-B4pS: Mounting of AZM 415-B4pS

// Mounting plate MP AZM 415-B4pS



PRODUCTION PROCESS COMPONENT PRODUCTION
ENCLOSURE FINISH





Ex safety switches with separate actuators

Thermoplastic enclosure

// Series Ex ST 14

from page 60

// Series Ex 95 AZ

from page 62

// Series Ex AZ 16

from page 64

Metal enclosure

// Series Ex 335 AZ

from page 70

// Series Ex 355 AZ

from page 74

// Series Ex ST 61

from page 78



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Ex safety switches with separate actuators

Range of application

These Ex safety switches with a separate actuator are suitable for sliding, hinged and particularly removable safety guards, which need to be closed to ensure the necessary operational safety. They are also suitable for mounting on profile sections and retrofitting on existing equipment.

In combination with a safety relay module series SRM, all safety switches shown in this chapter achieve PL »e« per EN ISO 13849-1 or up to SIL 3 per EN 62061, subject to suitable circuit arrangements.

The Ex switches are suitable for application in zone 1 and 2, as well as zone 21 and 22 according to ATEX 94/9/EC.

Design and operating principle

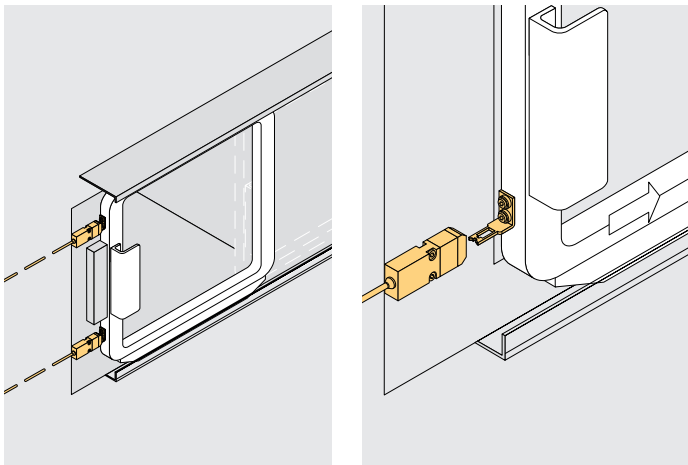
On the Ex safety switches with a separate actuator, the switching element is not physically connected to the actuator, but functionally united or separated by switching. When the guard device is opened, the actuator is separated from the base unit. In this process, NC contacts are positively opened and NO contacts closed. A wide range of coded actuators is available for safety switches series Ex AZ 16, also suitable for small radii. Furthermore, lockout tags and different fixing mechanisms like latching magnets and ball catches can be ordered.

The protection class of all the safety switches is IP 65/67. The safety switches can be fitted in any desired mounting position.

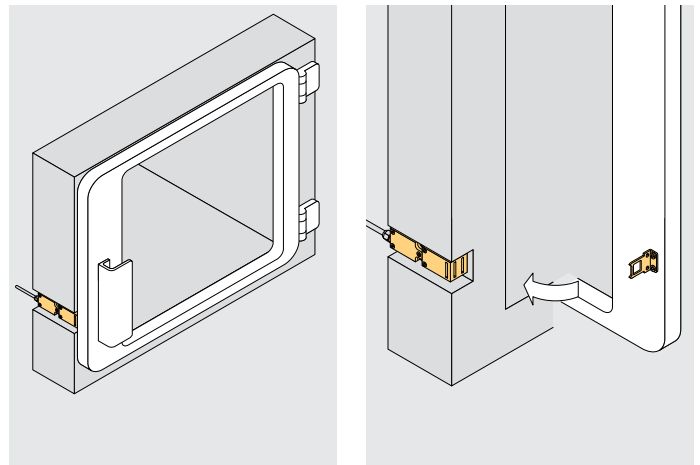
All Ex safety switches shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC and according to ATEX 94/9/EC. The Ex safety switches per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Application

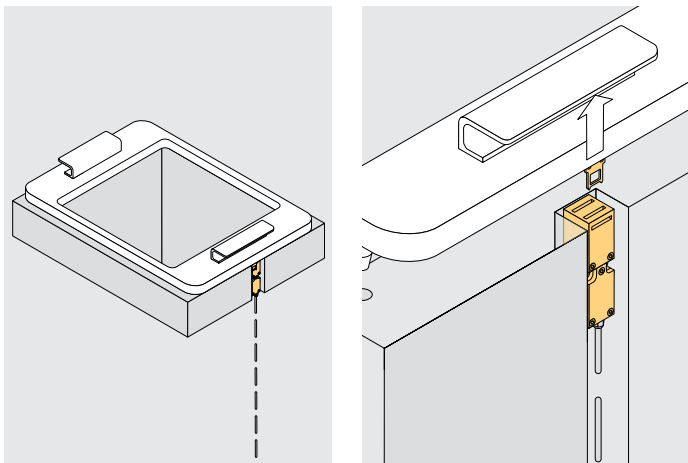
on sliding guards



on hinged guards



on removable guards



Ex safety switches with separate actuators

// Series Ex ST 14

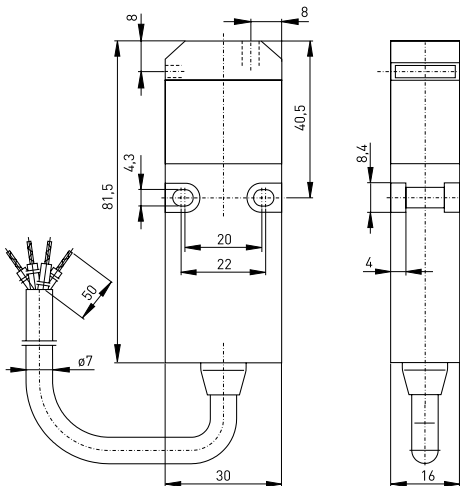
Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Double insulated □
- Slow action available with contact overlapping
- Version with cable outlet on side
- With prewired cable, length 2 metres
- Special version only for dust Ex zone 22 available

// EX ST 14



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Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0 stainless steel 1.4301
Actuator	stainless steel 1.4301
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	cable H05VV-F 4 x 0.75 mm ²
Cable length	2m, 5m or 10 m
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
I_e/U_e	6 A/250 VAC; 4 A/24 VDC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	10/1S, 20: 8 mm, UE: 9.5 mm
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1070 X; IECEx PTB 06.0098X

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ST 14 10/1S
1 NC/1 NO contact with overlapping	Ex ST 14 UE
2 NC contacts	Ex ST 14 20

Type code

Type code	Ex ST 14 10/1S-S-2m-3D
	Equipment Categ. 3D, dust Ex zone 22
	Cable length 2 m, (5 m, 10 m)
	Cable on side
	Contact type 1NC/1NO, (20, UE)
	Series
	Safety door switch
	Ex certified component

Ex safety switches with separate actuators

// Series Ex ST 14, actuators

Features/Options

ST 14-B1

- Rubber mounting damps vibrations on guard devices
- Actuating radius on hinged guards
a = 140 mm and b = 1000 mm
- Axial misalignment x = 30 mm

ST 14-B3

- Especially suitable for hinged guards
- Actuating radius on hinged guards
a = 50 mm
- Axial misalignment x = 14 mm

Features/Options

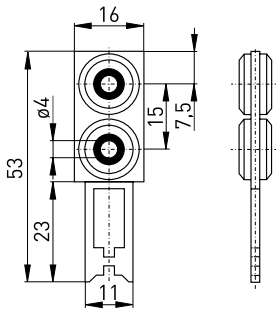
ST 14-B5

- Rubber mounting damps vibrations on guard devices
- Suitable for hinged guards
- Actuating radius on hinged guards
a = 140 mm and b = 1000 mm
- Axial misalignment x = 15 mm

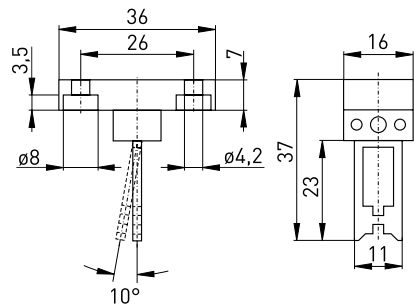
Note

Inserted position of actuator = 0 in switch travel diagram
The actuators are not included with the switches.

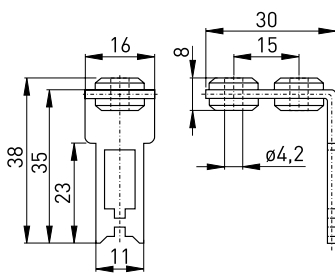
// Straight actuator ST 14-B1



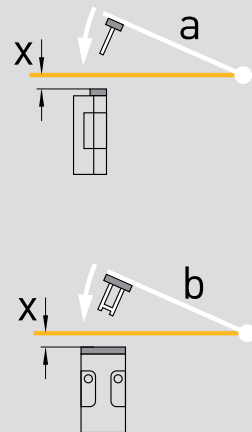
// Flexible actuator ST 14-B3



// Angled actuator ST 14-B5



// Actuating radius



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment

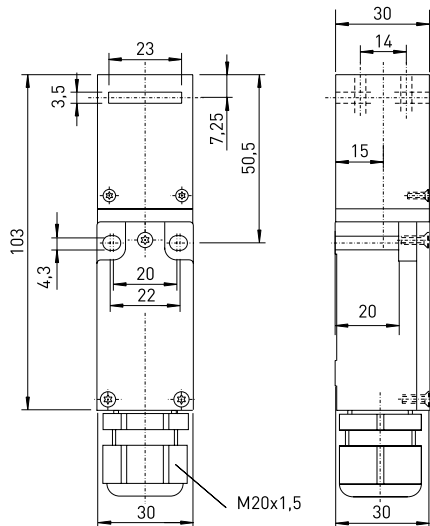
Ex safety switches with separate actuators

// Series Ex 95 AZ

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure, double insulated □
- Slow action ⊖, change-over contact with double break
- Wiring compartment
- Mounting details to EN 50 047
- Horizontal mounting slots
- Actuator head can be repositioned in factory in 4 x 90° steps
- Special version only for dust Ex zone 22 available

// EX 95 AZ



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7; EN 61241-0, EN 61241-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0 stainless steel 1.4301
Actuator	IP 67 to IEC/EN 60529
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gL/gG D fuse
Positive break travel	9 mm
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6, II 2D Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 118, IECEx in 2011



Contact variants: switch travel/contacts

1 NC/1 NO contact	Slow action Ex 95 AZ 10̄/1S
2 NC contacts	Ex 95 AZ 20̄

Type code

Ex 95 AZ 10̄/1S-90°-3D	
Equipment Categ. 3D, dust Ex zone 22	
Actuating head repositioned by 90°	
Contact type 1NC/1NO, (20̄)	
Separate actuator AZ	
Series	
Ex certified component	

Ex safety switches with separate actuators

// Series Ex 95 AZ, actuators

Features/Options

95 AZ-B1

- Actuating radius on hinged guards
a = 350 mm and b = 700 mm
- Axial misalignment x = 11 mm

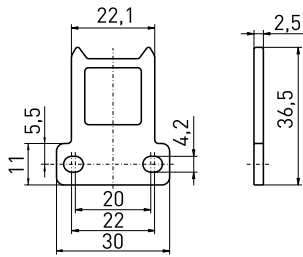
95 AZ-B5

- Especially suitable for hinged guards
- Actuating radius on hinged guards
a = 350 mm and b = 700 mm
- Axial misalignment x = 13.5 mm

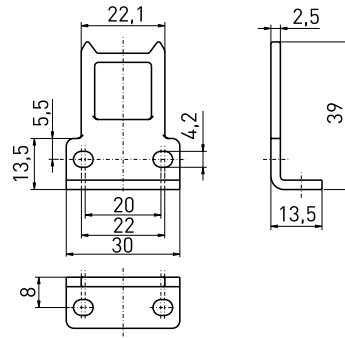
Note

Inserted position of actuator = 0 in switch travel diagram
The actuators are not included with the switches.

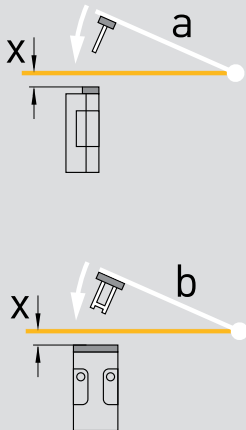
// Straight actuator 95 AZ-B1



// Angled actuator 95 AZ-B5



// Actuating radius



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment

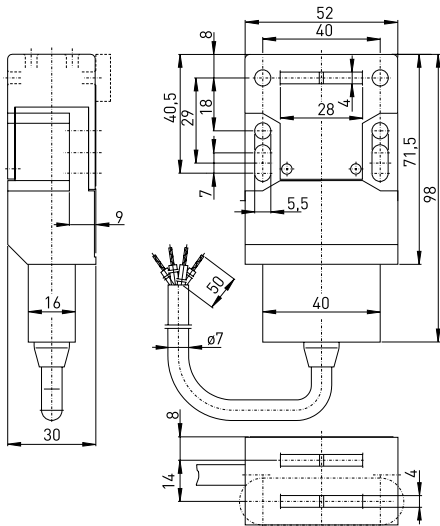
Ex safety switches with separate actuators

// Series Ex AZ 16

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Multiple coding
- Slow action \ominus , change-over contact with double break
- With prewired cable, length 2 metres
- Special version only for dust Ex zone 22 available

// EX AZ 16



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0 stainless steel 1.4301
Actuator	Ex 13
Switch insert	IP 65 to IEC/EN 60529
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact \ominus
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F, 4 x 0.75 mm ²
Cable length	2m, 5m or 10 m
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	9.5 mm
Positive break force	ca. 15 N
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db

Approvals

PTB 03 ATEX 1068 X, IECEx PTB 06.0053 X referring to the switch insert



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex AZ 16 1Ö/1S

Type code

Ex	AZ	16	1Ö/1S	-30N	-2m	-3D	
							Equipment Categ. 3D, dust Ex zone 22
							Cable length 2 m, (5 m, 10 m)
							30 N latching force (5N, blank ejection force)
							1 NC/1 NO contact
							Series
							Separate actuator AZ
							Ex certified component

Ex safety switches with separate actuators

// Series Ex AZ 16, actuators

Features/Options

AZ 15/16-B1

- Actuating radius on hinged guards
a = 150 mm and b = 150 mm
- Axial misalignment x = 5 mm

AZ 15/16-B2

- Actuating radius on hinged guards
b = 45 mm
- Axial misalignment = 11 mm

AZ 15/16-B3

- Actuating radius on hinged guards
a = 32 mm

Features/Options

- Axial misalignment x = 11 mm

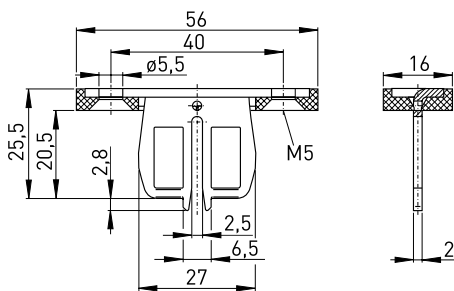
AZ 15/16-B6

- Actuating radius on hinged guards
a = 25 mm and b = 38 mm
- Axial misalignment x = 11 mm

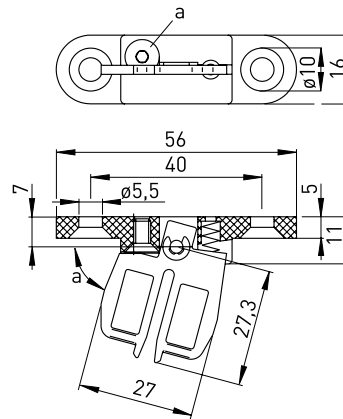
Note

Inserted position of actuator = 0 in switch travel diagram
The actuators are not included with the switches.

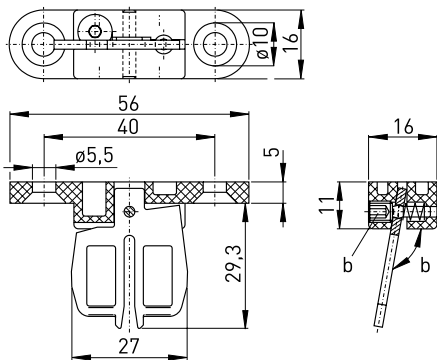
// Straight actuator AZ 15/16-B1



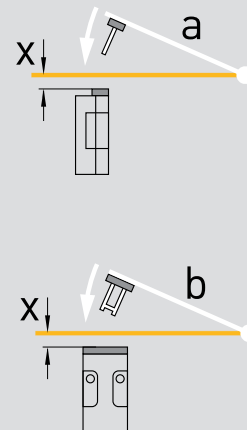
// Flexible actuator AZ 15/16-B2



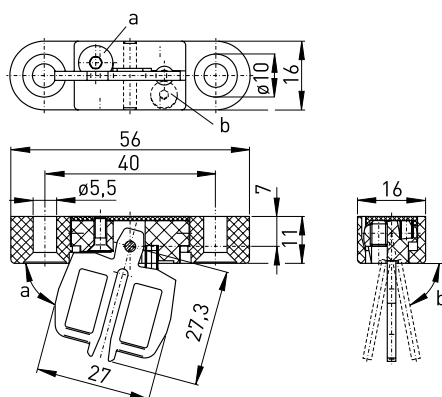
// Flexible actuator AZ 15/16-B3



// Actuating radius



// Flexible actuator AZ 15/16-B6



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment

Ex safety switches with separate actuators

// Series Ex AZ 16, actuators

Features/Options

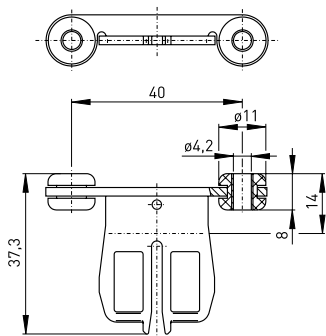
AZ 15/16-B1-2245

- Actuating radius on hinged guards
a = 150 mm and b = 150 mm
- Axial misalignment x = 14 mm
- Rubber mounting damps vibrations on guard devices
- Max. 200 Ncm tightening torque for fixing the actuator

Actuator with magnetic latch

- For play-free interlocking of light guards, holding force: 30 N
- The magnetic latch can easily be fitted in any actuating plane
- Suitable for retrofitting

// Actuator with rubber AZ 15/16-B1-2245



Features/Options

AZ 15/16-B1-1747

- Actuating radius on hinged guards
a = 150 mm and b = 150 mm, axial misalignment x = 5 mm

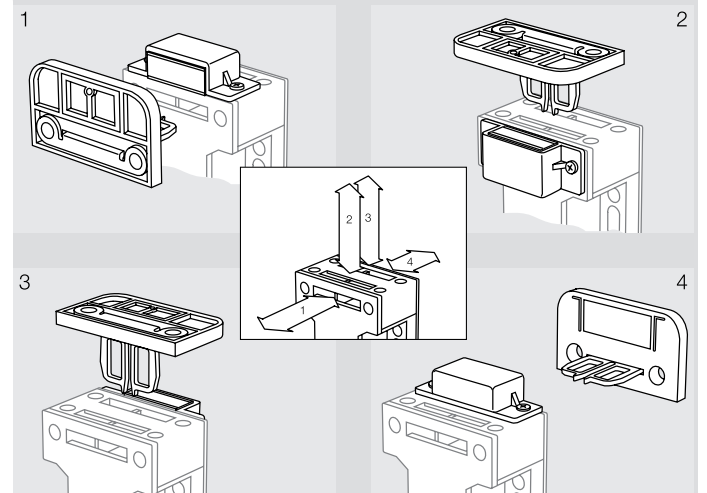
AZ 15/16-B2-1747

- Actuating radius on hinged guards
b = 45 mm, axial misalignment x = 11 mm

AZ 15/16-B3-1747

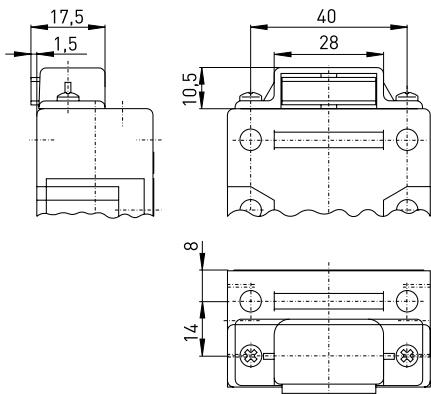
- Actuating radius on hinged guards
a = 32 mm, axial misalignment x = 11 mm

// Actuator with magnetic latch



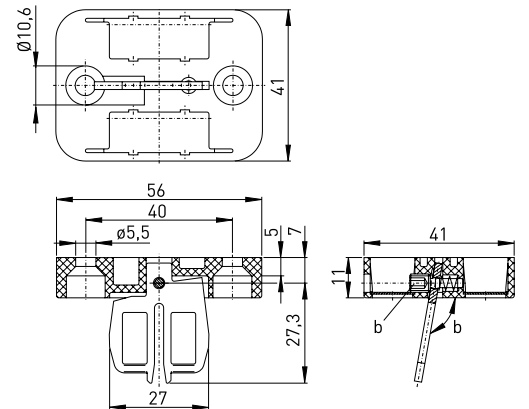
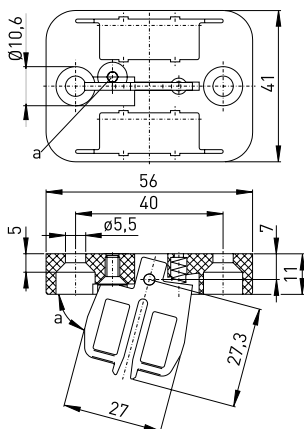
// Actuator magn. latch AZ 15/16-B1-1747

// Magnetic latch



// Actuator magn. latch AZ 15/16-B2-1747

// Actuator magn. latch AZ 15/16-B3-1747



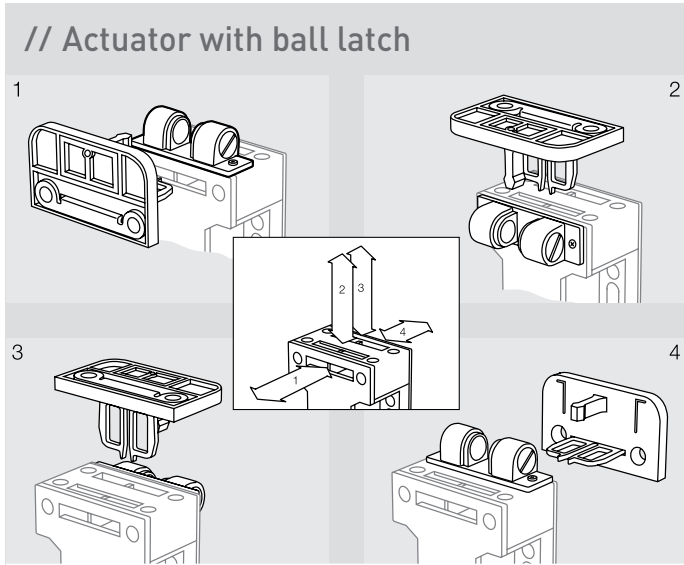
Ex safety switches with separate actuators

// Series Ex AZ 16, actuators

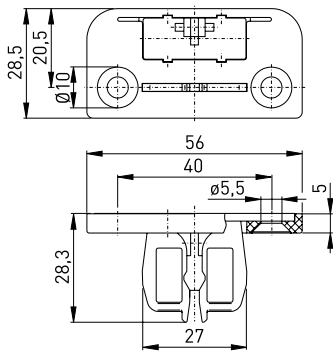
Features/Options

Actuator with ball latch

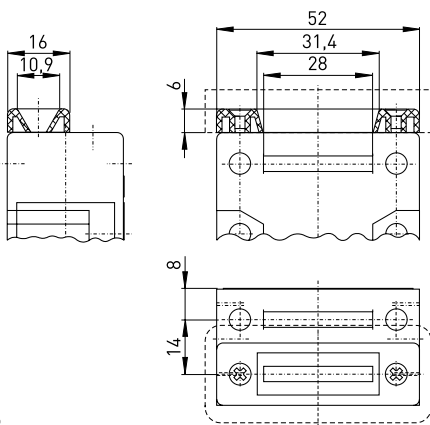
- For interlocking of light to medium-weight guards
- Latching force adjustable up to 100 N
- AZ 15/16-B1-2053
- Actuating radius on hinged guards
a = 150 mm and b = 150 mm
- Axial misalignment x = 11 mm



// Actuator ball latch AZ 15/16-B1-2053



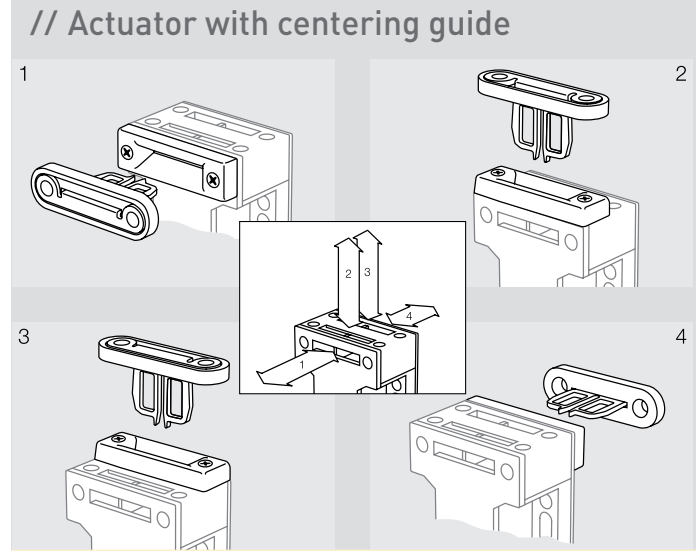
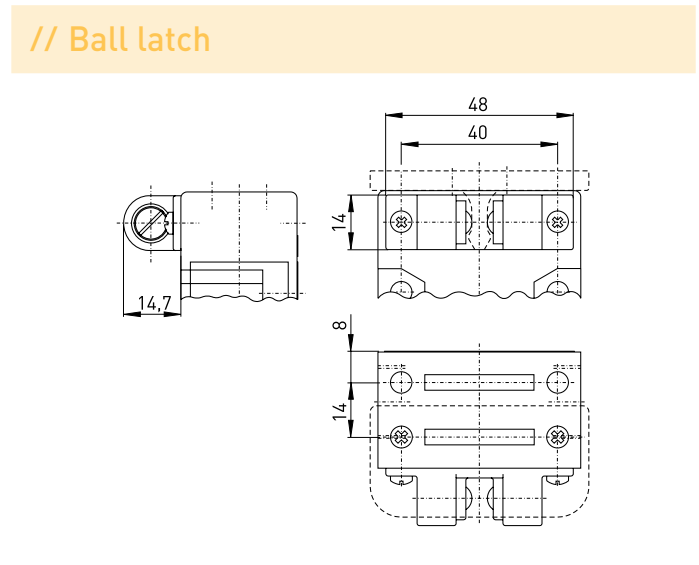
// Centering guide



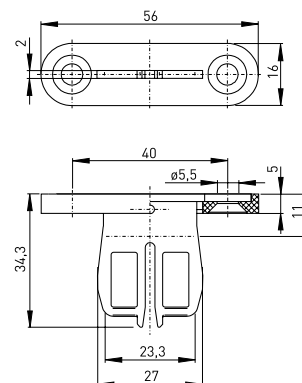
Features/Options

Actuator with centering guide

- For interlocking of light, unguided guards
- AZ 15/16-B1-2177
- Actuating radius on hinged guards
a = 150 mm and b = 150 mm
- Axial misalignment x = 11 mm



// Actuator cent. guide AZ 15/16-B1-2177



Ex safety switches with separate actuators

// Series Ex AZ 16, actuators

Features/Options

Actuator with slot lip-seal AZ 15/16-B1-2024

- For protection against the ingress of coarse dirt
- Particularly suitable for sliding doors
- Actuating radius on hinged guards
 - a = 150 mm and b = 150 mm, axial misalignment x = 11 mm

Slot sealing plug AZ 15/16-1476

- For protection against the ingress of coarse dirt
- To cover unused actuator slots
- Simple clip-in fitting
- Quantity required: 3 per switch, ordering unit: 10 pieces

Features/Options

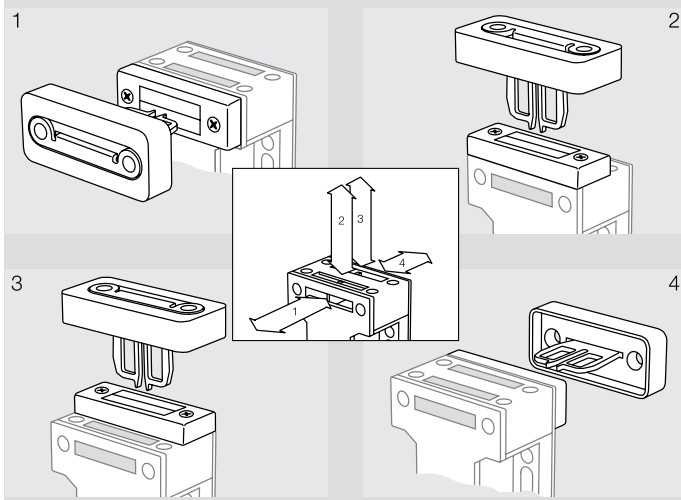
Ball latch 2053-2

- Additional ball latch for stable latching of light to medium-weight guards
- For separate mounting on the guard
- Latching force adjustable up to 100 N

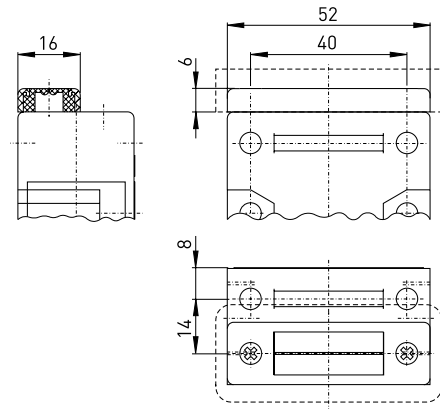
Lockout tag SZ 16/335

- To prevent inadvertent closing, e. g. during maintenance by preventing actuation of the switch
- For complex plants
- Up to 6 padlocks can be fitted
- The lockout tag can be fixed on a chain near to the safety switch

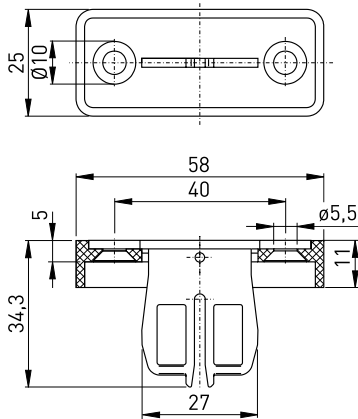
// Actuator with slot lip-seal



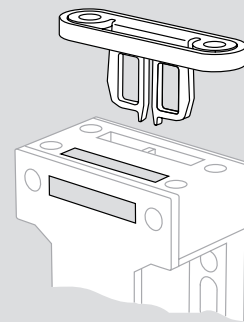
// Slot lip-seal



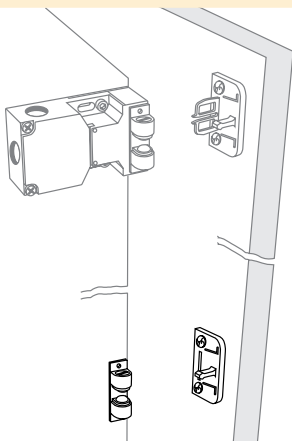
// Actuator slot lip-seal AZ 15/16-B1-2024



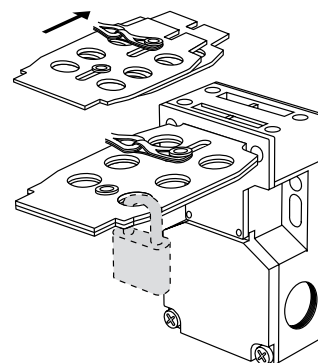
// Slot sealing plug AZ 15/16-1476



// Ball latch 2053-2



// Lockout tag SZ 16/335



Ex safety switches with separate actuators

// Series Ex AZ 16, actuators

Features/Options

Tamperproof screws

- To mount the actuator
- Higher protection against tampering with interlock
- Protects against unauthorised removal of actuator
- Available in various lengths
- Countersunk-head screws
- M 5 x 12, M 5 x 16 and M 5 x 20 available
- Ordering unit: 2 pieces

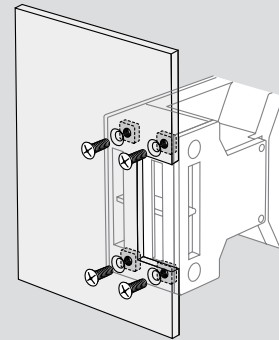
Features/Options

- Suitable for actuators B1, B2, B3 and B6
- Equipped with square nuts for front mounting of switch
- Ordering suffix: -1762

// Tamperproof screws



// Front mounting AZ 16-1762



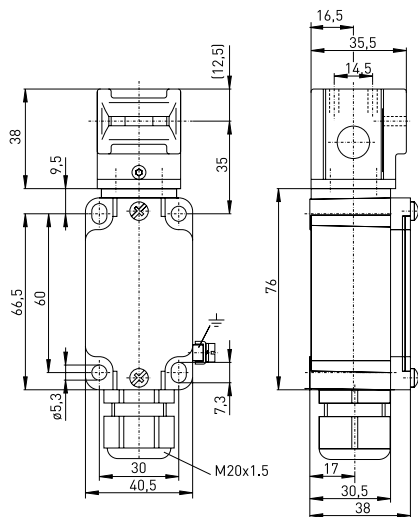
Ex safety switches with separate actuators

// Series Ex 335 AZ

Features/Options

- Ex zone 1 and 21
- Metal enclosure
- Mounting details to EN 50 041
- Wiring compartment
- Actuator head can be repositioned in factory in 4 x 90° steps
- Special version only for dust Ex zone 22 available

// EX 335 AZ



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; IEC 61241-0, -1; EN ISO 13849-1
Enclosure	zinc die casting, enamelled
Actuator	stainless steel 1.4301
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	8.3 mm
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	DMT 01 ATEX E 178, IECEx BVS 07.0014



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 335 AZ 1Ö/1S
2 NC contacts	Ex 335 AZ 2Ö

Type code

Ex 335 AZ 1Ö/1S-3D

Equipment Categ. 3D,
dust Ex zone 22
Contact type 1Ö/1S, (2Ö)
Separate actuator AZ
Series
Ex certified component

Ex safety switches with separate actuators

// Series Ex 335 AZ, actuators

Features/Options

AZ 335/355-B1

- Actuating radius on hinged guards
a = 900 mm and b = 700 mm
- Axial misalignment x = 52.7 mm

AZ 335/355-B1-2245

- Rubber mounting damps vibrations on guard devices
- Actuating radius on hinged guards
a = 900 mm and b = 700 mm
- Axial misalignment x = 52.7 mm

Features/Options

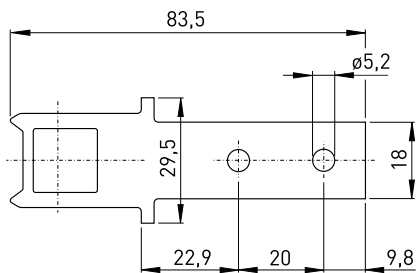
AZ 335/355-B5

- Especially suitable for hinged guards
- Actuating radius on hinged guards
a = 900 mm and b = 700 mm
- Axial misalignment x = 15.4 mm

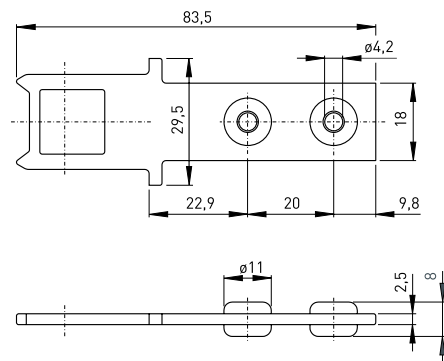
Note

Inserted position of actuator = 0 in switch travel diagram
The actuators are not included with the switches.

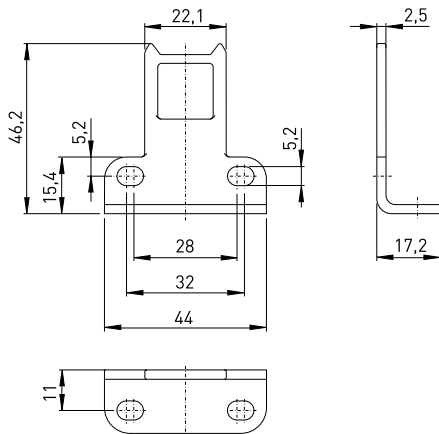
// Straight actuator AZ 335/355-B1



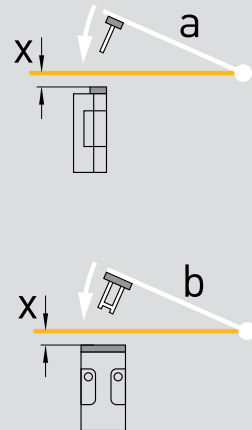
// Straight actuator AZ 335/355-B1-2245



// Angled actuator AZ 335/355-B5



// Actuating radius



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment

Ex safety switches with separate actuators

// Series Ex 335 AZ, actuators

Features/Options

AZ 335/355-B5-Flex

- Especially suitable for sliding and hinged guards
- Compensates play of ± 5 mm in two axes
- Actuating radius on hinged guards
a = 100 mm and b = 100 mm, axial misalignment x = 30.3 mm

AZ 335/355-B6

- Especially suitable for hinged guards
- Actuating radius adjustable, min. 100 mm, using a hexagonal key wrench 2 mm A/F (a or b)
- Actuating radius on hinged guards
a = 100 mm and b = 100 mm, axial misalignment x = 13 mm

Features/Options

AZ 335/355-B6-Flex

- Especially suitable for hinged guards
- Compensates play of ± 5 mm in two axes
- Actuating radius on hinged guards
a = 100 mm, axial misalignment x = 28 mm

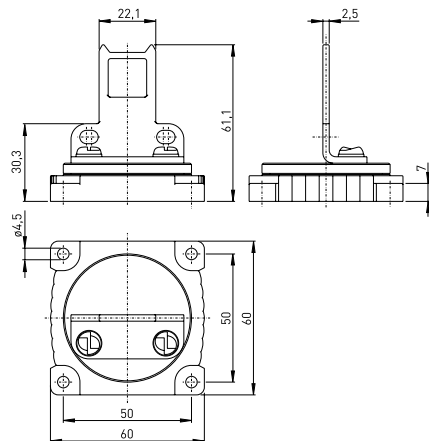
Lockout tag SZ 16/335

- To prevent inadvertent closing, e. g. during maintenance by preventing actuation of the switch

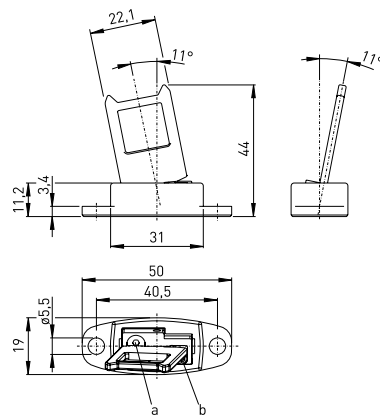
Slot sealing plug AZ 335/355-1990

- For protection against the ingress of coarse dirt
- Quantity required: 3 per switch, ordering unit: 10 pieces

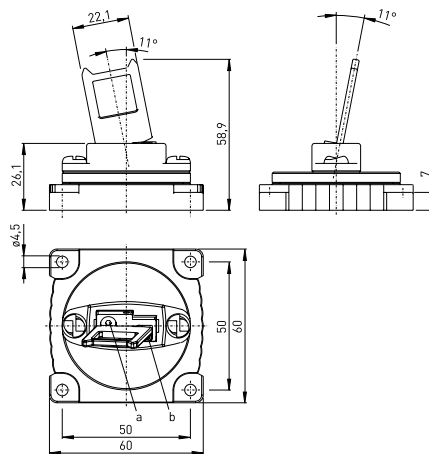
// Angled actuator AZ 335/355-B5-Flex



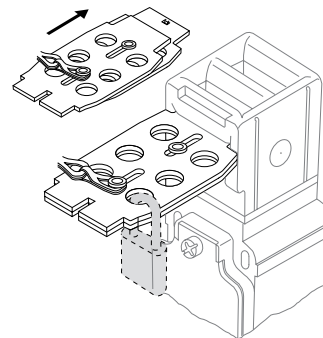
// Flexible actuator AZ 335/355-B6



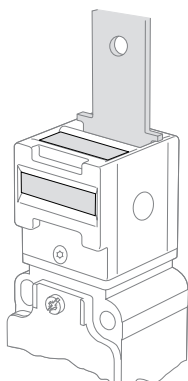
// Flexible actuator AZ 335/355-B6-Flex



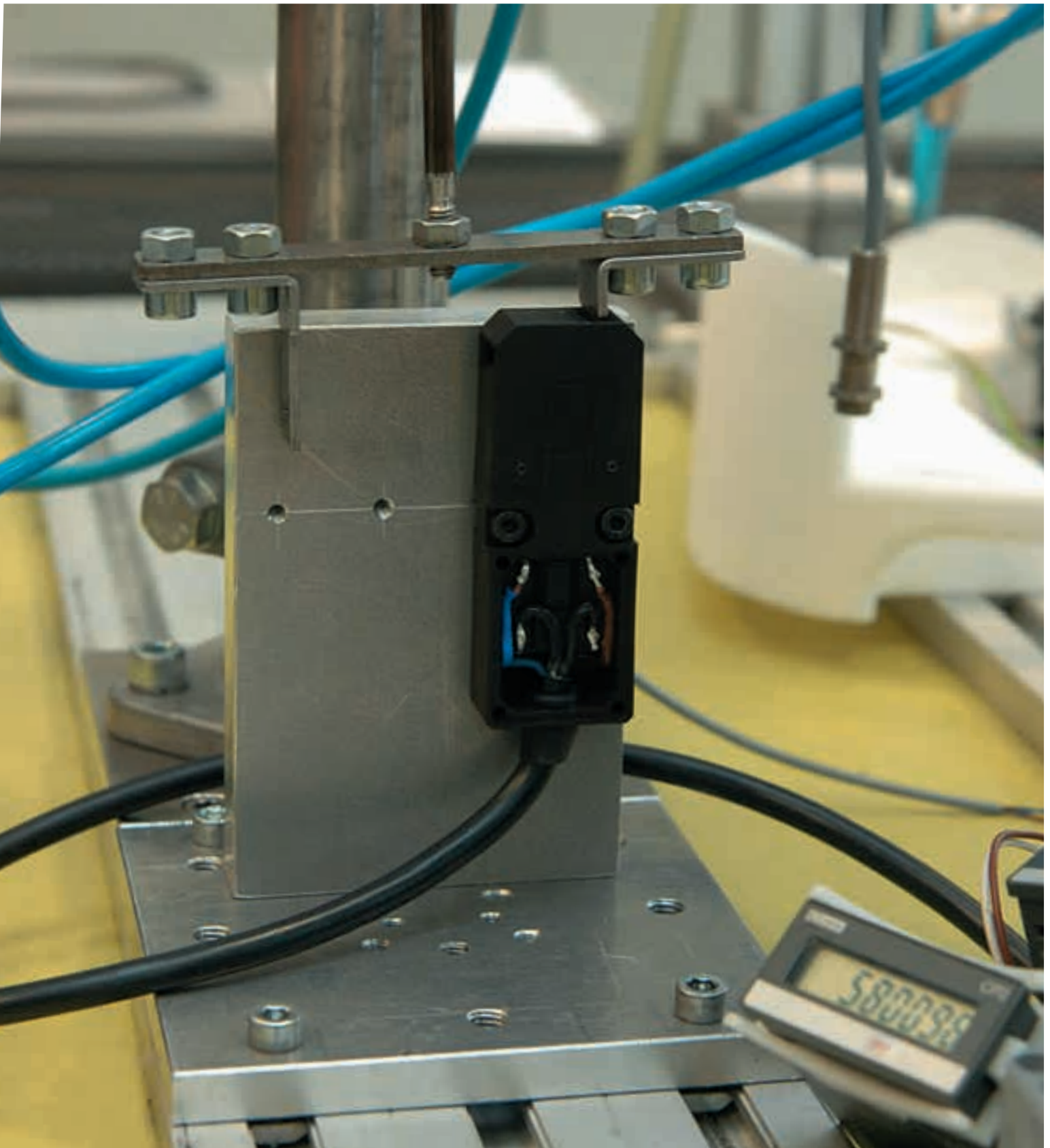
// Lockout tag SZ 16/335



// Slot sealing plug AZ 335/355-1990



PRODUCTION PROCESS QUALITY MANAGEMENT
LIFE TEST OF ACTUATOR MECHANISM OF EX ST 14



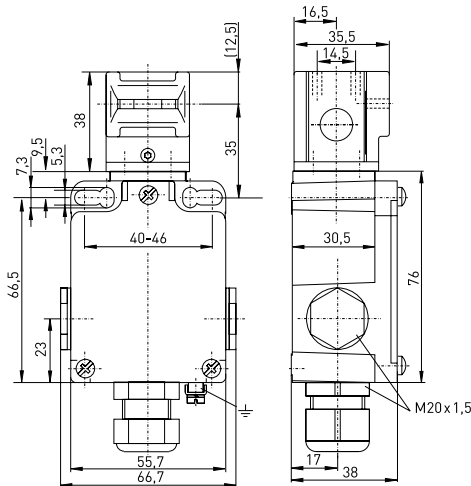
Ex safety switches with separate actuators

// Series Ex 355 AZ

Features/Options

- Ex zone 1 and 21
- Metal enclosure
- Mounting details to EN 50 041
- Wiring compartment
- Actuator head can be repositioned in factory in 4 x 90° steps
- Special version only for dust Ex zone 22 available

// EX 355 AZ



Technical data

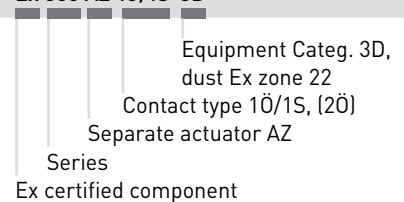
Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Enclosure	zinc die casting, enamelled
Actuator	stainless steel 1.4301
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	8.3 mm
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	BVS 04 ATEX E 126, IECEx BVS 07.0013

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 AZ 1Ö/1S
2 NC contacts	Ex 355 AZ 2Ö

Type code

Ex 355 AZ 1Ö/1S-3D



Ex safety switches with separate actuators

// Series Ex 355 AZ, actuators

Features/Options

AZ 335/355-B1

- Actuating radius on hinged guards
a = 900 mm and b = 700 mm
- Axial misalignment x = 52.7 mm

AZ 335/355-B1-2245

- Rubber mounting damps vibrations on guard devices
- Actuating radius on hinged guards
a = 900 mm and b = 700 mm
- Axial misalignment x = 52.7 mm

Features/Options

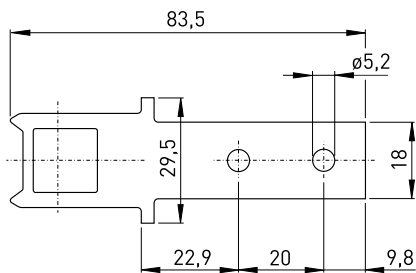
AZ 335/355-B5

- Especially suitable for hinged guards
- Actuating radius on hinged guards
a = 900 mm and b = 700 mm
- Axial misalignment x = 15.4 mm

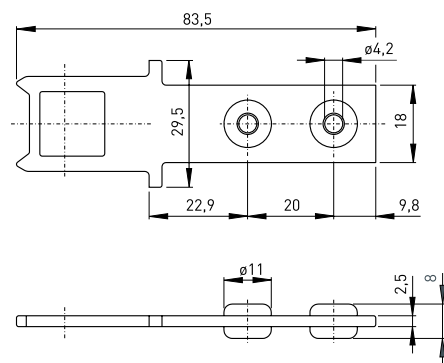
Note

Inserted position of actuator = 0 in switch travel diagram
The actuators are not included with the switches.

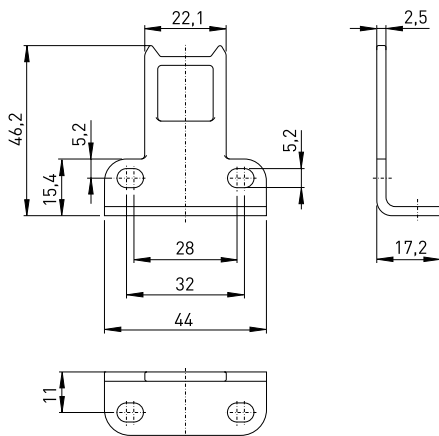
// Straight actuator AZ 335/355-B1



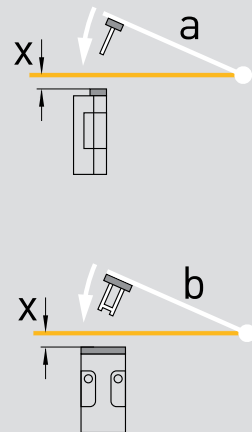
// Straight actuator AZ 335/355-B1-2245



// Angled actuator AZ 335/355-B5



// Actuating radius



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment

Ex safety switches with separate actuators

// Series Ex 355 AZ, actuators

Features/Options

AZ 335/355-B5-Flex

- Especially suitable for sliding and hinged guards
- Compensates play of ± 5 mm in two axes
- Actuating radius on hinged guards
a = 100 mm and b = 100 mm, axial misalignment x = 30.3 mm

AZ 335/355-B6

- Especially suitable for hinged guards
- Actuating radius adjustable, min. 100 mm, using a hexagonal key wrench 2 mm A/F (a or b)
- Actuating radius on hinged guards
a = 100 mm and b = 100 mm, axial misalignment x = 13 mm

Features/Options

AZ 335/355-B6-Flex

- Especially suitable for hinged guards
- Compensates play of ± 5 mm in two axes
- Actuating radius on hinged guards
a = 100 mm, axial misalignment x = 28 mm

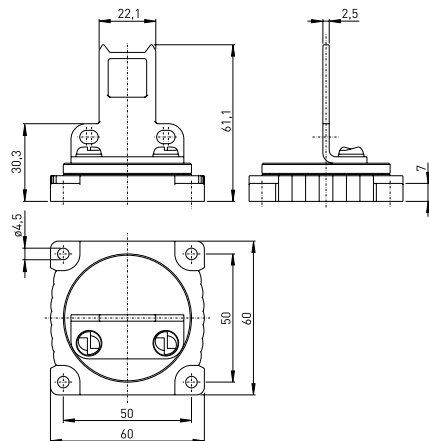
Lockout tag SZ 16/335

- To prevent inadvertent closing, e. g. during maintenance by preventing actuation of the switch

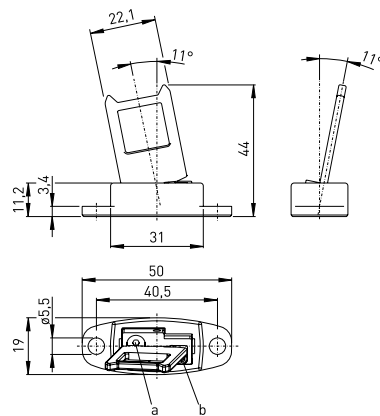
Slot sealing plug AZ 335/355-1990

- For protection against the ingress of coarse dirt
- Quantity required: 3 per switch, ordering unit: 10 pieces

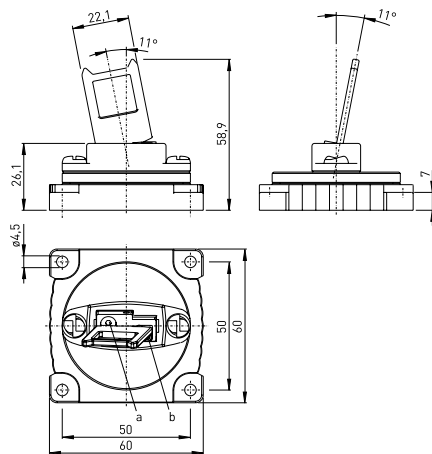
// Angled actuator AZ 335/355-B5-Flex



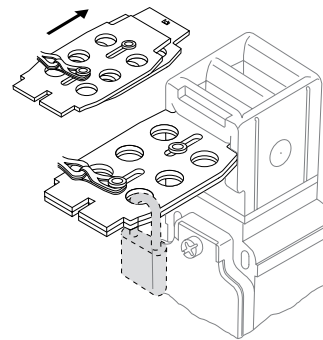
// Flexible actuator AZ 335/355-B6



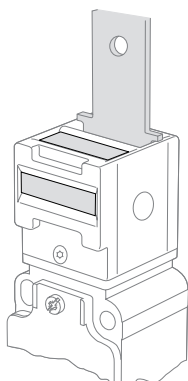
// Flexible actuator AZ 335/355-B6-Flex



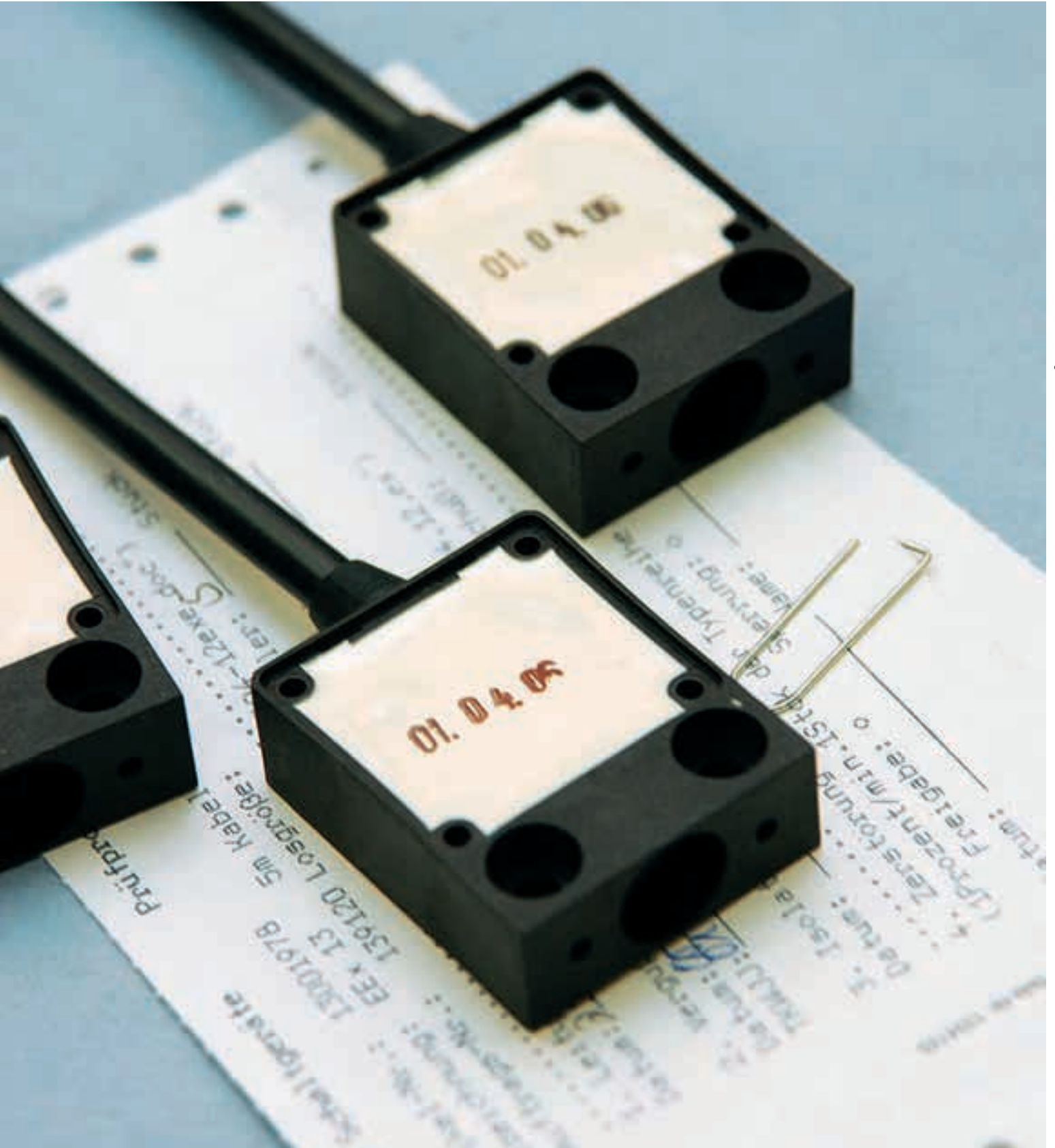
// Lockout tag SZ 16/335



// Slot sealing plug AZ 335/355-1990



PRODUCTION PROCESS ASSEMBLY
EX SWITCH INSERT AFTER POTTING



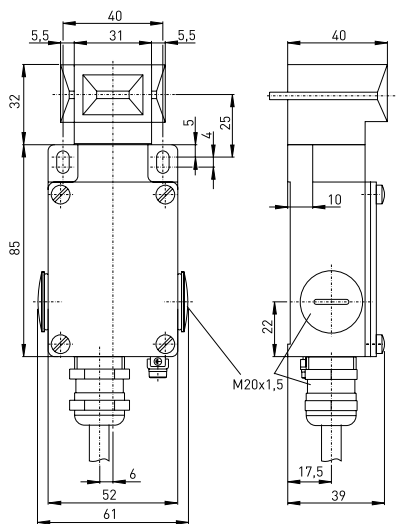
Ex safety switches with separate actuators

// Series Ex ST 61

Features/Options

- Ex zone 1 and 21
- Metal enclosure
- Double insulated □
- Slow action ⊖, change-over contact with double break
- Pre-wired cable, cable length 3 metres
- Long life
- High level of contact reliability with low voltages and currents
- Special version only for dust Ex zone 22 available

// EX ST 61



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die casting, enamelled
Actuator	stainless steel 1.4301
Switch insert	Ex 14
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, NC contact with positive break ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F, 4 x 0.75 mm ²
Cable length	3 m
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	12 mm
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Ex marking	⊖ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEX Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1070 X*, IECEX PTB 06.0098X*



*referring to the switch insert

Contact variants: switch travel/contacts

	Slow action						
1 NC/1 NO contact	Ex ST 61 10̄/1S						
	<table border="1"> <tr> <td>0</td> <td>13</td> <td>BK-GY</td> </tr> <tr> <td>10</td> <td>12</td> <td>BN-BU</td> </tr> </table>	0	13	BK-GY	10	12	BN-BU
0	13	BK-GY					
10	12	BN-BU					

Type code

Ex ST 61	10̄/1S-3m-3D				
					Equipment Categ. 3D, dust Ex zone 22
					Cable length 3 m
					Contact type 10̄/1S
					Series
					Safety door switch
					Ex certified component

Ex safety switches with separate actuators

// Series Ex ST 61, actuators

Features/Options

ST 61-B1

- Rubber mounting damps vibrations on guard devices
- Actuating radius on hinged guards
 - a = 140 mm and b = 1000 mm
- x = 30 mm

Features/Options

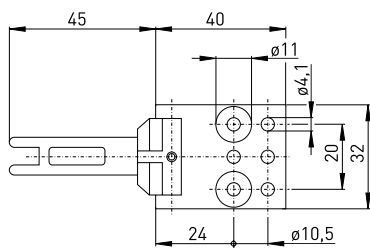
ST 61-B5

- Rubber mounting damps vibrations on guard devices
- Especially suitable for hinged guards
- Actuating radius on hinged guards
 - a = 140 mm and b = 1000 mm
- x = 15 mm

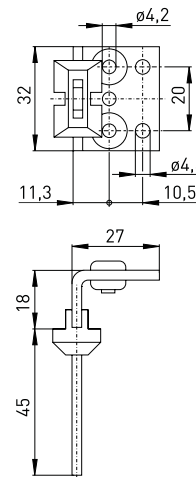
Note

Inserted position of actuator = 0 in switch travel diagram
The actuators are not included with the switches.

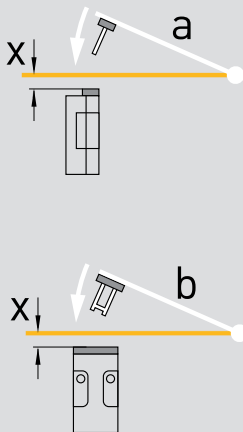
// Straight actuator ST 61-B1



// Angled actuator ST 61-B5



// Actuating radius



- The axis of the hinge should be x mm above the top edge of the safety switch and in the same plane
- a Actuating radius to the plane of the actuator
- b Actuating radius in line with the plane of the actuator
- x Axial misalignment





Ex safety sensors

Cylindrical form

// Series Ex RC Si M30

from page 84

Rectangular form

// Series Ex RC Si 56

from page 86

// Series Ex HS Si 4

from page 88

Safety relay module

// Series SRM 21 RT2

from page 90

// Series SRM 21 Multi

from page 92



Ex safety sensors

Range of application

The Ex safety sensors are suitable for monitoring the position of sliding, hinged and removable protective doors. They can only be used for safety duties to DIN VDE 0660-209 in combination with a safety guard monitor for protection up to safety level PL »e« per EN ISO 13849-1 or up to SILCL 3 per EN 62061.

The use of safety sensors is of particular advantage in cases where extremely dirty conditions can occur or high hygienic standards need to be maintained. This is provided by the simplicity of cleaning the units. A further advantage is the facility for concealed mounting behind non-magnetic materials.

Working surfaces and storage areas can be arranged without the need for dust-collecting edges or other functionally required cutouts or projections. The Ex safety sensors can also be applied in cases where a precise approach is not possible and greater tolerances are required.

Design and operating principle

These devices comprise a multi-channel safety sensor and an actuating magnet. The Ex safety sensors are actuated by a coded actuator without any mechanical contact. The devices can be selected with one NC and one NO contact or with two NC contacts. All described Ex safety sensors are supplied with a pre-wired cable.

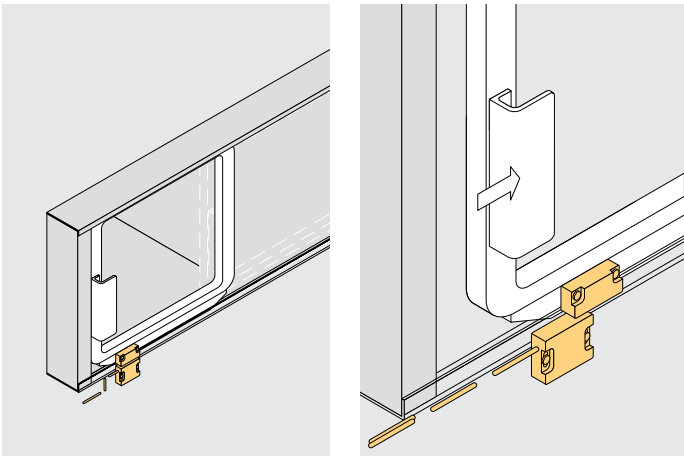
The Ex safety sensors are protected to degree of protection IP 67.

The mounting site of safety sensors must be free of magnetic fields.

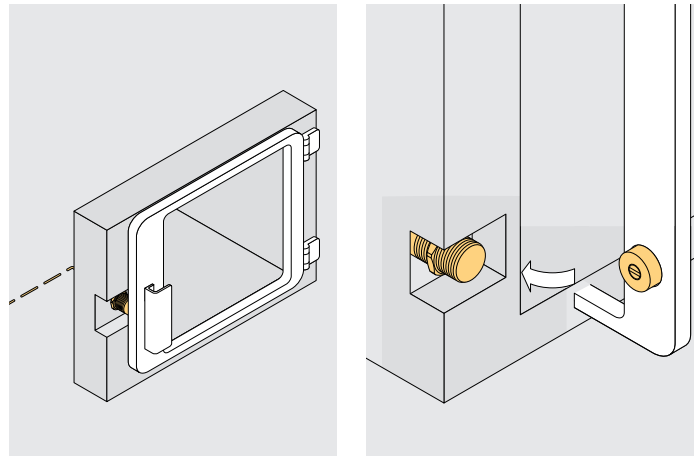
All Ex safety sensors shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC and according to ATEX 94/9/EC. The Ex safety sensors per equipment category 3G/D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Application

On sliding doors



On hinged doors



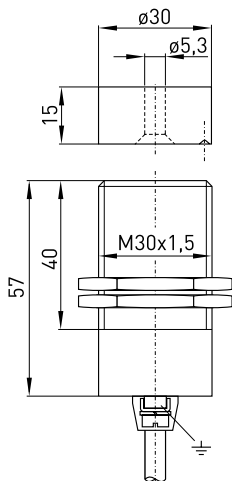
Ex safety sensors, cylindrical form

// Series Ex RC Si M30

Features/Options

- Ex zone 1 and 21
- Metal enclosure
- Available in stainless steel enclosure
- Reed contacts, coded
- Actuation from front
- Switching distance up to 8 mm
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC SI M30



Technical data

Standards	EN ISO 13849-1; IEC 60947-5-3 / PDF-M*; EN 954-1; EN 60079-0; EN 60079-18; EN 61241-0, EN 61241-1
Enclosure	brass, nickered or stainless steel 1.4571
Defined object	actuator Ex MC 30 order No. 05.00.8213, Ex MC 30-NIRO order No. 05.00.8216
Switching system	reed contacts, 1 NC/1 NO or 2 NC contacts
Protection class	IP 67 to IEC/EN 60529
Connection	cable, 5 x H05 VV-F 5G, 0.5 mm ² , length 2, 5 or 10 m
B_{10d} (10% load)	2 million
T_M	max. 20 years
MTTF_d	>100 years
I_e/U_e	max. 125 mA, with LED: 20 mA/24 VDC
Switching voltage	max. 30 VDC
Voltage drop at I_e	2,5 V, with LED: 3 V
Switching frequency	5 Hz
Limit distances	s _{ao} 8 mm, s _{ar} 24 mm
Repeatability	< 0.5 mm
Ambient temperature	-20 °C ... +70 °C
Mechanical life	> 10 mio. operations
Ex marking	⊕ II 2G Ex mb II T6, II 2D Ex tD A21 IP67 T80°C IECEx Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	PTB 05 ATEX 2024 X; IECEx PTB 07.0008 X

* The control category of the safety sensor is only achieved in combination with a safety module.

Contact variants: switch travel/contacts

	without LED	with LED
1 NC/1 NO contact	Ex RC Si M30 1Ö/1S 	Ex RC Si M30 1Ö/1S-LED
2 NC contacts	Ex RC Si M30 2Ö 	Ex RC Si M30 2Ö-LED

Type code

Ex RC Si M30 1Ö/1S-NIRO-B-LED-3G/D	
	Equipm. cat. 3G/D, gas Ex z. 2 a. dust Ex z. 22
	Built-in LED
	B Mounting thread M16 x 1.5
	Stainless steel enclosure
	1 NC/1 NO contact (2Ö)
	Series, Enclosure diameter M30
	Safety
	Magnetic sensor
	Ex certified component

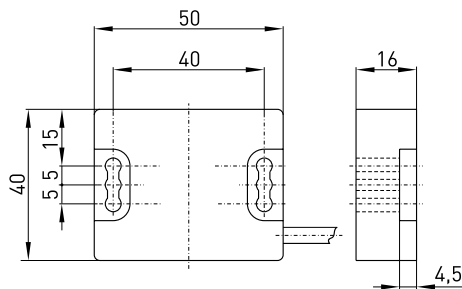
Ex safety sensors, rectangular form

// Series Ex RC Si 56



Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Long life
- Reed contacts, coded
- Actuation from front
- Switching distance up to 7 mm
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC SI 56



Technical data

Standards	EN ISO 13849-1; IEC 60947-5-3 / PDF-M*; EN 60079-0; EN 60079-18; EN 61241-0, EN 61241-1
Enclosure	glass-fibre reinforced thermoplastic, self-extinguishing, A3XZG5
Defined object	actuator Ex MC 56 order No. 05.00.8218, Ex MC 56-3 order No. 05.00.8219
Switching system	reed contacts, 1 NC/1 NO or 2 NC contacts
Protection class	IP 67 to IEC/EN 60529
Connection	cable, 4 x AWG 24, length 2, 5 or 10 m
B_{10d} (10% load)	2 million
T_M	max. 20 years
MTTF_d	>100 years
I_e/U_e	max. 125 mA, with LED: 20 mA/24 VDC
Switching voltage	max. 30 VDC
Voltage drop at I_e	2,5 V, mit LED: 3 V
Switching frequency	5 Hz
Limit distances	s _{a0} 7 mm, s _{ar} 23 mm
Repeatability	< 0.5 mm
Ambient temperature	T ₆ : -20 °C ... +70 °C; T ₅ : -20 °C ... +85 °C
Mechanical life	> 10 mio. operations
Ex marking	⊕ II 2G Ex mb II T6/T5, II 2D Ex tD A21 IP67 T80°C/T95°C IECEx Ex mb II T6/T5, Ex tD A21 IP67 T80°C/T95°C
Approvals	PTB 08 ATEX 2027 X, IECEx PTB 08.0042X.  

* The control category of the safety sensor is only achieved in combination with a safety module.

Contact variants: switch travel/contacts

	without LED	with LED
1 NC/1 NO contact	Ex RC Si 56 10/1S 	Ex RC Si 56 10/1S-LED
2 NC contacts	Ex RC Si 56 20 	Ex RC Si 56 20-LED

Type code

Ex RC Si 56 10/1S-LED-3G/D

Equipm. cat. 3G/D,
gas Ex z. 2 a. dust Ex
z. 22
Built-in LED
1 NC/1 NO contact (20)
Series, Enclosure diameter M30
Safety
Magnetic sensor
Ex certified component

Ex safety sensors, rectangular form

// Series Ex RC Si 56, Actuator

Features/Options

Ex MC 56

- compact design
- suitable for 30 mm profiles

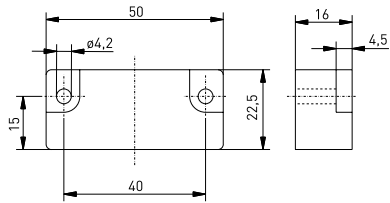
Ex MC 56-3

- suitable for 30, 40 and 50 mm profiles

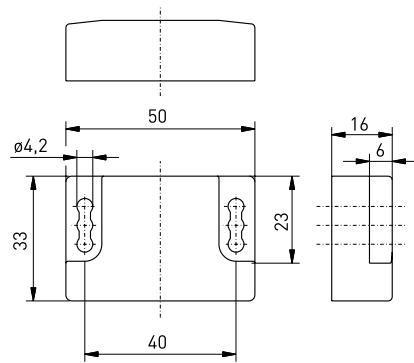
Note

The actuator is not included in the delivery of the switches.

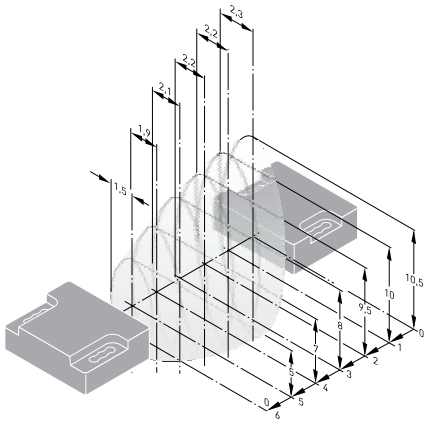
// Actuating magnet Ex MC 56



// Actuating magnet Ex MC 56-3



// Switching capacity



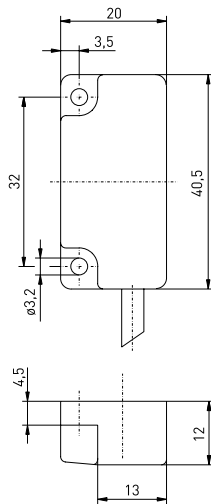
Ex safety sensors, rectangular form

// Series Ex HS Si 4

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Hall elements, coded
- Actuation from front
- Switching distance up to 8 mm
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX HS SI 4



Technical data

Standards	EN 60079-0; EN 60079-18; EN 61241-0; EN 61241-18; EN 60947-5-3 /PDF-M*; EN 1088; EN ISO 13849-1
Enclosure	glass-fibre reinforced thermoplastic, self-extinguishing, A3XZG5
Defined object	actuator Ex MC 4 order No. 05.00.8222
Switching system	hall sensor, 2 galvanically separated channels, 1 NC/1 NO or 2 NC contacts
Protection class	IP 67 to IEC/EN 60529
Connection	cable, 6 x AWG 26, 2, 5 or 10 m, max. 15 m
T_M	max. 20 years
MTTF_d	>100 years
Utilisation category	DC-13; DC-12
Switching voltage	24 VDC
Switching current	max. 40 mA per channel
Switching capacity	max. 1.2 W
No-load supply current I₀	max. 6 mA per channel
Input voltage	10 ... 30 VDC
Voltage drop	max. 2.5 VDC
Switch-on/-off time	< 1 ms
Max. fuse rating	< 50 mA internal reversible fuse
Switching frequency	max. 1000 Hz
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 10 mio. operations
Switching distances	s _{ao} 6 mm, s _{ar} 20 mm
Axial misalignment	max. 4 mm
Ex marking	⊕ II 2G Ex mb II T6 II 2D Ex mbD 21 T80°C IECEx Ex mb II T6 Ex mbD 21 T80°C
Approvals	BVS 08 ATEX E150 X; IECEx BVS 08.0054X

* The control category of the safety sensor is only achieved in combination with a safety module.

Contact variants: switch travel/contacts

	Bi-directional actuation
1 NC/1 NO contact	Ex HS Si 4 1Ö/1S
2 NC contacts	Ex HS Si 4 2Ö

Type code

Ex HS Si 4 1Ö/1S-3G/D	Equipm. cat. 3G/D, gas Ex z. 2 a. dust Ex z. 22
1	1 NC/1 NO contact (2Ö)
1	Series
1	Safety
1	Hall sensor
1	Ex certified component

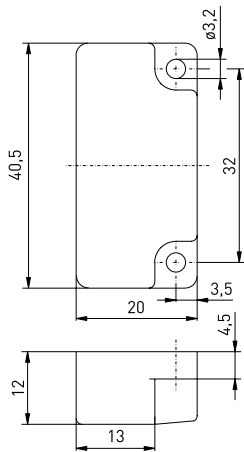
Ex safety sensors, rectangular form

// Series Ex HS Si 4, Actuator

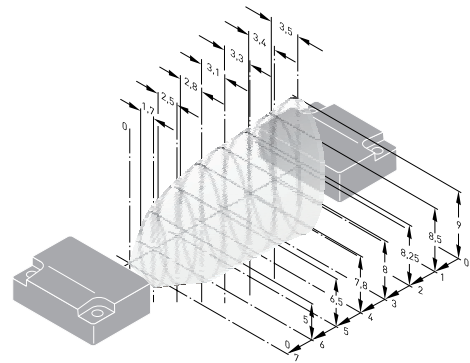
Note

The actuator is not included in the delivery of the switches.

// Actuator Ex MC 4



// Switching capacity



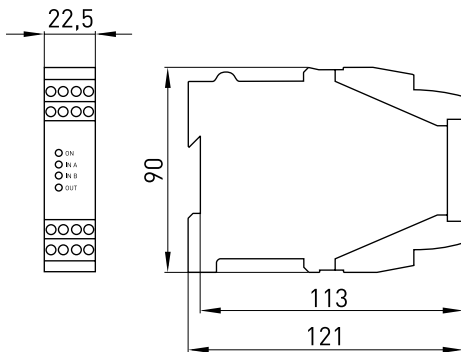
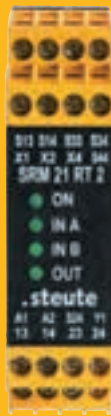
Safety relay module

// Series SRM 21 RT2

Features/Options

- Enclosure width: 22.5 mm
- 2 NC contacts or NC/NO combination can be connected
- Feedback circuit
- 2 enabling paths
- 1 transistor output
- Manual or automatic reset
- Switching position indication by LED

// SRM 21 RT2



Technical data

Standards	EN ISO 13849-1; EN 62061; EN 1088, EN 60204-1, BG-GS-ET 20; EN 60947-5-3/PDF-M, EN 954-1
Enclosure	polycarbonate, terminal block polyamid V0
Mounting	DIN rail mounting, screw terminals
Protection class	enclosure IP 40, terminals IP 20 to IEC/EN 60529
Safety-relevant data	
EN 954-1	category 4
EN 60204-1	stop category 0
EN 62061	SILCL 3
EN ISO 13849-1	PL e
h_{op}	8 h/d
d_{op}	220 d/a
t_{zyklus}	30 s
T_M	max. 20 years
MTTFd	>40 years
DC/ DC _{avg}	>99 %
U_e	24 VDC $\pm 15\%$
I_e	0.125 A
Inputs	1 NC/1 NO or 2 NC inputs, 1 feedback circuit, 1 start input (monitored)
Outputs	2 enabling paths, 1 transistor output as signalling output
I_e/U_e of enabling paths	3 A/ 230 VAC, 2 A/ 24 VDC
Utilisation category	AC-15; DC-13
Max. fuse rating	power supply 2A slow blow enabling paths 6A gG/gN fuse
Display	1 LED for supply voltage, 1 LED each for input A and B, 1 LED for authorisation
Ambient temperature	0 °C ... +55 °C
Shock resistance	3g
Approvals	

Type code

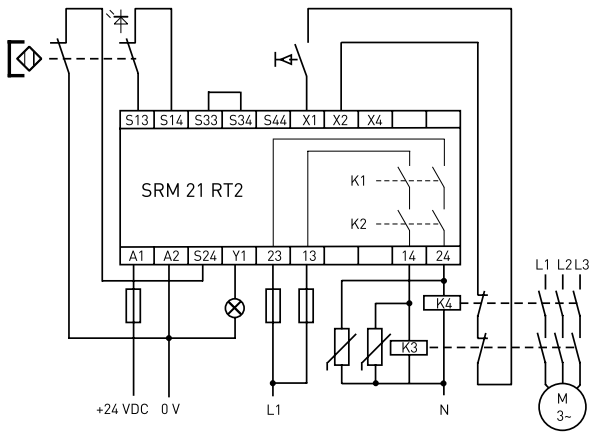
SRM 21 RT2

- 2 inputs
- automatic reset
- manual reset
- 1 transistor output
- 2 enabling paths
- Safety relay module

Safety relay module

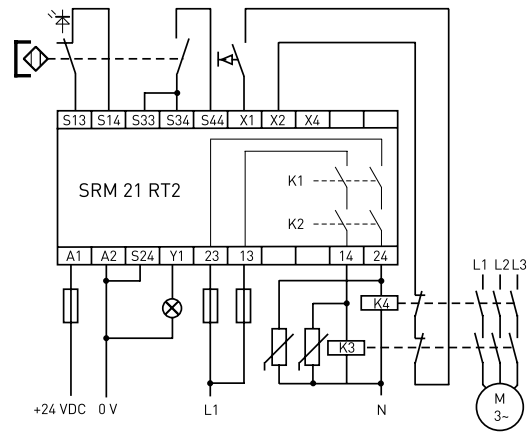
// Series SRM 21 RT2, wiring examples

// Wiring example



- 2-channel: monitoring of one magnetic safety sensor with 2 NC contacts
- Feedback circuit
- Cross-wire detection
- With manual reset/start
- Y1 high upon authorisation
- Up to PL e or SILCL 3

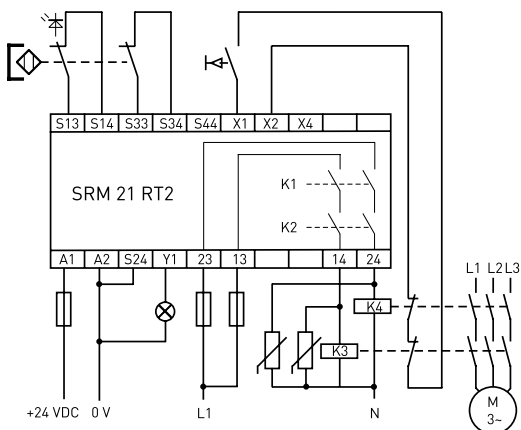
// Wiring example



- 2-channel: monitoring of one magnetic safety sensor with 2 NC contacts
- Feedback circuit
- Without cross-wire detection
- With manual reset/start
- Y1 high upon authorisation
- Up to PL e or SILCL 3

91

// Wiring example



- 2-channel: monitoring of one magnetic safety sensor with 1 NC and 1 NO contact
- Feedback circuit
- Without cross-wire detection
- With manual reset/start
- Y1 high upon authorisation
- Up to PL e or SILCL 3

Safety relay module

// Series SRM 21 Multi

Features/Options

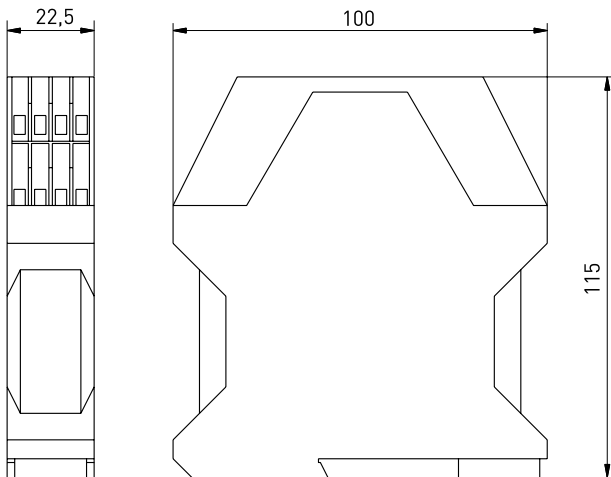
- Enclosure width: 22.5 mm
- 2 NC contacts combination can be connected
- Feedback circuit
- 2 enabling paths
- 1 transistor output
- Manual or automatic reset
- Switching position indication by LED

// SRM 21 MULTI



Technical data

Standards	EN ISO 13849-1; EN 62061; EN 1088, EN 60204-1, EN 60947-5-1, EN 60947-5-3/-PDF-M, EN 954-1, DIN EN 61508, 2004/108/EC
Enclosure	polyamid PA 6.6 V0
Mounting	DIN rail mounting
Protection class	enclosure and terminals IP 20 to IEC/EN 60529
Safety-relevant data	
EN 954-1	category 4
EN 60204-1	stop category 0
EN 61508	SIL 3
PFH	2.2×10^{-9}
PFD	4.64×10^{-6}
EN ISO 13849-1	PL e
T_M	max. 20 years
MTTFd	100 years
DC/ DC _{avg}	>99 %
U_e	24 VDC -20 % ... +25 %
I_e	0.125 A
Inputs	2 NC inputs, 1 feedback circuit, 1 start input (monitored)
Outputs	2 enabling paths, 1 transistor output as signalling output
I_e/U_e of enabling paths	3A/ 230VAC, 5A/ 24VDC
Utilisation category	AC-15; DC-13
Max. fuse rating	power supply 2 A slow blow, enabling paths 4 A gG/gN fuse
Display	2 LEDs for inputs, 2 LEDs for outputs, 1 LED for supply voltage, 1 LED for fault
Ambient temperature	-25 °C ... +55 °C
Shock resistance	10g
Approvals	TUV



Type code

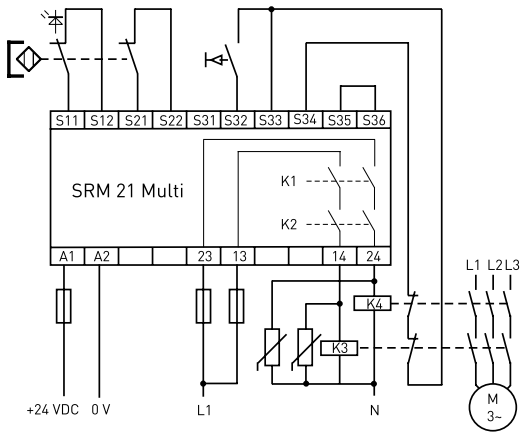
SRM 21 Multi

multi-functional
1 transistor output
2 enabling paths
Safety relay module

Safety relay module

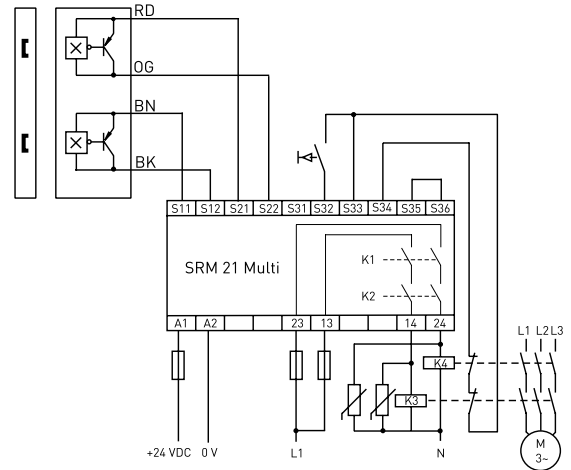
// Series SRM Multi, wiring examples

// Wiring example



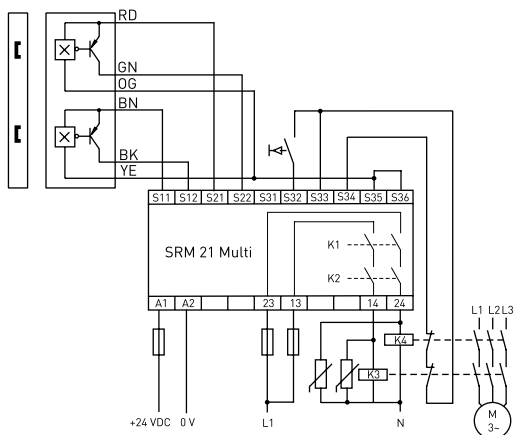
- 2-channel: monitoring of one magnetic safety sensor with two NC contacts
- Cross-wire detection, monitored start and feedback circuit
- S31 is high on authorisation
- Up to PL e

// Wiring example

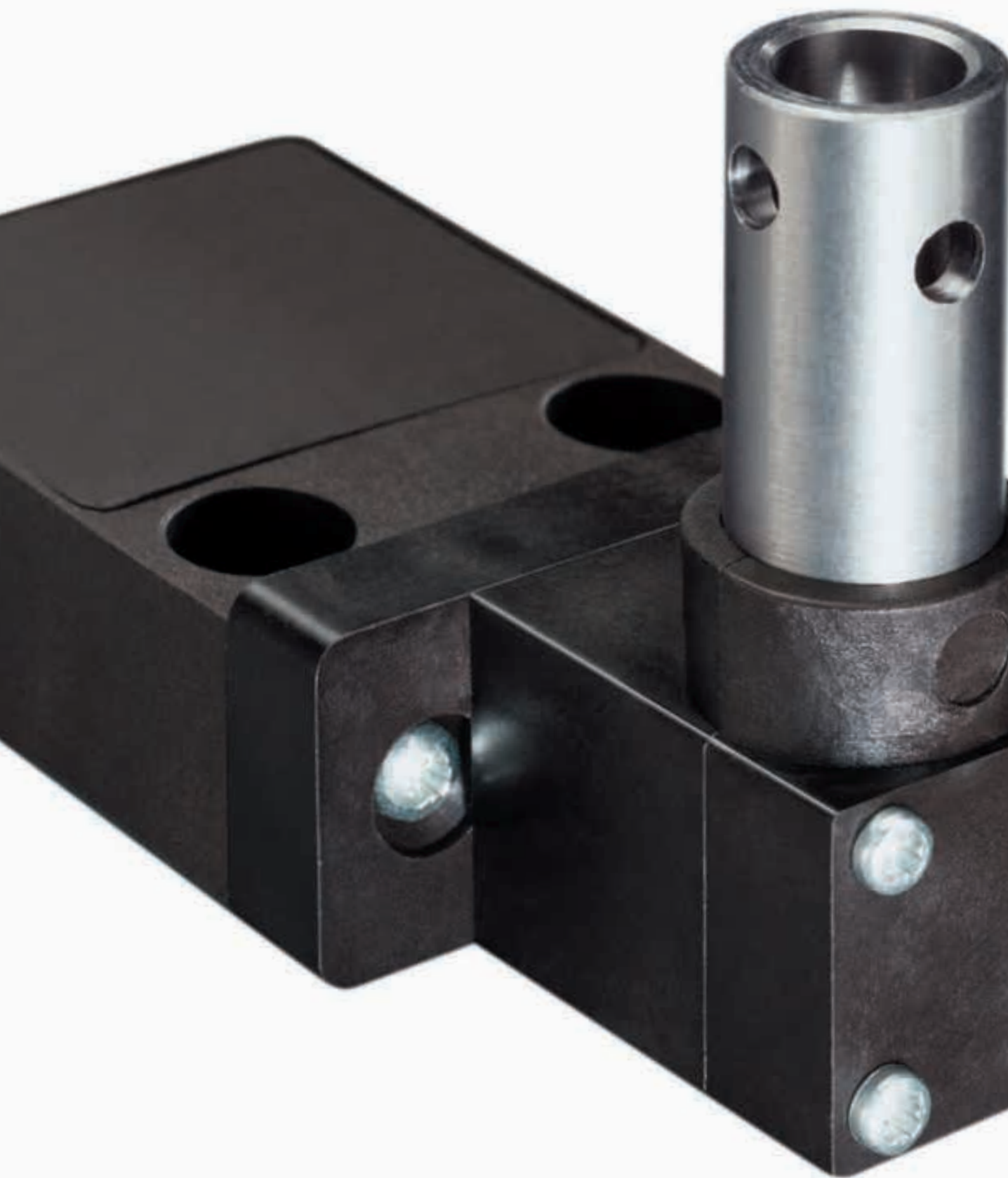


- 2-channel: monitoring of one safety hall sensor with two semiconductor outputs as NC
- Cross-wire detection, monitored start and feedback circuit
- S31 is high on authorisation
- Up to PL e

// Wiring example



- 2-channel: monitoring of one safety hall sensor with two semiconductor outputs as NC
- cross-wire detection, monitored start and feedback circuit
- S31 is high on authorisation
- up to PL e





Ex safety switches for hinged guards

Thermoplastic enclosure

// Series Ex 95 T.C

from page 98

// Series Ex 13 SB

from page 99

// Series Ex 95 SB

from page 100

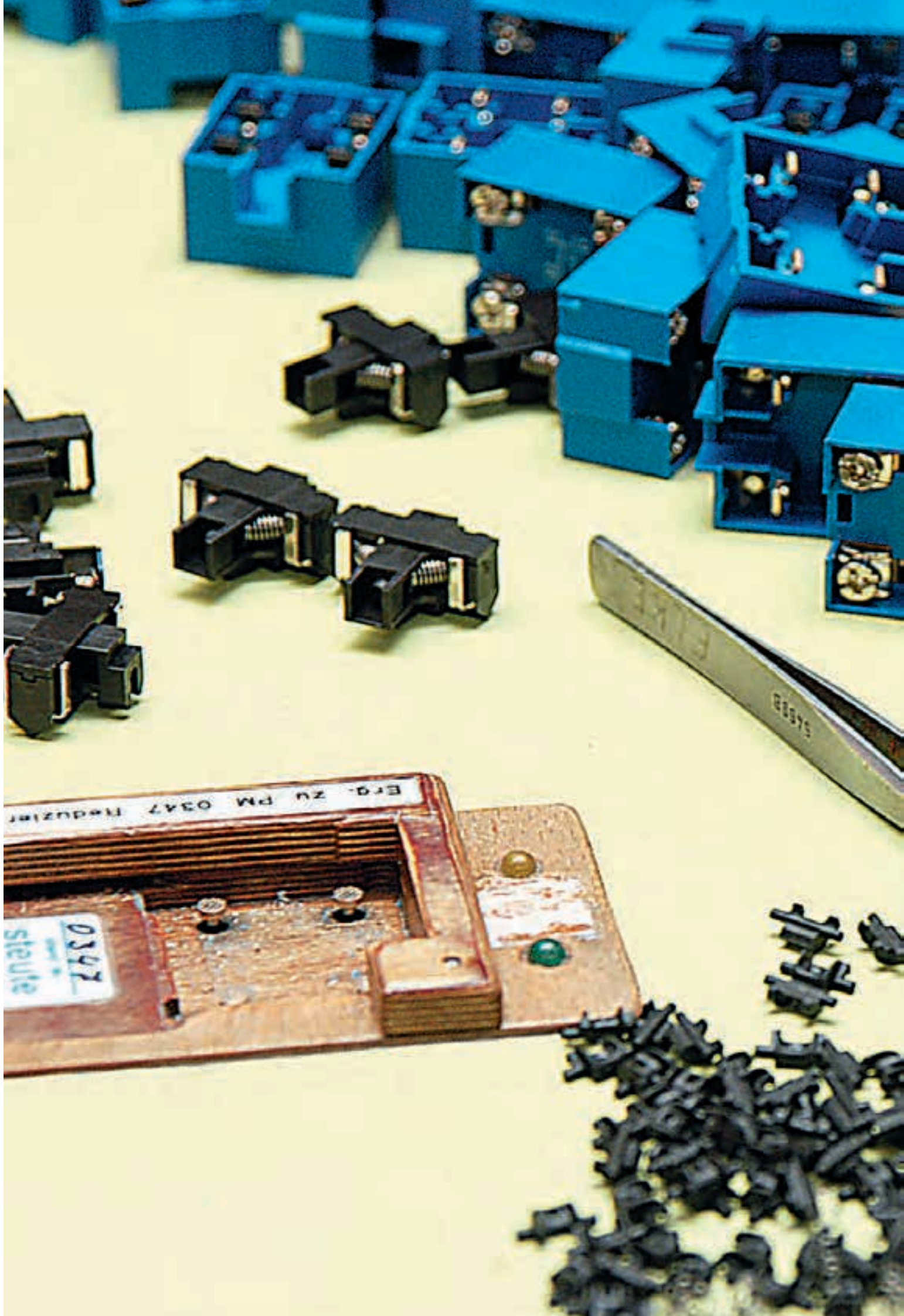
Metal enclosure

// Series Ex 335 V.S

from page 101

// Series Ex 355 V.S

from page 102



Ex safety switches for hinged guards

Range of application

These Ex safety switches are suitable for hinged safety guards, which need to be closed in order to guarantee the necessary operational safety.

The variety of requirements to be found in practice can be met by means of the wide range of safety switches for hinged guard doors.

Depending on the particular version of the switch, small doors and service flaps, as well as heavy hinged doors on machinery and plants, can be protected in such a way as to provide for easy set-up and maintenance.

Design and operating principle

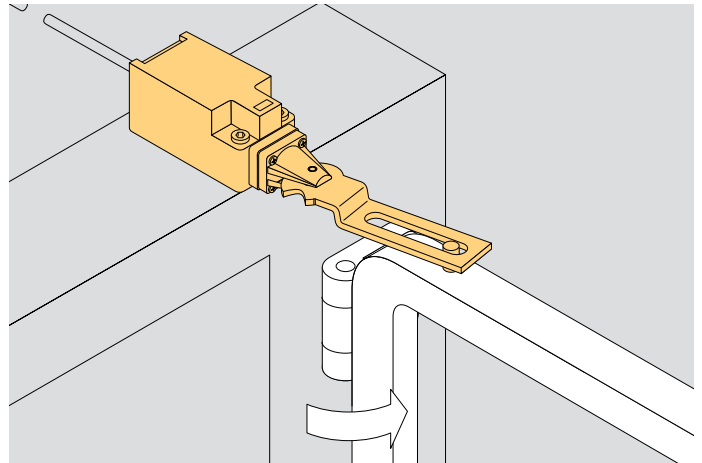
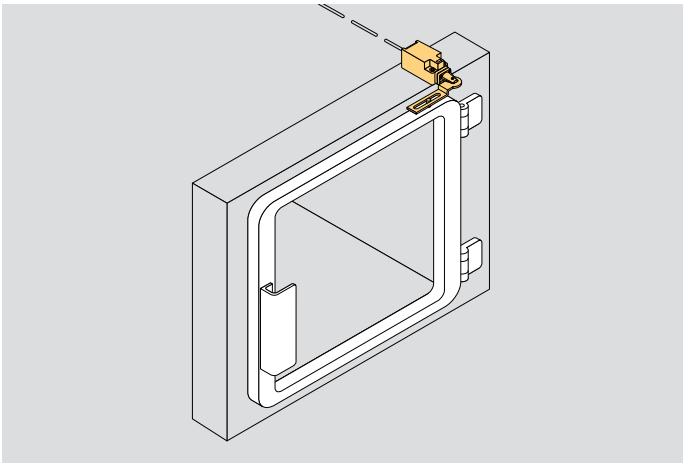
A general advantage of the Ex safety switches shown here is the integral cam within the safety switch. The requirements of EN 1088, such as positive linkage between cam and actuator, as well as protection against tampering, are thus fulfilled.

This combination within the switch provides a cost advantage for the user in avoiding the necessity of mounting a specially designed cam. These safety switches are provided with slow action.

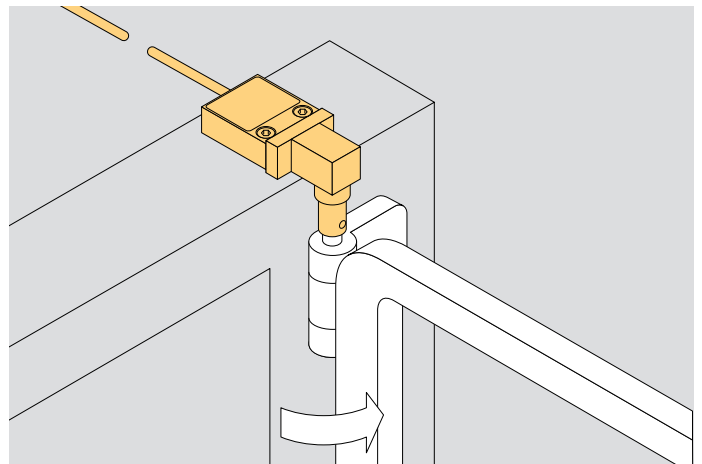
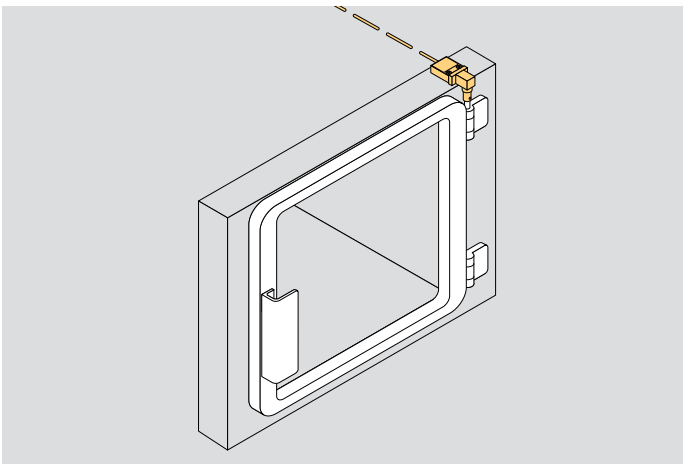
All Ex safety switches for hinged guards shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC and according to ATEX 94/9/EC. The Ex safety switches for hinged guards per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Application

safety flap switch on sliding guard



safety hinge switch on sliding guard



Ex safety switches for hinged guards

// Series Ex 95 T.C

Features/Options

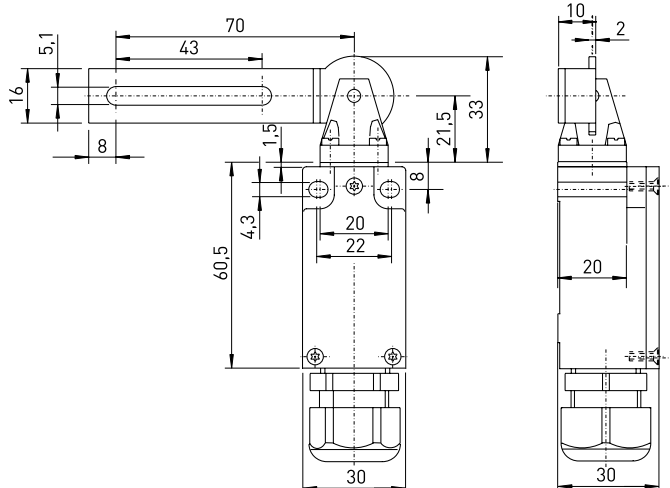
- Ex zone 1 and 21
- Double insulated □
- Slow action ⊖, change-over contact with double break
- Cable entry M20 x 1.5
- Wiring compartment
- With gold-plated contacts available on request
- Mounting details to EN 50 047
- Actuator head can be repositioned in factory in 4 x 90° steps
- Special version only for dust Ex zone 22 available

// EX 95 T.C



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7; EN 61241-0, EN 61241-1; EN ISO 13849-1
Design	mounting details to DIN EN 50 047
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	M20 x 1.5
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6, II 2D Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 118; IECEx in 2011



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 T5C 10/1S
1 NC/1 NO contact with overlapping	Ex 95 T5C UE
2 NC contacts	Ex 95 T5C 20

Type code

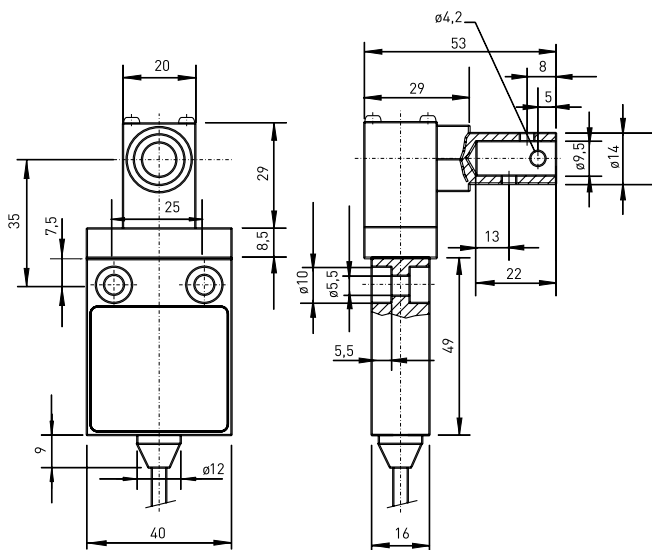
Ex 95 T5C 10/1S-3D

- Equipment Categ. 3D, dust Ex zone 22
- Contact type 10/1S, (20, UE)
- Actuator T5C, 5 Ride-side version (3 Left-side, 4 Swivel doors)
- Series
- Ex certified component

Ex safety switches for hinged guards

// Series Ex 13 SB

// EX 13 SB



Features/Options

- Ex zone 1 and 21
- Double insulated □
- Version with cable entry on side available
- With pre-wired cable, cable length 2 metres
- With gold-plated contacts available on request
- Shaft bore \varnothing 10 mm available
- Actuating shaft can be turned 360°
- Special version only for dust Ex zone 22 available

Technical data

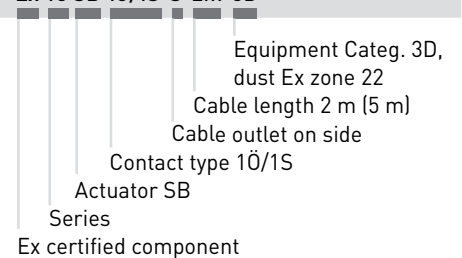
Standards	EN 60947-5-1; EN 1088; BG-GS-ET-15; EN 60079-0, EN 60079-1; EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0 IP 65 to IEC/EN 60529
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact \ominus
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	cable H05VV-F, 4 x 0.75 mm ²
Cable length	2 or 5 m
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1068 X, IECEx PTB 06.0053X

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 13 SB 10/1S
	180° 15° 0° 15° 180° BK-GY BN-BU

Type code

Ex 13 SB 10/1S-S-2m-3D



Ex safety switches for hinged guards

// Series Ex 95 SB

Features/Options

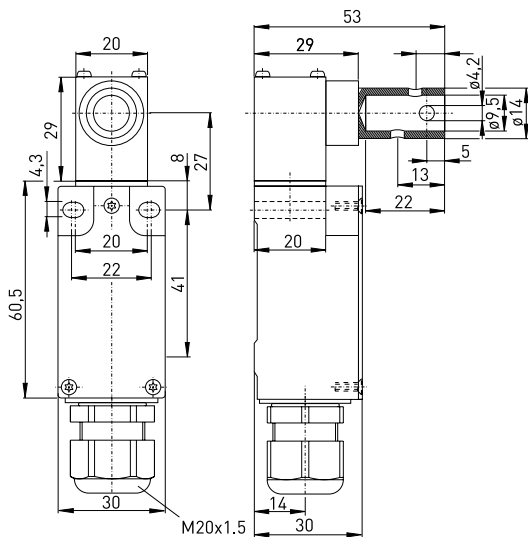
- Ex zone 1 and 21
- Double insulated □
- Slow action ⊖, change-over contact with double break
- With gold-plated contacts available on request
- Wiring compartment, cable entry M20 x 1.5
- Mounting details to EN 50 047
- Actuator head can be repositioned in factory in 4 x 90° steps
- Shaft bore ø 10 mm available
- Actuating shaft can be turned 360°
- Special version only for dust Ex zone 22 available

// EX 95 SB



Technical data

Standards	EN 60947-5-1; EN 1088; BG-GS-ET-15; EN 60079-0, EN 60079-1, EN 60079-7; EN 61241-0, EN 61241-1; EN ISO 13849-1
Design	mounting details to DIN EN 50 047
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	M20 x 1.5
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6, II 2D Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 118; IECEx in 2011



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 SB 1Ö/1S 180° 16°0°16° 180° 23-24 20°10°10°20° 11-12
2 NC contacts	Ex 95 SB 2Ö 180° 20°0°20° 180° 11-12 10° 10° 21-22
1 NC/1 NO contact with overlapping	Ex 95 SB UE 180° 11°0°11° 180° 23-24 27°17°17°27° 15-16

Type code

Ex 95 SB 1Ö/1S-3D

Equipment Categ. 3D, dust Ex zone 22
 Contact type 1Ö/1S, (2Ö, UE)
 Actuator SB
 Series
 Ex certified component

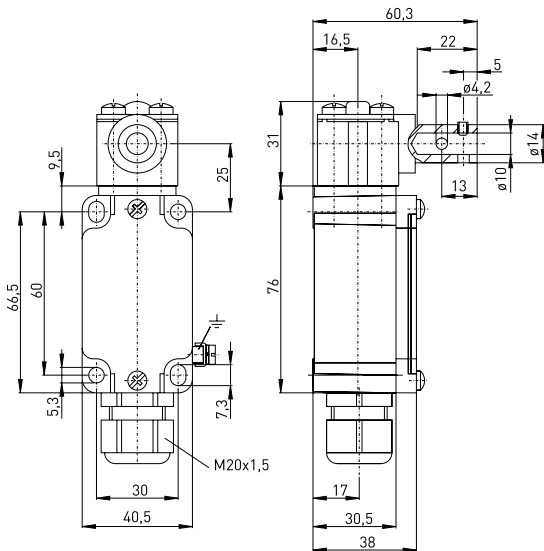
Ex safety switches for hinged guards

// Series Ex 335 V.S

Features/Options

- Ex zone 1 and 21
- Wiring compartment
- With gold-plated contacts available on request
- Mounting details to DIN EN 50 041
- Actuator head can be repositioned in 4 x 90° steps
- Actuating shaft can be turned 360°
- Shaft bore \varnothing 10 mm
- Special version only for dust Ex zone 22 available

// EX 335 V.S



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Design	mounting details to DIN EN 50 041
Enclosure	zinc die-cast, enamelled
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact \ominus
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
Cable entry	M20 x 1.5
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	DMT 01 ATEX E 178, IECEx BVS 07.0014



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 335 V.S 10/1S
2 NC contacts	Ex 335 V.S 20

Type code

Ex 335 V10S 10/1S-3D
Equipment Categ. 3D, dust Ex zone 22
Contact type 10/1S, (20)
Actuator V10S shaft bore \varnothing 10 mm
Series
Ex certified component

Ex safety switches for hinged guards

// Series Ex 355 V.S

Features/Options

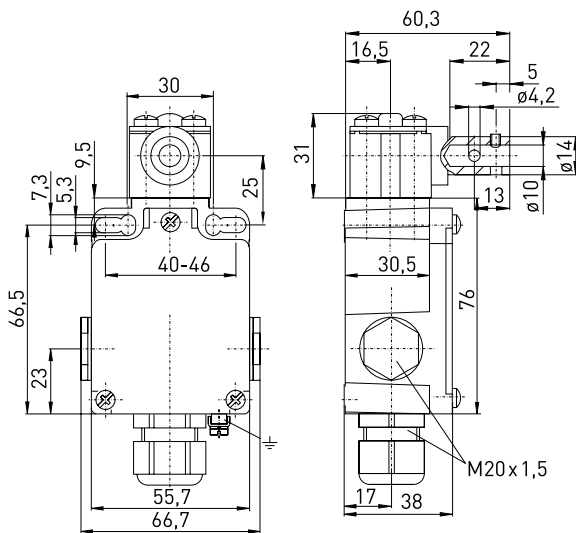
- Ex zone 1 and 21
- Wiring compartment
- With gold-plated contacts available on request
- Mounting details to DIN EN 50 041
- Actuator head can be repositioned in 4 x 90° steps
- Actuating shaft can be turned 360°
- Shaft bore \varnothing 10 mm
- Special version only for dust Ex zone 22 available

// EX 355 V.S



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Design	mounting details to DIN EN 50 041
Enclosure	zinc die-cast, enamelled
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact \ominus
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	M20 x 1.5
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	BVS 04 ATEX E 126, IECEx BVS 07.0013



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 V.S 1Ö/1S
2 NC contacts	Ex 355 V.S 2Ö

Type code

Ex 355 V10S 1Ö/1S-3D
Equipment Categ. 3D, dust Ex zone 22
Contact type 1Ö/1S, (2Ö)
Actuator V10S shaft bore \varnothing 10 mm
Series
Ex certified component

Ex safety switches for hinged guards

// Accessories

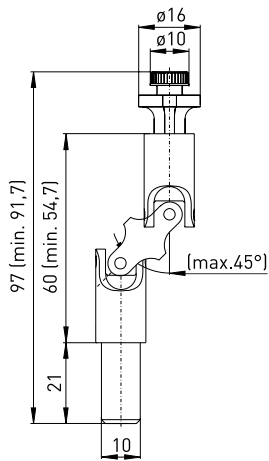
Features/Options

- Factory-mounted pins
- Suitable for Ex 335 V10S, Ex 95 SB-10mm and Ex 335 V10S
- Suitable only in connection with hinges F and L

Features/Options

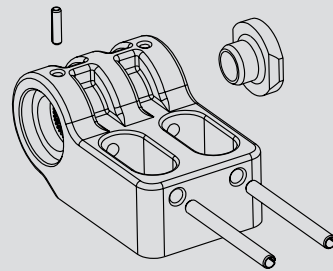
- Locating pins
- One blanking plug
- Two M 5 x 20 screws to ISO 7380

// Universal joint K2

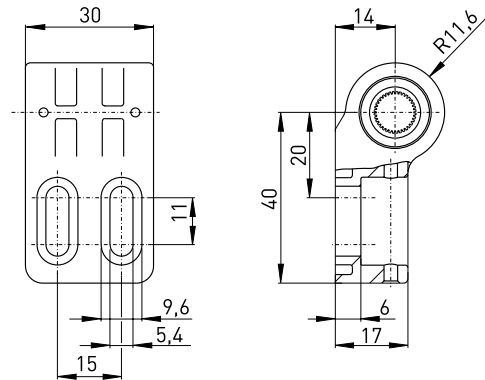


// Universal joint K2

// Fixed hinge F



// Fixed hinge F



Order number

Universal joint K2

01.08.0145

Order number

Fixed hinge F

01.08.0146

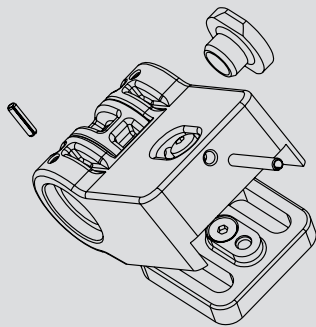
Ex safety switches for hinged guards

// Accessories

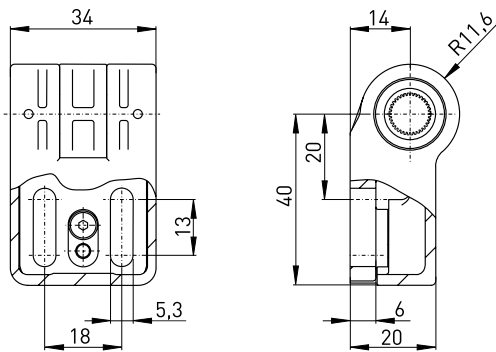
Features/Options

- Locating pins
- One blanking plug
- Two M 5 x 20 screws to ISO 7380

// Adjustable hinge L



// Adjustable hinge L



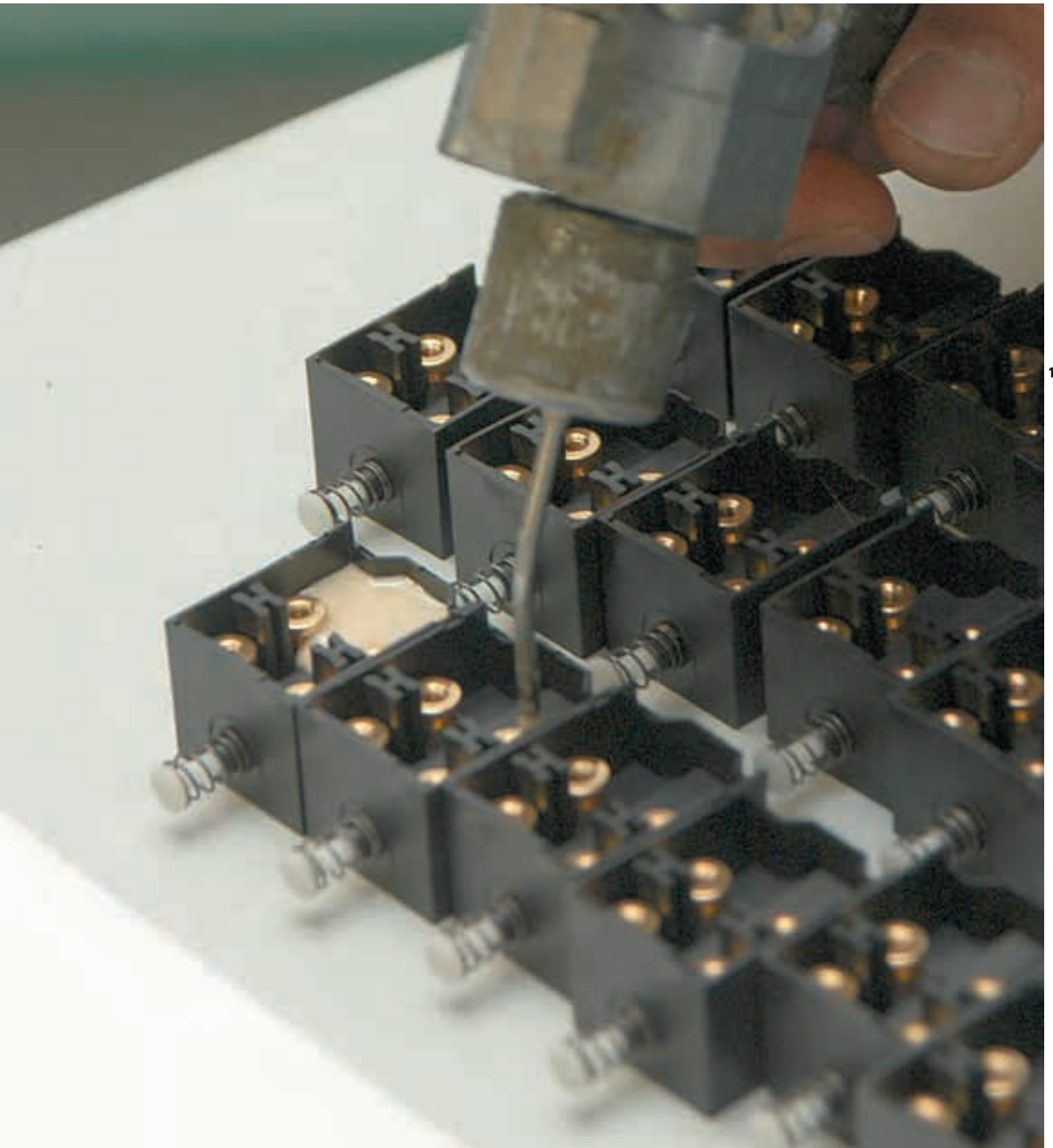
Order number

Adjustable hinge L

01.08.0147

PRODUCTION PROCESS MOUNTING

POTTING OF SWITCH INSERTS FOR POSITION SWITCHES







Ex position switches with/without safety function

Thermoplastic enclosure

// Series Ex 13

from page 112

// Series Ex/ExM 14

from page 124

// Series Ex 95

from page 134

// Series Ex T 356

from page 144

Metal enclosure

// Series Ex 12

from page 148

// Series Ex 335

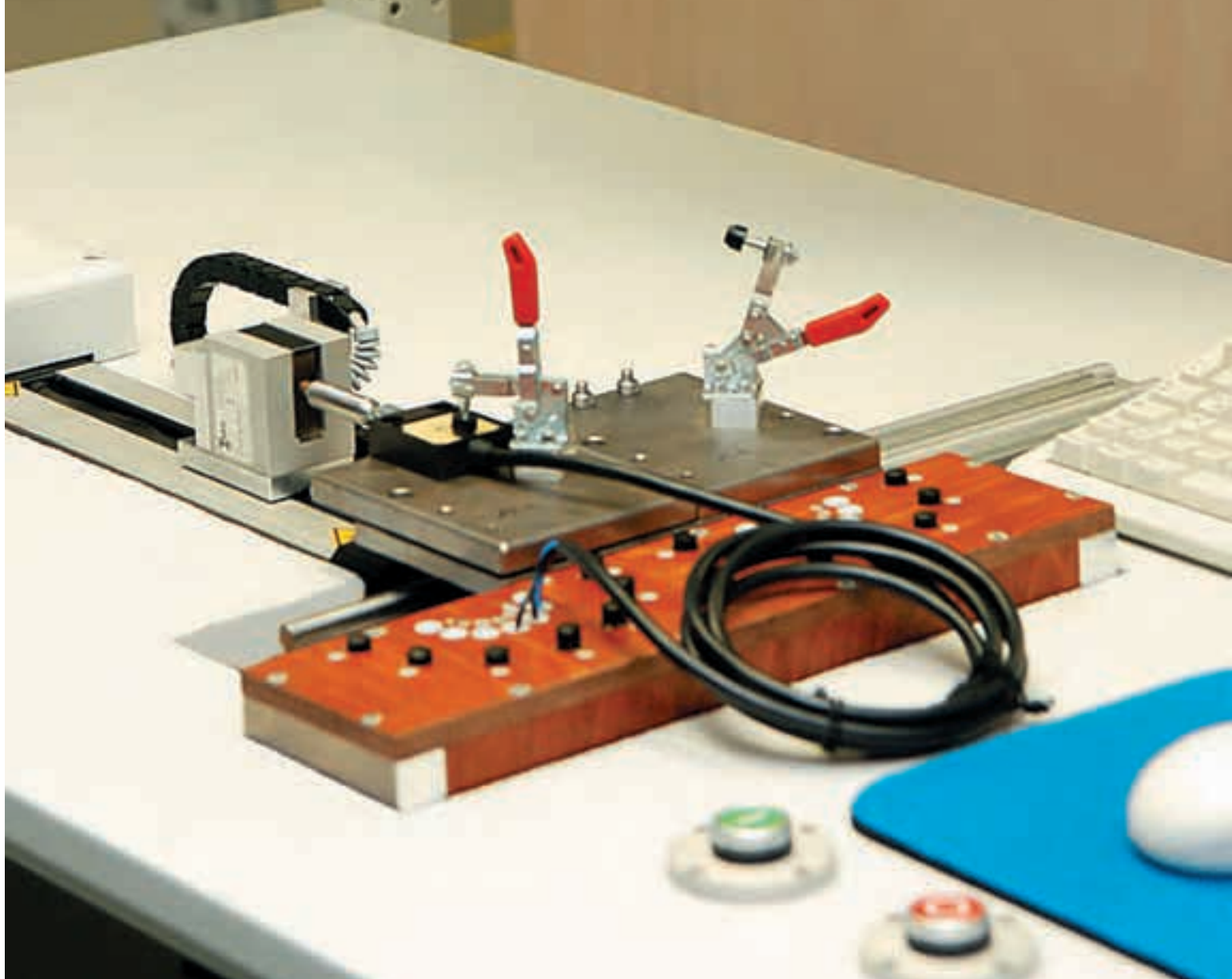
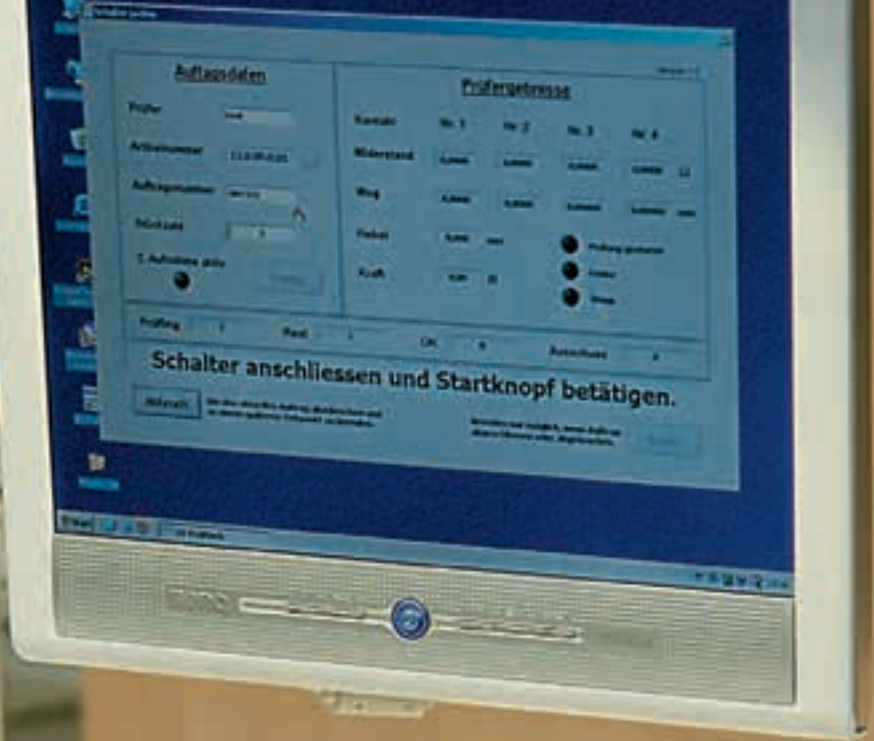
from page 160

// Series Ex 355

from page 166

// Series Ex/ExM 61

from page 172



Ex position switches with/without safety function

Range of application

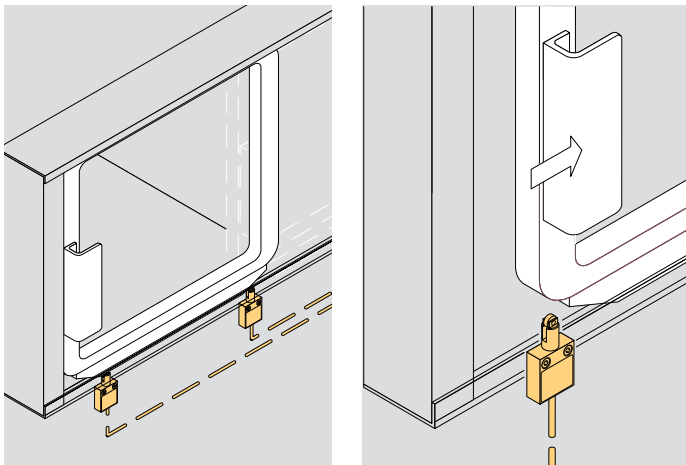
Ex position switches are used where moving parts of machines and industrial plants have to be positioned, controlled and monitored.

The Ex safety position switches are suitable for sliding and hinged safety guards, which need to be closed to ensure the necessary operational security. In combination with guard door monitors, all Ex switches shown in this chapter achieve PL »e« per EN ISO 13849-1 or up to SIL 3 per EN 62061, subject to suitable circuit arrangements.

Design and operating principle

Many of the Ex position switches fulfil the requirements of the IEC 60947-5-1 standard and can therefore also be used as Ex position switches with safety function. On the Ex safety position switches, the guard device and the positive break NC contact are positively linked. When the guard device is closed, the position switch is not actuated. On sliding guards one switch is actuated and one switch is not actuated so that there is a change when opening and closing the guard door. These products are identified by the symbol \ominus for positive break.

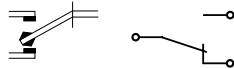
Application on sliding guards



Contacts per IEC 60617

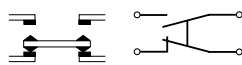
Type C

Change-over contact with single break with 3 terminals



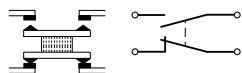
Type Za

Change-over contact with double break with 4 terminals. The contacts have the same polarity.



Type Zb

Change-over contact with double break with 4 terminals. The two movable contacts are electrically insulated from each other.



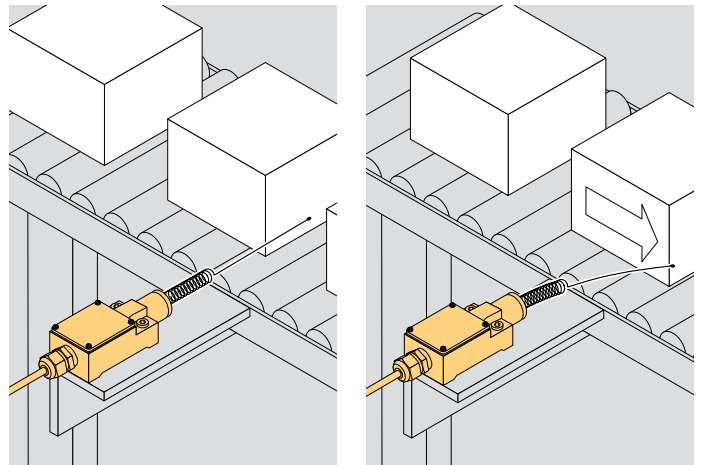
Some position switches fulfil the requirements for standardised switches to DIN EN 50 047 or DIN EN 50 041.

The position switches are available with snap and slow action and are available with different contact configurations. A wide range of actuators completes the program. Most of the switches can be supplied with a metal roller on request.

The devices are listed in the order of enclosure dimensions and materials, starting with the smallest and the plastic enclosures.

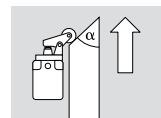
All Ex position switches shown in this chapter bear the CE mark according to the Low Voltage Directive 06/95/EC and to ATEX 94/9/EC. The Ex position switches per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity. All Ex position switches with safety function bear the CE mark according to the Machinery Directive 2006/42/EC and according to ATEX 94/9/EC. The Ex position switches with safety function per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

As a piece counter

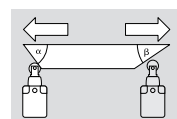


Legend

a: Actuating angle from bottom of switch axis as shown in picture



a: Actuating angle from right of switch axis



b: Actuating angle from left of switch axis as shown in picture










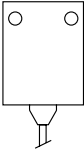

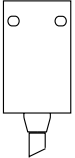
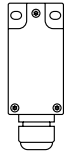
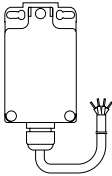
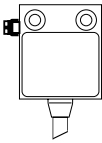

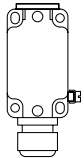


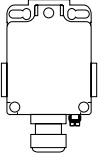
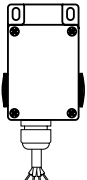


Selection table

Ex position switches with/without safety function

// Series

// Actuator

		↓	↓	↺	↺	↺	↔	↔	↔	
										
Ex 13, from page 112 - Safety switch - Thermoplastic enclosure - Cable IECEx 		+ W	F	KU WKU	FKU			R WR		FR
Ex/ExM 14, from page 124 - Ex 14: Safety switch - Thermoplastic enclosure - Cable IECEx 		+ W	F	KU WKU	FKU	VKU		R WR		FR
Ex 95, from page 134 - Safety switch - Thermoplastic enclosure - Wiring compartment - 1 cable entry - Design to DIN EN 50 047		W						R	RL	
Ex T 356, from page 144 - Safety switch - Thermoplastic enclosure with metal cover - Cable IECEx		S						R		
Ex 12, from page 148 - Metal enclosure - Cable		+ W	F	KU WKU	FKU			R WR		FR
Ex 335, from page 160 - Safety switch - Metal enclosure - Wiring compartment - 1 cable entry IECEx 		S						R		
Ex 355, from page 166 - Safety switch - Metal enclosure - Wiring compartment - 3 cable entries IECEx  		S						R		
Ex /ExM 61, from page 172 - Ex 61: Safety switch - Metal enclosure - Cable		W								

+ Standard: plunger without water-tight collar

Actuating direction ↓ / Free movement of actuator →

	↔	↔	↔	↑	↔	↔	↔	↔	↔	↔	↔	↻	↻	↻		
		WH	WHL	WPH	WHK	D	DL	DS			DD	TL	TF	TK		
	VR					D	DL	DS				TL	TF	TK		
		WH WHM	WHLM	WPH WPHM 4K	WHKM	D		DS		DF	DD	TL		TK		
						4VH		4V7H			4V10H					
		WH	WHL	WPH	WHK	D	DL	DS			DD	TL	TF	TK		
		1K		3K		4VH	4V3H	4V7H	3V4D		4V10H			TK		
		1K		3K		4VH	4V3H	4V7H	3V4D		4V10H			TK		
		WH	WHL	WPH	WHK	D	DL	DS				TL	TF TFL	TK		

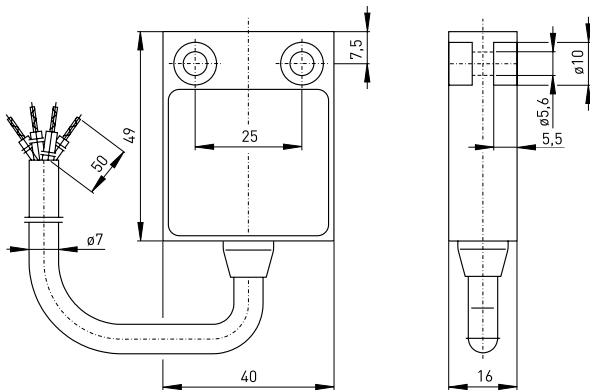
Ex position switches with/without safety function

// Series Ex 13

// EX 13




112



Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Double insulated □
- Slow action ⊖, change-over contact with double break
- Slow action with overlapping contacts available
- Suitable for in-line mounting
- With pre-wired cable, cable length 2 metres
- Special version only for dust Ex zone 22

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F, 4 x 0.75 mm ²
Cable length	2 or 5 m
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 4 mm
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1068 X, IECEx PTB 06.0053 X 

Type code

Ex 13 WR 10/1S-V-S-2m-3D

Equipment Categ.
3D, Staub-Ex
Zone 22
Cable length 2 m,
(5 m, 10 m)
Cable entry on side
Mechanical latching
Contact type 10/1S, (UE)
Actuator R (H, TK, D, etc. ...)
Collar
Series
Ex certified component

Ex position switches with/without safety function

// Series Ex 13, variants

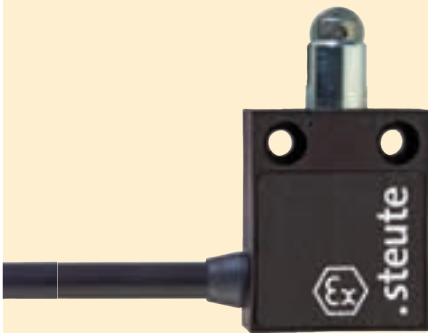
Features/Options

- Special cables possible on request
- Gold-plated contacts available on request
- Mechanical latching: locking by actuation, unlocking by pulling the unlocking button

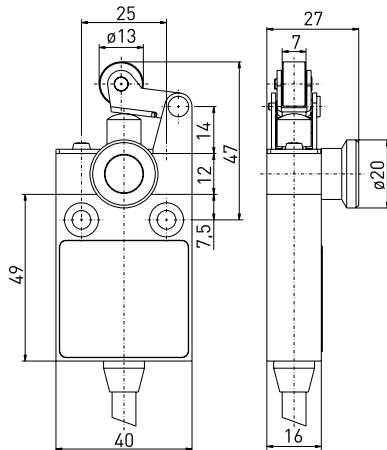
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 0°

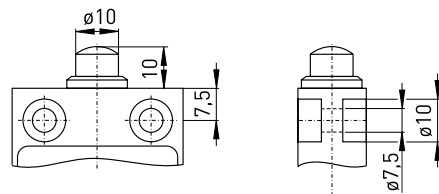
// Cable entry on side S



// Mechanical latching V



// Plunger

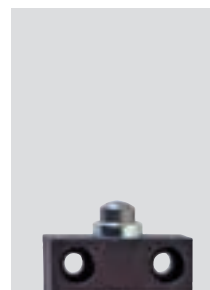
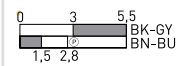


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13



Ex position switches with/without safety function

// Series Ex 13, actuators

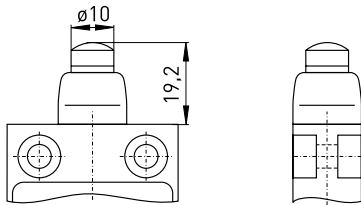
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 0°
- Collar to protect against the entry of foreign bodies

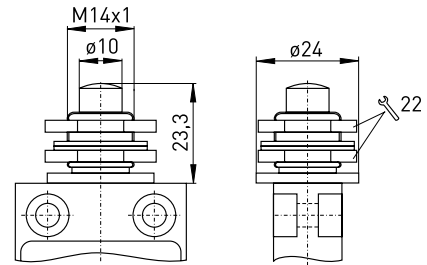
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 0°

// Plunger with collar W



// Plunger for front mounting F



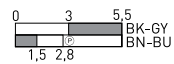
Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

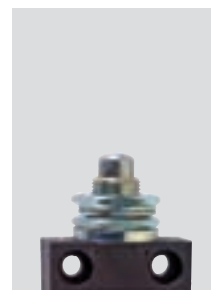
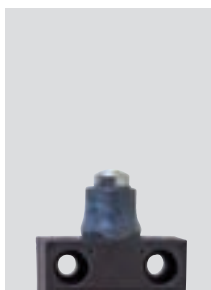
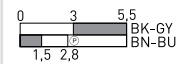
Ex 13 W 10/1S



Slow action

1 NC/1 NO contact

Ex 13 F 10/1S



Features/Options

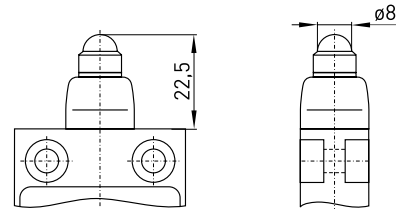
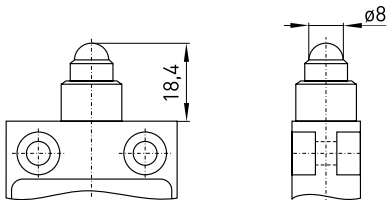
- Actuating speed 0.5 m/s with an actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point

Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 15°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point
- Collar to protect against the entry of foreign bodies

// Ball plunger KU

// Ball plunger with collar WKU



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Slow action

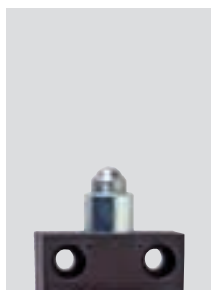
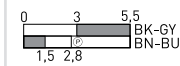
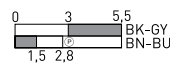
Slow action

1 NC/1 NO contact

1 NC/1 NO contact

Ex 13 KU 10/1S

Ex 13 WKU 10/1S



Ex position switches with/without safety function

// Series Ex 13, actuators

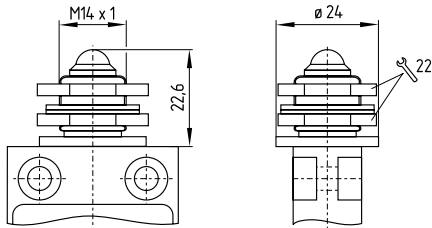
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Ball diameter: 8 mm
- Exact repeatability of switching point

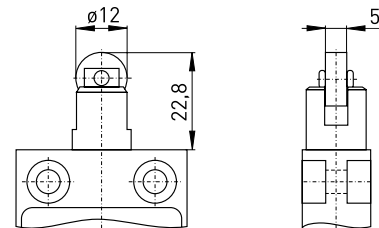
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 30°
- Metal roller
- Available with actuator repositioned by 90°

// Ball plunger for front mounting FKU



// Roller plunger R

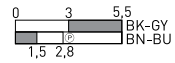


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 FKU 10/1S

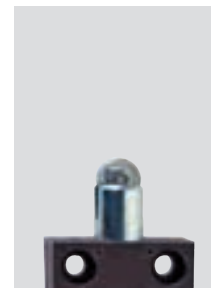
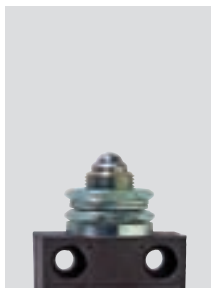
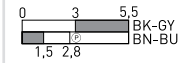


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 R 10/1S



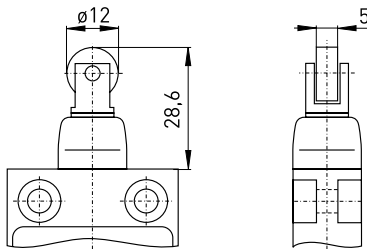
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 25°
- Metal roller
- Available with actuator repositioned by 90°
- Collar to protect against the entry of foreign bodies

Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 25°
- Metal roller
- Available with actuator repositioned by 90°

// Roller plunger with collar WR

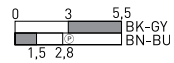


Contact variants: switch travel/contacts

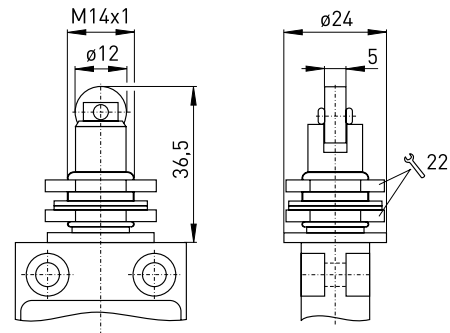
Slow action

1 NC/1 NO contact

Ex 13 WR 10/1S



// Roller plunger for front mounting FR

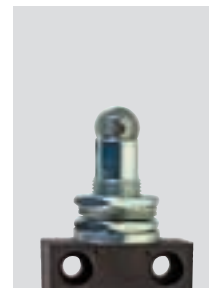
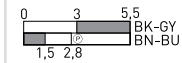


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 FR 10/1S



Ex position switches with/without safety function

// Series Ex 13, actuators

Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

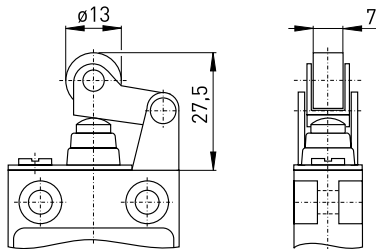
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

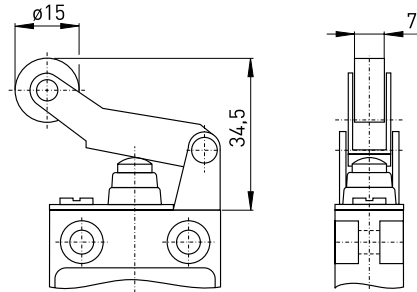
Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

// Roller lever with collar WH



// Long roller lever with collar WHL

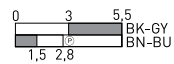


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 WH 10/1S

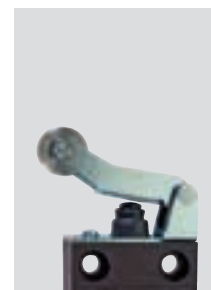
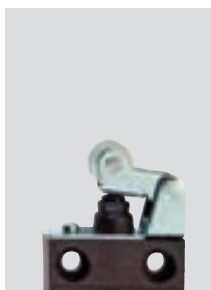


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 WHL 10/1S



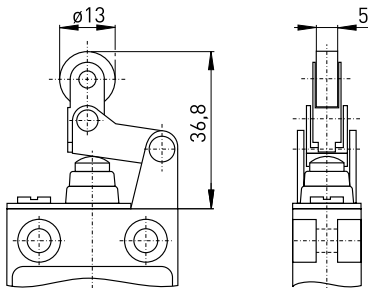
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$
- Actuation only possible from right-hand side
- Free movement of actuator from the other side
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

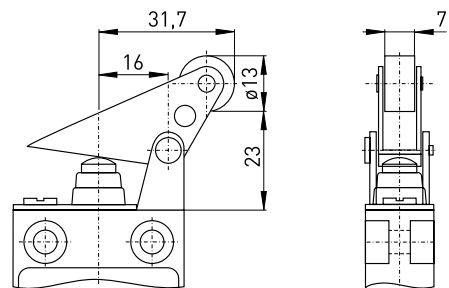
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

// Rocking roller lever with collar WHK



// Parallel roller lever with collar WPH

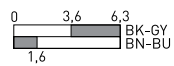


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 WHK 10/15

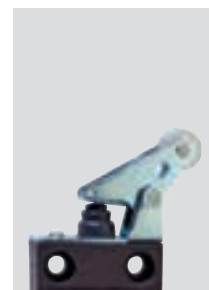
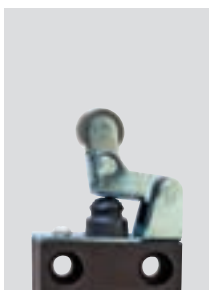
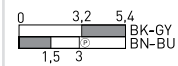


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 WPH 10/15



Ex position switches with/without safety function

// Series Ex 13, actuators

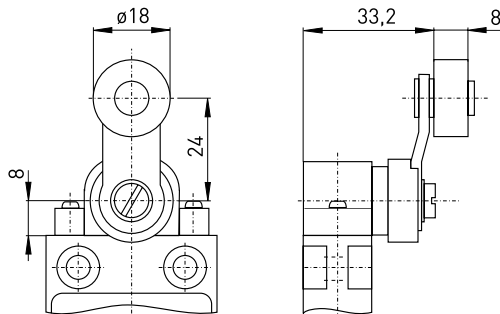
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

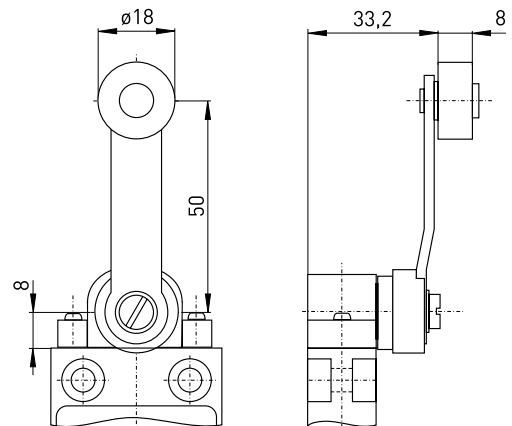
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

// Rocking roller lever D



// Long rocking roller lever DL

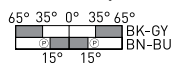


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 D 10/1S

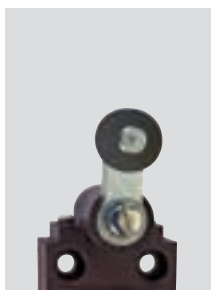
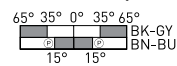


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 DL 10/1S



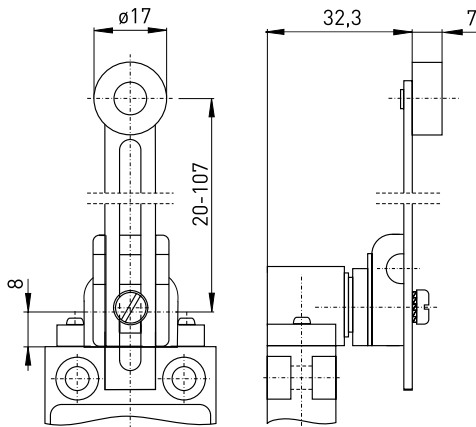
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

Features/Options

- No safety switch!
- Wear-resistant thermoplastic tip
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°

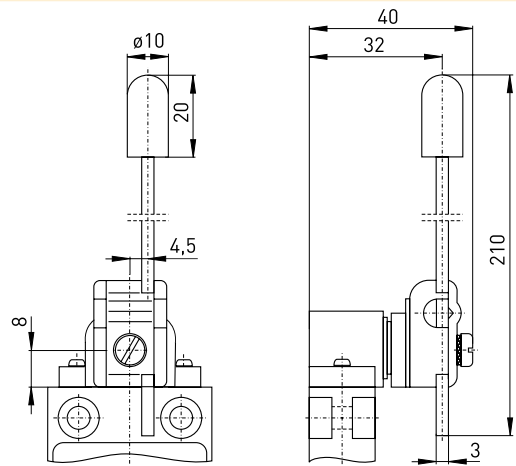
// Adjustable-length roller lever DS



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 13 DS 10/1S 65° 35° 0° 35° 65° BK-GY BN-BU 15° 15°

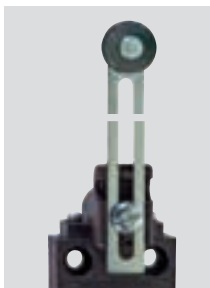
// Wire roller lever DD



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 13 DD 10/1S 65° 35° 0° 35° 65° BK-GY BN-BU 15° 15°

121



Ex position switches with/without safety function

// Series Ex 13, actuators

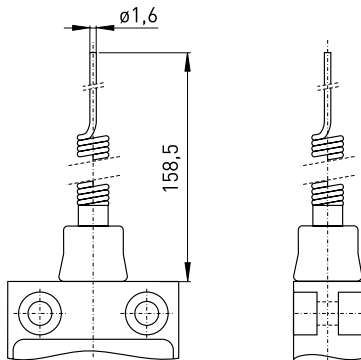
Features/Options

- No safety switch!
- Spring rod can be actuated from any direction
- Spring rod can be shortened 30 mm in actuating area
- Exact linear actuation not unnecessary
- Elasticity of spring allows for deflection above the max. switching angle of 18°

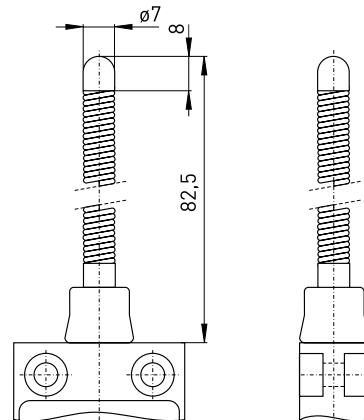
Features/Options

- No safety switch!
- With rounded steel tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 18°

// Long spring rod TL



// Spring rod with rounded steel tip TF

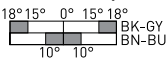


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 TL 10/1S

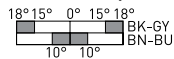


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

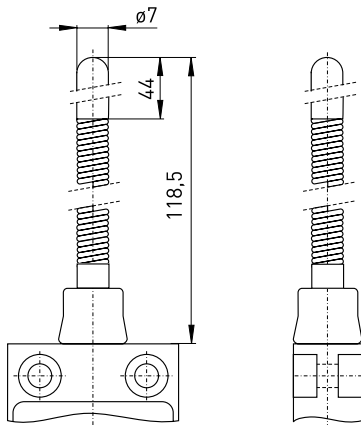
Ex 13 TF 10/1S



Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 18°

// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex 13 TK 10/1S
18° 15° 0° 15° 18° BK-GY
10° 10° BN-BU



Ex position switches with/without safety function

// Series Ex/ExM 14

Features/Options

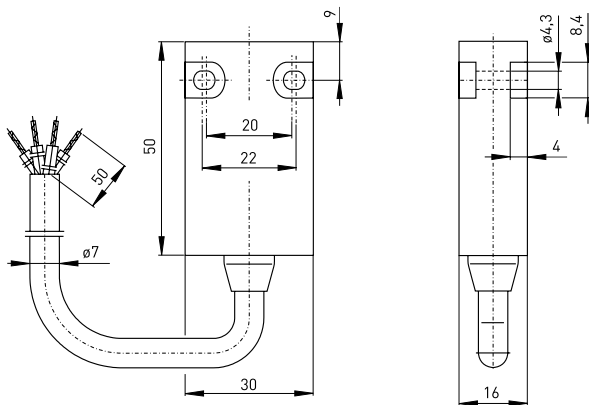
- Ex zone 1 and 21
- Safety switch only version with slow action
- Thermoplastic enclosure
- Double insulated □
- Slow action with overlapping contacts available
- Mounting details to DIN EN 50 047
- Suitable for in-line mounting
- With pre-wired cable, cable length 2 metres
- Special version only for dust Ex zone 22 available

// EX/EXM 14



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action
Switching elements	Ex 14: change-over with double break Zb or 2 NC contacts, galvan. sep. contact bridges; ExM 14: change-over cont. with single break C or Za cable H05VV-F, 3/4 x 0.75mm ² , length 2 or 5 m
Connection	
B_{10d} (10 % load)	Ex 14: 2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: Zb: 6 A; C and Za: 5 A; T5: 3 A
I_e/U_e	Zb: 6 A/250 VAC, 0.25 A/230 VDC; Za: 5 A/250 VAC, 0.2 A/230 VDC, C: 5 A/250 VAC, 0.16 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	Zb: 6 A gG/gN-fuse; C, Za: 5 A gG/gN-fuse
Ambient temperature	T6: -20°C...+65°C, C: +60°C; T5: -20°C...+95°C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 4 mm
Note	Switch must be protected from mechanical damage!
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T90°C Db IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T90°C Db
Approvals	ExM 14: PTB 03 ATEX 1069 X ExM 14 1Ö/1S: PTB 03 ATEX 1006 X Ex 14: PTB 03 ATEX 1070X, IECEx PTB06.0098X



Type code

ExM 14 WR 1Ö/1S-RE-S-2m-3D

- Equipment
- Categ. 3D, dust
- Ex zone 22
- Cable length 2 m, (5 m)
- Cable entry on side
- Latching
- Contact type 1Ö/1S, (UE, 2Ö)
- Actuator R (H, TK, D, etc. ...)
- Collar
- Series
- M Snap action
- Ex certified component

Ex position switches with/without safety function

// Series Ex/ExM 14, actuators

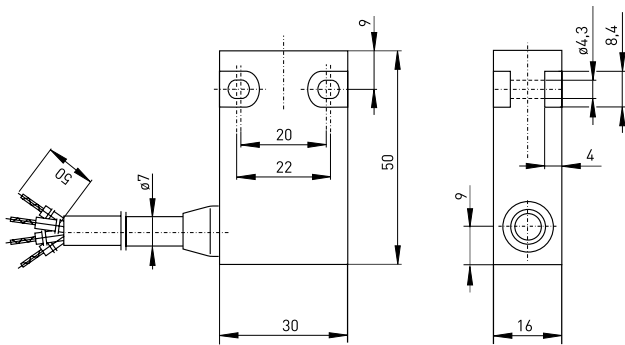
Features/Options

- Snap action, change-over contact available with double break e.g. ExM 14 R 10/1S
- Slow action available with 2 NC contacts
- With gold-plated contacts available on request
- With latching: On-/Off principle

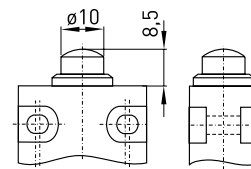
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 0°

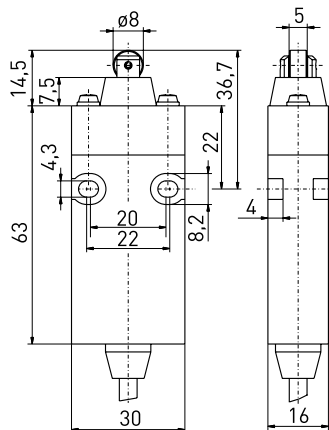
// Cable entry on side S



// Plunger

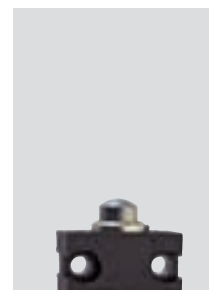


// With latching RE



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 10/1S 	Ex 14 10/1S
1 change-over contact	ExM 14 	
2 NC contacts		Ex 14 20



Ex position switches with/without safety function

// Series Ex/ExM 14, actuators

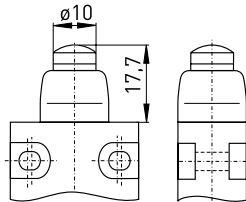
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 0°
- Collar to protect against the entry of foreign bodies

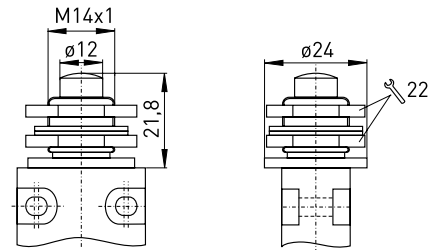
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 0°

// Plunger with collar W



// Plunger for front mounting F



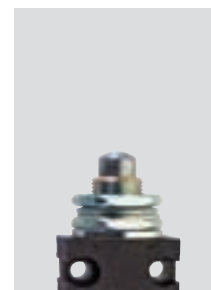
126

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 W 10/1S 	Ex 14 W 10/1S
1 change-over contact	ExM 14 W 	
2 NC contacts		Ex 14 W 20

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 F 10/1S 	Ex 14 F 10/1S
1 change-over contact	ExM 14 F 	
2 NC contacts		Ex 14 F 20



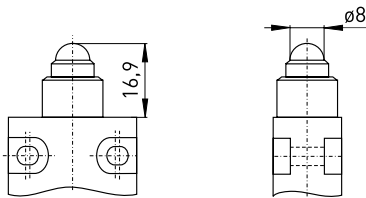
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point

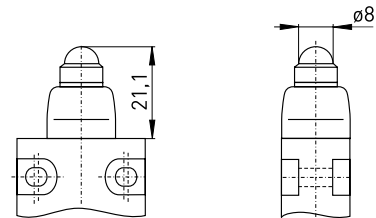
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point
- Collar to protect against the entry of foreign bodies

// Ball plunger KU



// Ball plunger with collar WKU

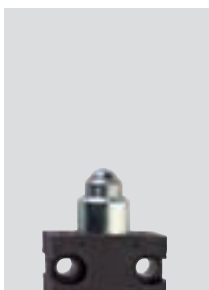


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 KU 10/1S 	Ex 14 KU 10/1S
1 change-over contact	ExM 14 KU 	
2 NC contacts		Ex 14 KU 2Ö

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 WKU 10/1S 	Ex 14 WKU 10/1S
1 change-over contact	ExM 14 WKU 	
2 NC contacts		Ex 14 WKU 2Ö



Ex position switches with/without safety function

// Series Ex/ExM 14, actuators

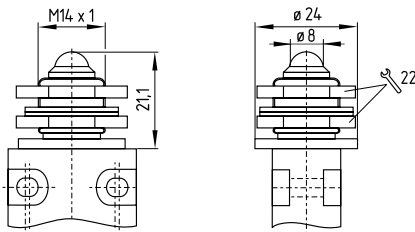
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with a vertical actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point

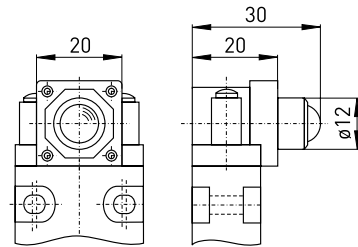
Features/Options

- Safety switch only version with slow action
- Actuation from any direction
- Actuator head with captive stainless steel ball actuator

// Ball plunger for front mounting FKU



// Vertical ball plunger VKU

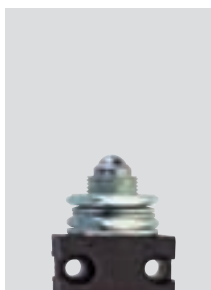


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 FKU 1Ö/1S 	Ex 14 FKU 1Ö/1S
1 change-over contact	ExM 14 FKU 	
2 NC contacts		Ex 14 FKU 2Ö

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 VKU 1Ö/1S 	Ex 14 VKU 1Ö/1S
1 change-over contact	ExM 14 VKU 	
2 NC contacts		Ex 14 VKU 2Ö



Features/Options

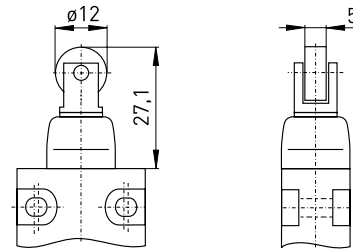
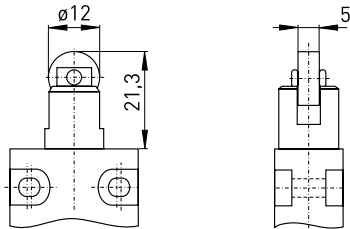
- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 30°
- Metal roller
- Available with actuator repositioned by 90°

Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 25°
- Metal roller
- Available with actuator repositioned by 90°
- Collar to protect against the entry of foreign bodies

// Roller plunger R

// Roller plunger with collar WR

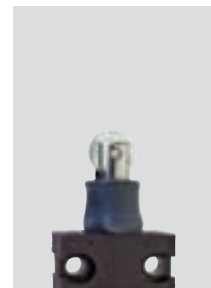
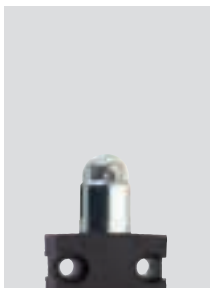


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 R 1Ö/1S 	Ex 14 R 1Ö/1S
1 change-over contact	ExM 14 R 	
2 NC contacts		Ex 14 R 2Ö

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 WR 1Ö/1S 	Ex 14 WR 1Ö/1S
1 change-over contact	ExM 14 WR 	
2 NC contacts		Ex 14 WR 2Ö



Ex position switches with/without safety function

// Series Ex/ExM 14, actuators

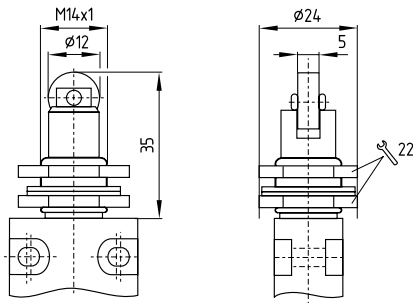
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 25°
- Metal roller
- Available with actuator repositioned by 90°

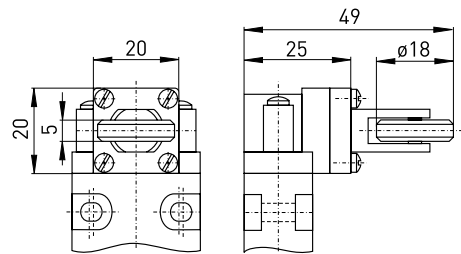
Features/Options

- Safety switch only version with slow action
- Available with actuator repositioned by 90°
- Wear-resistant thermoplastic roller

// Roller plunger for front mounting FR



// Vertical roller plunger VR



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 FR 1Ö/1S 0 1,5 5,5 BK-GY BN-BU	Ex 14 FR 1Ö/1S 0 3 5,5 BK-GY BN-BU 1,5 2,8
1 change-over contact	ExM 14 FR 0 1,5 5,5 GY-BK GY-BN	
2 NC contacts		Ex 14 FR 2Ö 0 5,5 BK-GY BN-BU 1,5 2,8

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 VR 1Ö/1S 0 1,5 5,5 BK-GY BN-BU	Ex 14 VR 1Ö/1S 0 3 5,5 BK-GY BN-BU 1,5 2,8
1 change-over contact	ExM 14 VR 0 1,5 5,5 GY-BK GY-BN	
2 NC contacts		Ex 14 VR 2Ö 0 5,5 BK-GY BN-BU 1,5 2,8



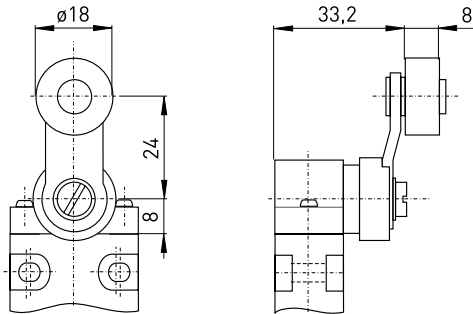
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

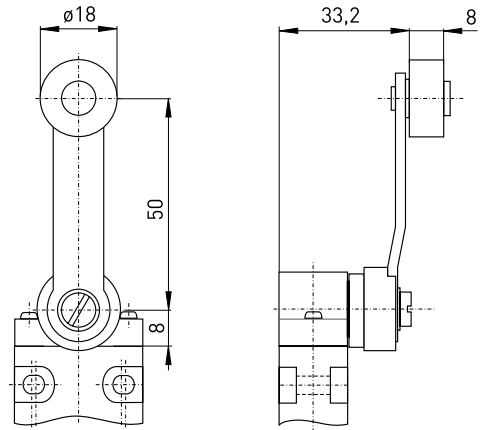
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

// Rocking roller lever D



// Long rocking roller lever DL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 D 10/1S 	Ex 14 D 10/1S
1 change-over contact	ExM 14 D 	
2 NC contacts		Ex 14 D 20

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 DL 10/1S 	Ex 14 DL 10/1S
1 change-over contact	ExM 14 DL 	
2 NC contacts		Ex 14 DL 20



Ex position switches with/without safety function

// Series Ex/ExM 14, actuators

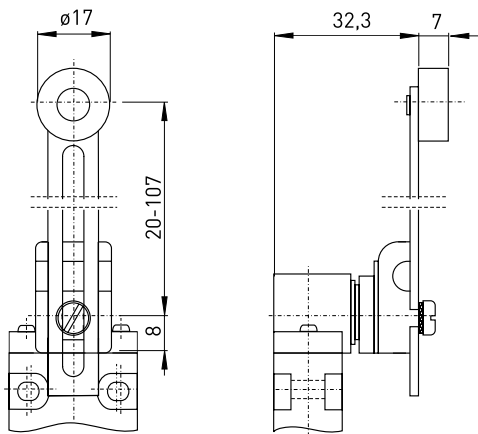
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

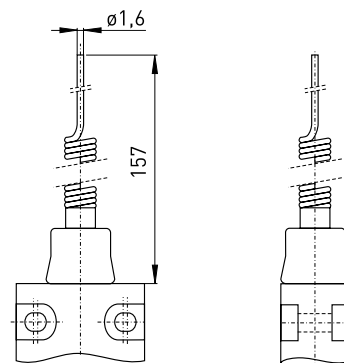
Features/Options

- No safety switch!
- Spring rod can be actuated from any direction
- Spring rod can be shortened 30 mm in actuating area
- Exact linear actuation not necessary
- Elasticity of spring allows for deflection above the max. switching angle of 18°

// Adjustable-length roller lever DS



// Long spring rod TL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 DS 10/1S 	Ex 14 DS 10/1S
1 change-over contact	ExM 14 DS 	
2 NC contacts		Ex 14 DS 20

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 TL 10/1S 	Ex 14 TL 10/1S
1 change-over contact	ExM 14 TL 	
2 NC contacts		Ex 14 TL 20



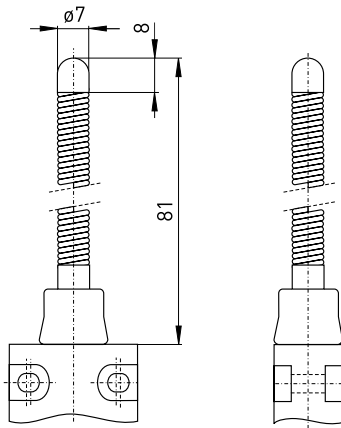
Features/Options

- No safety switch!
- With rounded steel tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 18°

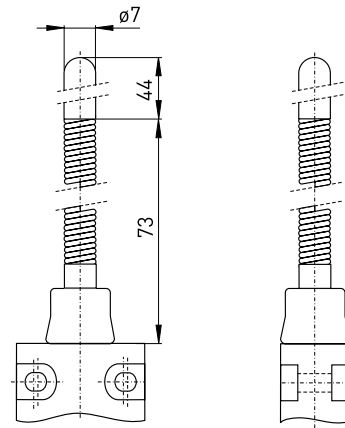
Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 18°

// Spring rod with rounded steel tip TF



// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 TF 10/1S 	Ex 14 TF 10/1S
1 change-over contact	ExM 14 TF 	
2 NC contacts		Ex 14 TF 20

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 14 TK 10/1S 	Ex 14 TK 10/1S
1 change-over contact	ExM 14 TK 	
2 NC contacts		Ex 14 TK 20



Ex position switches with/without safety function

// Series Ex 95

Features/Options

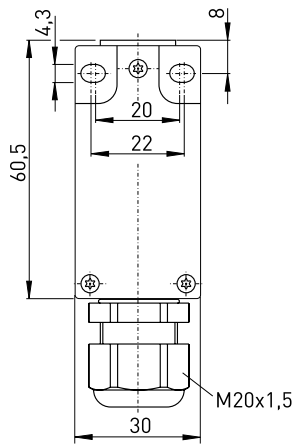
- Ex zone 1 and 21
- Thermoplastic enclosure
- Design according to DIN EN 50 047
- Wiring compartment
- Double insulated
- Available with overlapping contacts
- Actuator heads can be repositioned in 4 x 90° steps
- Angle of offset roller lever can be adjusted in 10° steps
- With gold-plated contacts available on request
- Special version only for dust Ex zone 22 available

// EX 95



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7; EN 61241-0, EN 61241-1; EN ISO 13849-1
Design	DIN EN 50 047
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Switching frequency	3600/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 3.5 mm
Ex marking	⊕ II 2G Ex de IIC T6, II 2D Ex td A21 IP67 T80°C
Approvals	DMT 01 ATEX E 118; IECEx in 2012



Type code

Ex 95 WH 10/1S-3D

Equipment Categ. 3D, dust
Ex zone 22
Contact type 10/1S, (2Ö, UE)
Actuator H (R, D, DS, etc. ...)
Collar
Series
Ex certified component

Ex position switches with/without safety function

// Series Ex 95, actuators

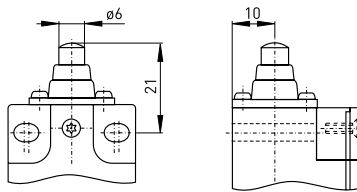
Features/Options

- Actuator type B to DIN EN 50 047
- Actuator with collar

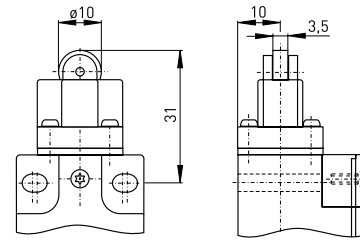
Features/Options

- Actuator type C to DIN EN 50 047
- Wear-resistant thermoplastic roller
- Metal roller available on request
- Actuator heads can be repositioned in 4 x 90° steps

// Plunger W



// Roller plunger R

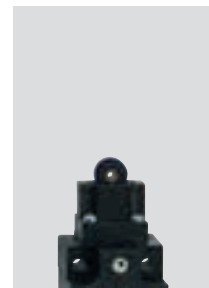
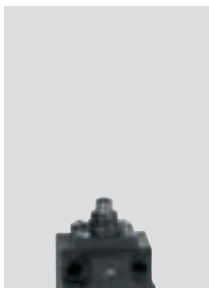


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 W 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 95 W UE
2 NC contacts	Ex 95 W 2Ö

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 R 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 95 R UE
2 NC contacts	Ex 95 R 2Ö



Ex position switches with/without safety function

// Series Ex 95, actuators

Features/Options

- Wear-resistant thermoplastic roller
- Metal roller available on request
- Actuator heads can be repositioned in 4 x 90° steps

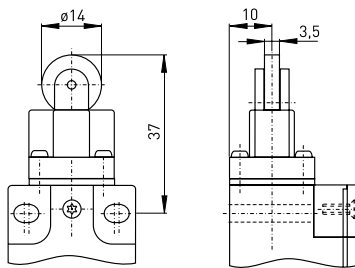
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $a = 40^\circ$ and $b = 25^\circ$
- Actuator type E to DIN EN 50 047
- Actuator with collar
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

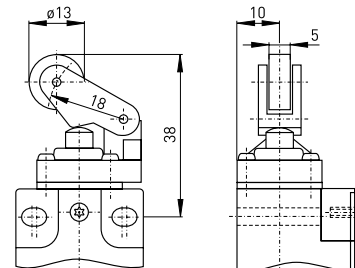
Note

Actuation from left should be avoided since this reduces the mechanical life of the position switch.

// Long roller plunger RL



// Roller lever WH

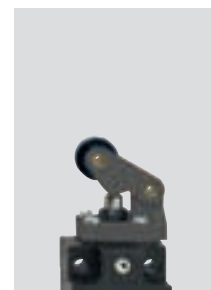


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 RL 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 95 RL UE
2 NC contacts	Ex 95 RL 2Ö

	Slow action
1 NC/1 NO contact	Ex 95 WH 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 95 WH UE
2 NC contacts	Ex 95 WH 2Ö



Features/Options

- Actuating speed 0.5 m/s with an actuating angle of a = 40° and b = 25°
- Actuator with collar
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

Note

Actuation from left should be avoided since this reduces the mechanical life of the position switch.

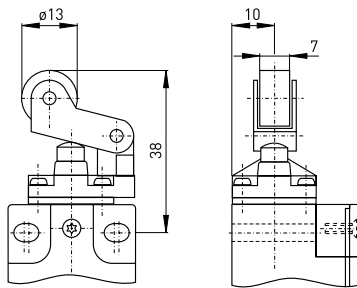
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of a = 40°
- Actuator with collar
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

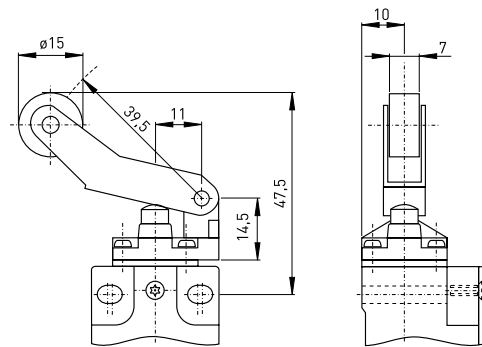
Note

Actuation from left should be avoided since this reduces the mechanical life of the position switch.

// Metal roller lever WHM



// Long metal roller lever WHLM

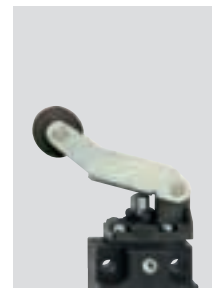
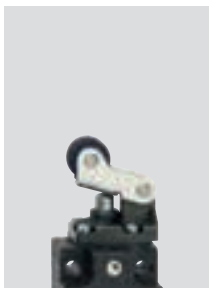


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	<p>Ex 95 WHM 10/15</p>
1 NC/1 NO contact with overlapping	<p>Ex 95 WHM UE</p>
2 NC contacts	<p>Ex 95 WHM 20</p>

	Slow action
1 NC/1 NO contact	<p>Ex 95 WHLM 10/15</p>
1 NC/1 NO contact with overlapping	<p>Ex 95 WHLM UE</p>
2 NC contacts	<p>Ex 95 WHLM 20</p>



Ex position switches with/without safety function

// Series Ex 95, actuators

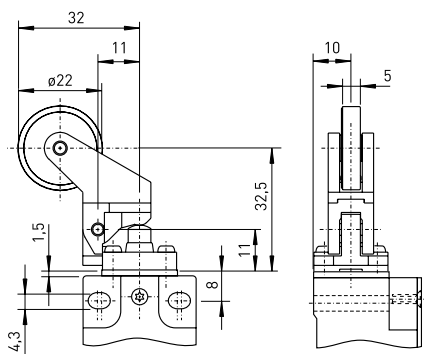
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$
- Actuation parallel to switch from left
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

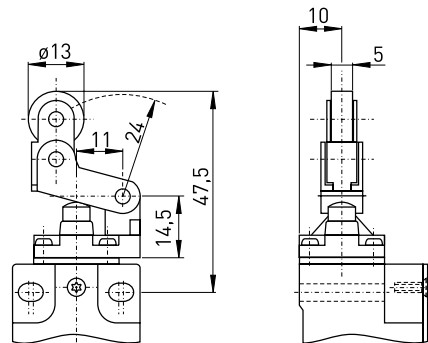
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$
- Actuator with watertight collar
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Actuation only possible from right-hand side
- Free movement of actuator from the other side
- Metal roller available on request

// Thermoplastic roller lever 4K



// Rocking roller lever WHKM

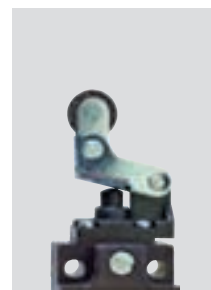
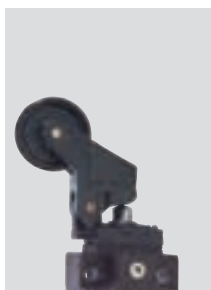


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 4K 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 95 4K UE
2 NC contacts	Ex 95 4K 2Ö

	Slow action
1 NC/1 NO contact	Ex 95 WHKM 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 95 WHKM UE
2 NC contacts	Ex 95 WHKM 2Ö



Features/Options

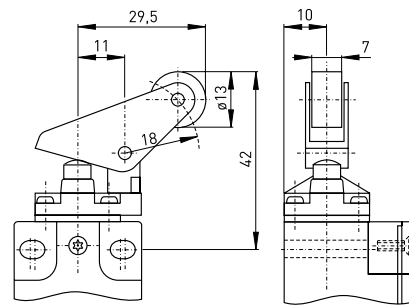
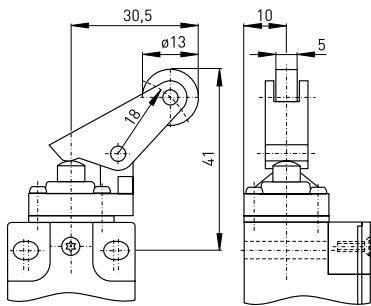
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Actuator with collar
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Actuator with collar
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

// Parallel roller lever WPH

// Metal parallel roller lever WPHM

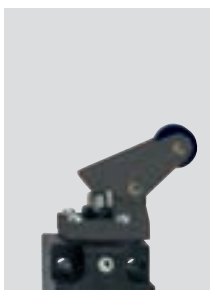


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	<p>Ex 95 WPH 1Ö/1S</p>
1 NC/1 NO contact with overlapping	<p>Ex 95 WPH UE</p>
2 NC contacts	<p>Ex 95 WPH 2Ö</p>

	Slow action
1 NC/1 NO contact	<p>Ex 95 WPHM 1Ö/1S</p>
1 NC/1 NO contact with overlapping	<p>Ex 95 WPHM UE</p>
2 NC contacts	<p>Ex 95 WPHM 2Ö</p>



Ex position switches with/without safety function

// Series Ex 95, actuators

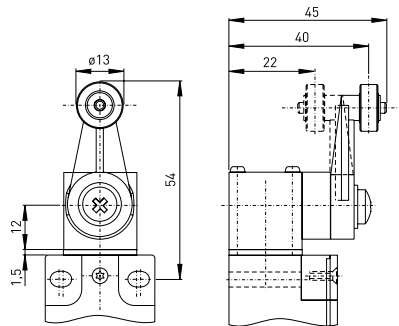
Features/Options

- Lever angle adjustable in 10° steps
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

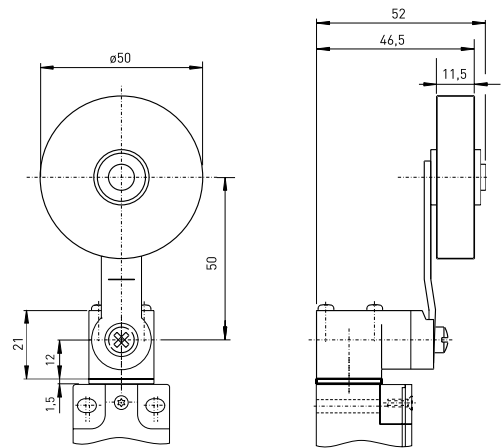
Features/Options

- Lever angle adjustable in 10° steps
- Actuator heads can be repositioned in 4 x 90° steps

// Rocking roller lever D



// Roller lever with rubber roller D50

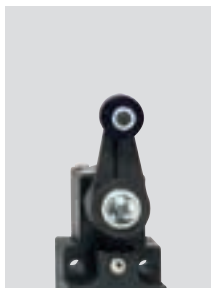


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 D 10/1S
1 NC/1 NO contact with overlapping	Ex 95 D UE
2 NC contacts	Ex 95 D 20

	Slow action
1 NC/1 NO contact	Ex 95 D50 10/1S
1 NC/1 NO contact with overlapping	Ex 95 D50 UE
2 NC contacts	Ex 95 D50 20



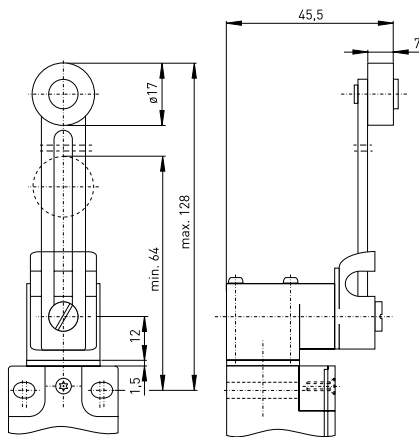
Features/Options

- No safety switch!
- Lever angle adjustable in 10° steps
- Length of roller lever adjustable
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Metal roller available on request

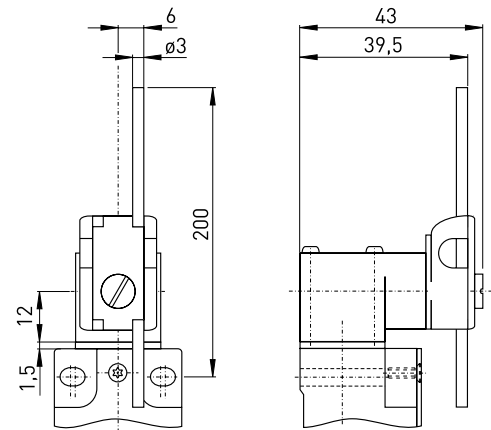
Features/Options

- No safety switch!
- Lever angle adjustable in 10° steps
- Actuator heads can be repositioned in 4 x 90° steps

// Adjustable-length roller lever DS



// Spring lever DD



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	<p>Ex 95 DS 10/1S</p>
1 NC/1 NO contact with overlapping	<p>Ex 95 DS UE</p>
2 NC contacts	<p>Ex 95 DS 20</p>

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	<p>Ex 95 DD 10/1S</p>
1 NC/1 NO contact with overlapping	<p>Ex 95 DD UE</p>
2 NC contacts	<p>Ex 95 DD 20</p>



Ex position switches with/without safety function

// Series Ex 95, actuators

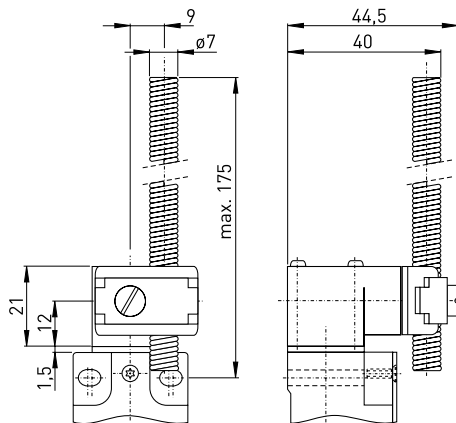
Features/Options

- No safety switch!
- Lever angle adjustable in 10° steps
- Actuator heads can be repositioned in 4 x 90° steps

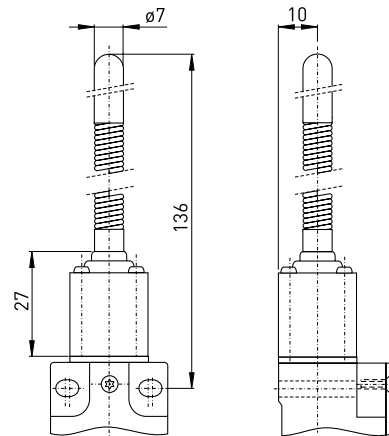
Features/Options

- No safety switch!
- Wear-resistant thermoplastic roller
- Spring rod can be actuated from any direction

// Wire lever DF



// Spring rod with plastic tip TK

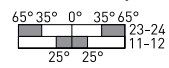


Contact variants: switch travel/contacts

Slow action

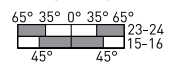
1 NC/1 NO contact

Ex 95 DF 1Ö/1S



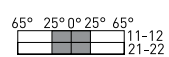
1 NC/1 NO contact with overlapping

Ex 95 DF UE



2 NC contacts

Ex 95 DF 2Ö

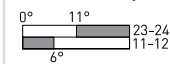


Contact variants: switch travel/contacts

Slow action

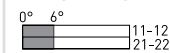
1 NC/1 NO contact

Ex 95 TK 1Ö/1S



2 NC contacts

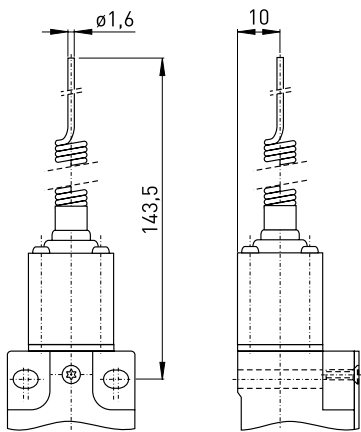
Ex 95 TK 2Ö



Features/Options

- No safety switch!
- Spring rod can be actuated from any direction

// Long spring rod TL



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	<p>Ex 95 TL 10/1S</p>
2 NC contacts	<p>Ex 95 TL 20</p>



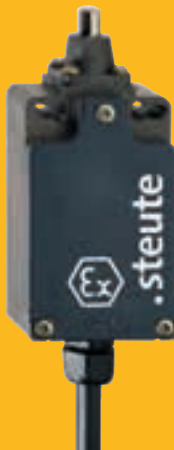
Ex position switches with/without safety function

// Series Ex T 356

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure with metal cover
- Mounting dimensions and switching points to EN 50041
- With pre-wired cable, cable length 2 metres
- Actuator heads can be repositioned in 4 x 90° steps
- Angle of offset roller lever can be adjusted in 10° steps
- Special version only for dust Ex zone 22 available

// EX T 356



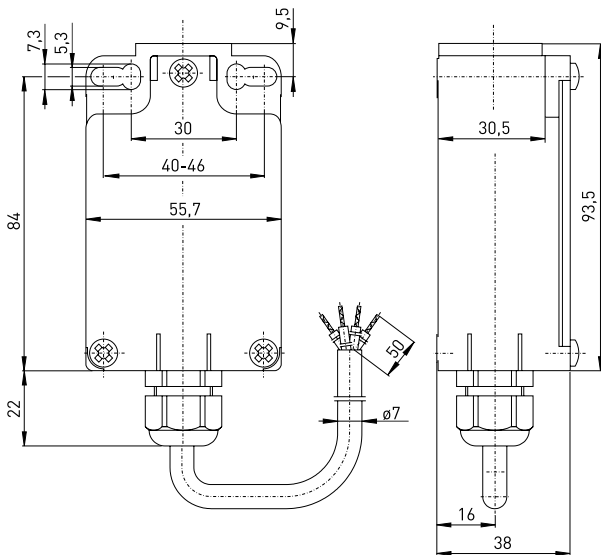
Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing
Cover	steel enamelled
Switch insert	Ex 13
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F, 4 x 0.75 mm ²
Cable length	2 or 5 m
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5 -20 °C ... +95 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 4.5 mm
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db

Approvals PTB 03 ATEX 1068 X*, IECEx PTB 06.0053 X



*referring to the switch insert



Type code

Ex T 356 S 1Ö/1S-2m-3D

Equipment Categ.
3D, dust Ex zone 22
Cable length 2 m, (5 m)
Contact type 1Ö/1S
Actuator S (R, 4VH, 4V7H, etc. ...)
Series
Ex certified component

Ex position switches with/without safety function

// Series Ex T 356, actuators

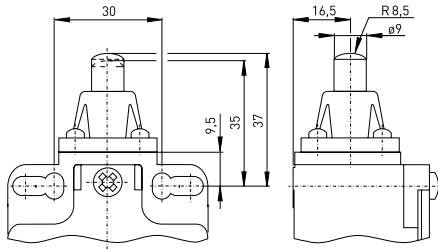
Features/Options

- Actuator type B to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 0^\circ$

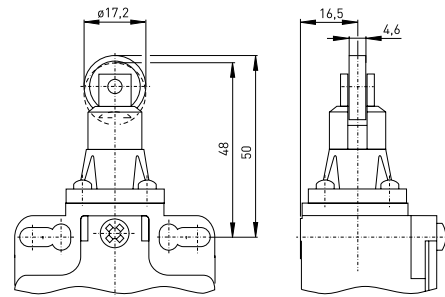
Features/Options

- Actuator type C to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$

// Plunger S



// Roller plunger R

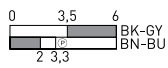


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex T 356 S 10/1S

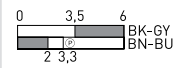


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex T 356 R 10/1S



Ex position switches with/without safety function

// Series Ex T 356, actuators

Features/Options

- Actuator type A to DIN EN 50 041
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

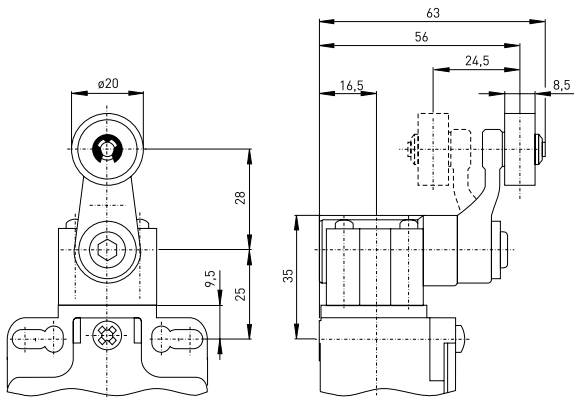
Features/Options

- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Safety switch \ominus , positive break, ordering suffix -2138

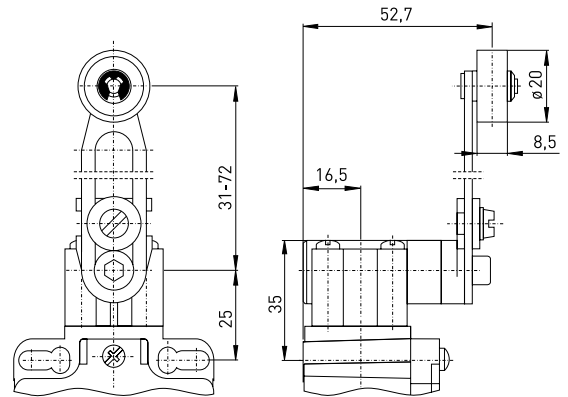
Note

Positive break angle \ominus only valid for Ex T4V7H 356 10/1S-2138

// Rocking roller lever 4VH



// Adjustable rocking lever 4V7H

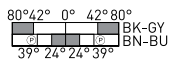


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex T 356 4VH 10/1S

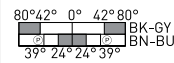


Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

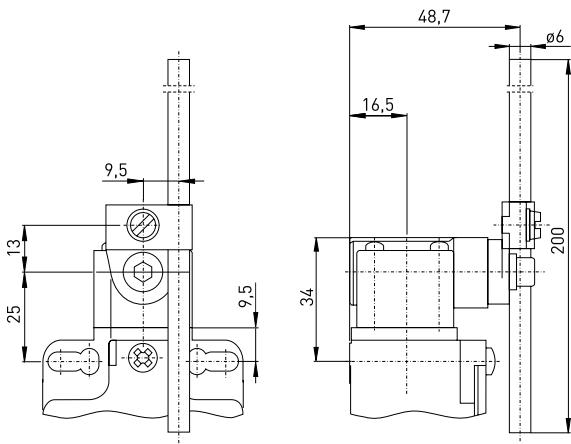
Ex T 356 4V7H 10/1S



Features/Options

- No safety switch!
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuator type D to EN 50041

// Rod lever 4V10H



Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact

Ex T 356 4V10H 10/1S

80°	42°	0°	42°	80°	BK-GY
39°	24°	24°	39°		BN-BU



Ex position switches with/without safety function

// Series Ex 12

Features/Options

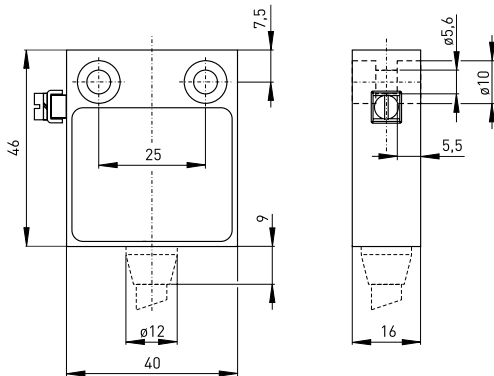
- No safety switch!
- Ex zone 1 and 21
- Metal enclosure
- No safety switch!
- Snap action, change-over contact with single break
- Suitable for in-line mounting
- With pre-wired cable, cable length 2 metres
- Special version only for dust Ex zone 22 available

// EX 12



Technical data

Standards	EN 60079-0, EN 60079-1, EN 60079-31
Enclosure	GD-AL alloy
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with single break
Switching system	snap action
Connection	cable H05VV-F, 4 x 0.75 mm ²
Cable length	2 or 5 m
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 5 A; T5: 3 A
Utilisation category	AC-15; DC-13
Ie/Ue	5 A/250 VAC; 0.16 A/230 VDC
Max. fuse rating	5 A gG/gN-fuse
Mechanical life	> 1 million operations
Switching frequency	1800/h
Ambient temperature	T6: -20 °C ... + 60 °C; T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1067 X, IECEx PTB 11.0089X



Type code

Ex 12 WKU-S-B-2 m-3D

- Ex certified component
- Series
- Watertight collar
- Actuator KU (H, TK, D, etc. ...)
- Cable on side
- Mounting thread M16 x 1.5
- Cable length 2 m, (5 m)
- dust Ex zone 22
- Equipment Categ. 3D,

Features/Options

- With gold-plated contacts available on request
- Available with hard-coated enclosure for use in aggressive conditions

// Cable on side

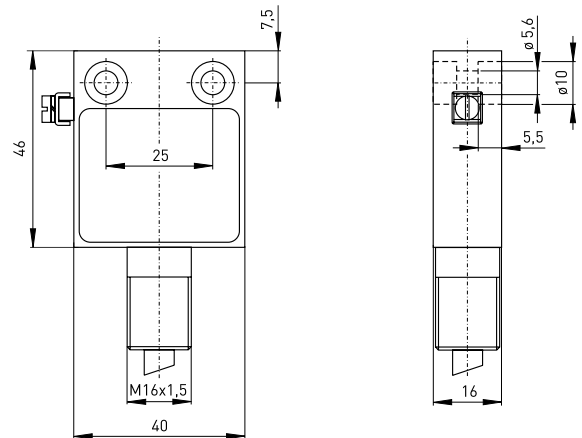
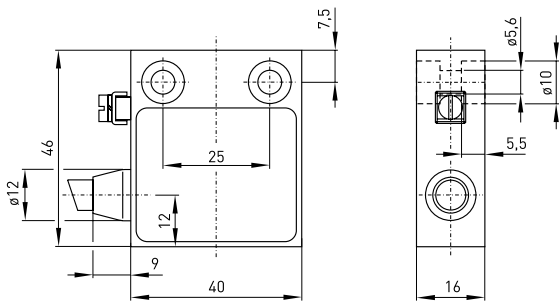


// Cable on side

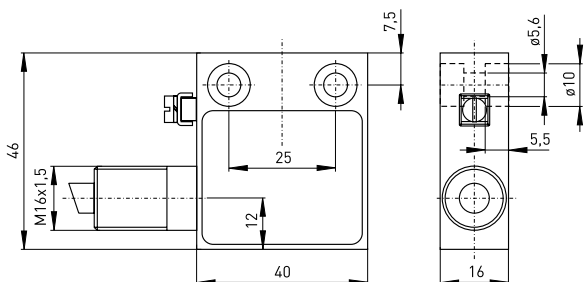
// Mounting thread M16 x 1.5



// Mounting thread M16 x 1.5



// Mounting thread on side M16 x 1.5



Ex position switches with/without safety function

// Series Ex 12, actuators

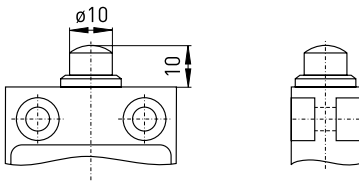
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 0°

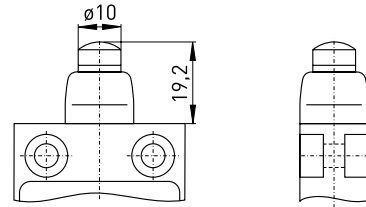
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 0°
- Collar to protect against the entry of foreign bodies

// Plunger



// Plunger with watertight collar W



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

1 change-over contact

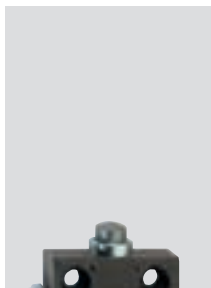
Ex 12



Snap action

1 change-over contact

Ex 12 W



Features/Options

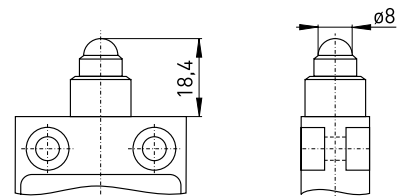
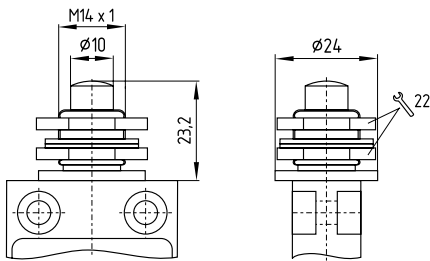
- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 0°

Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point

// Plunger for front mounting F

// Ball plunger KU



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

Snap action

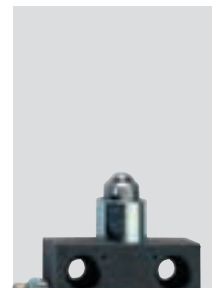
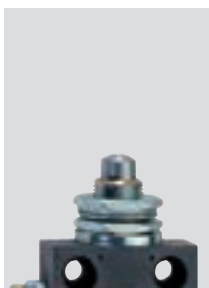
1 change-over contact

Ex 12 F



1 change-over contact

Ex 12 KU



Ex position switches with/without safety function

// Series Ex 12, actuators

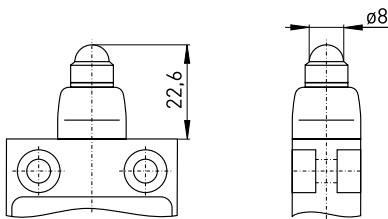
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 15°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Exact repeatability of switching point
- Collar to protect against the entry of foreign bodies

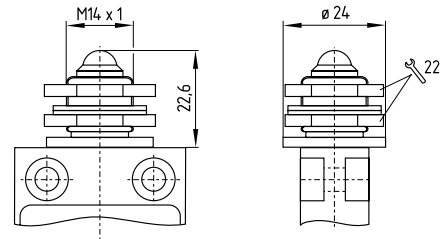
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 20°
- Can be actuated in line with or from side of switch axis
- Actuator head with captive stainless steel ball actuator
- Ball diameter 8 mm
- Exact repeatability of switching point

// Ball plunger with collar WKU



// Ball plunger front mounting FKU



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

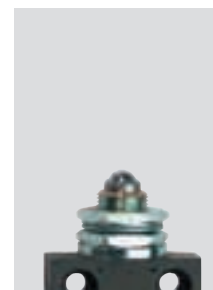
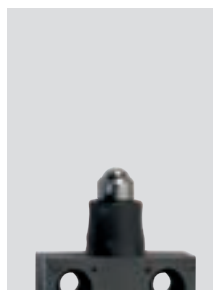
Snap action

1 change-over contact

1 change-over contact

Ex 12 WKU

Ex 12 FKU



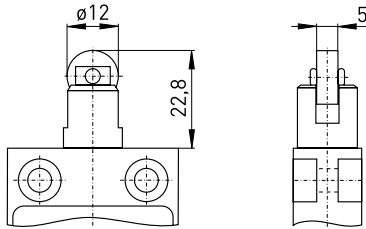
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 30°
- Metal roller
- Available with actuator repositioned by 90°

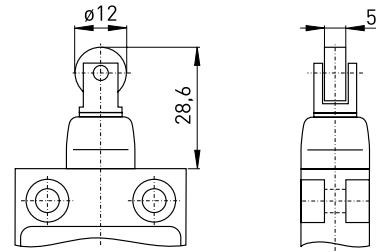
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 25°
- Metal roller
- Available with actuator repositioned by 90°
- Collar to protect against the entry of foreign bodies

// Roller plunger R



// Roller plunger collar WR



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

1 change-over contact

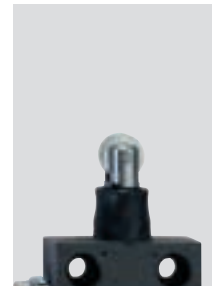
Ex 12 R



Snap action

1 change-over contact

Ex 12 WR



Ex position switches with/without safety function

// Series Ex 12, actuators

Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 25°
- Metal roller
- Available with actuator repositioned by 90°

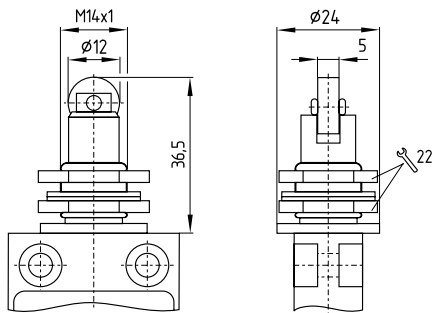
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

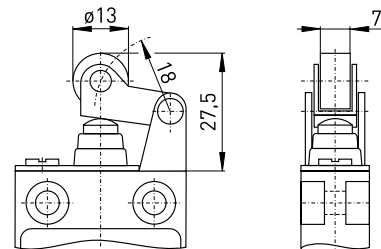
Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

// Roller plunger for front mounting FR



// Roller lever with collar WH



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

1 change-over contact

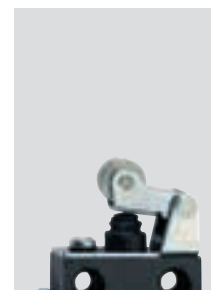
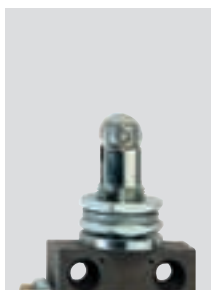
Ex 12 FR



Snap action

1 change-over contact

Ex 12 WH



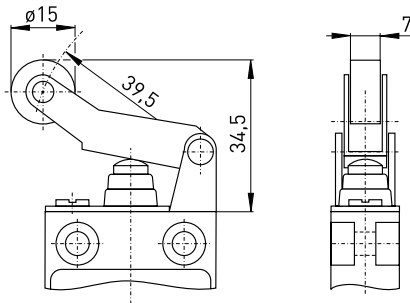
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

Features/Options

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

// Long roller lever with collar WHL

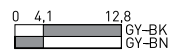


Contact variants: switch travel/contacts

Snap action

1 change-over contact

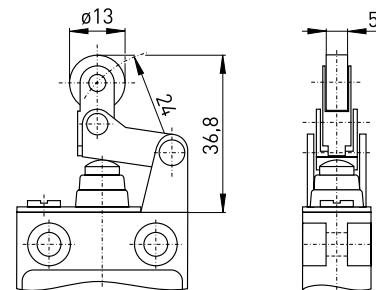
Ex 12 WHL



Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$
- Actuation only possible from right-hand side
- Free movement of actuator from the other side
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

// Rocking roller lever with collar WHK

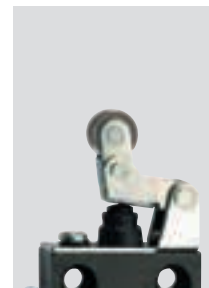
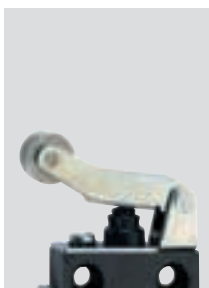


Contact variants: switch travel/contacts

Snap action

1 change-over contact

Ex 12 WHK



Ex position switches with/without safety function

// Series Ex 12, actuators

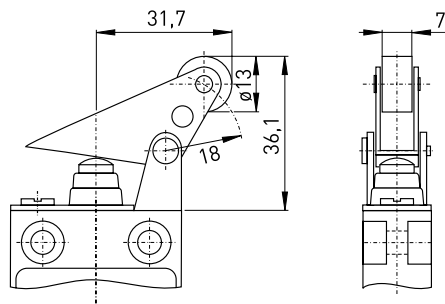
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to axis of switch from below
- Metal roller
- Available with actuator repositioned by 180°
- Collar to protect against the entry of foreign bodies
- With plastic roller available on request

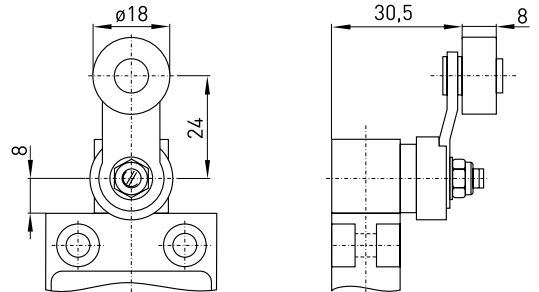
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

// Parallel roller lever with collar WPH



// Roller lever D



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

1 change-over contact

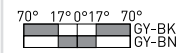
Ex 12 WPH



Snap action

1 change-over contact

Ex 12 D



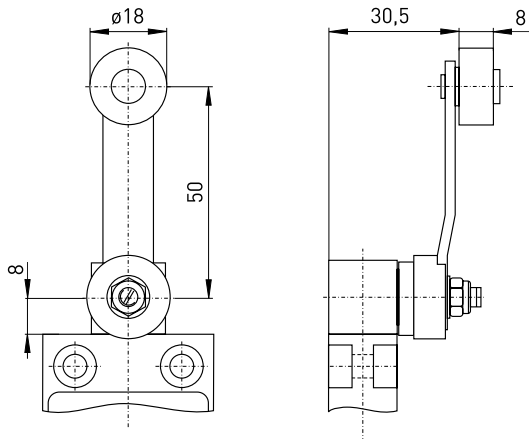
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

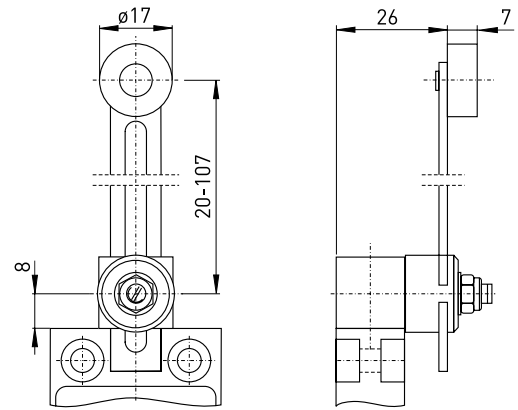
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

// Long roller lever DL



// Adjustable-length roller lever DS



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

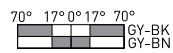
Snap action

Snap action

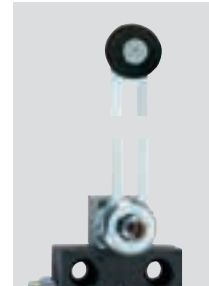
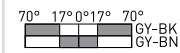
1 change-over contact

1 change-over contact

Ex 12 DL



Ex 12 DS



Ex position switches with/without safety function

// Series Ex 12, actuators

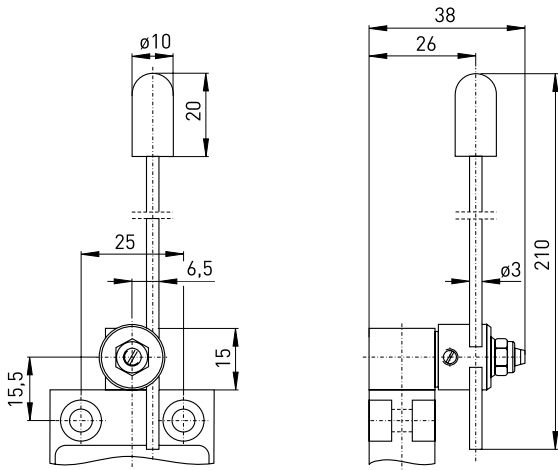
Features/Options

- No safety switch!
- Wear-resistant thermoplastic tip
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Available with actuator repositioned by 180°

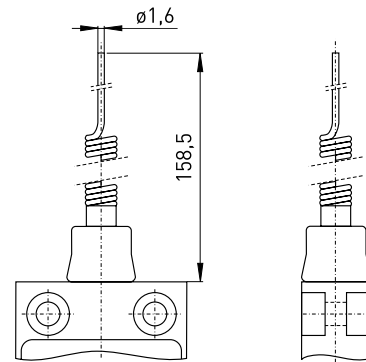
Features/Options

- No safety switch!
- Spring rod can be actuated from any direction
- Spring rod can be shortened 30 mm in actuating area
- Exact linear actuation not necessary
- Elasticity of spring allows for deflection above the max. switching angle of 18°

// Spring lever DD



// Long spring rod TL



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

1 change-over contact

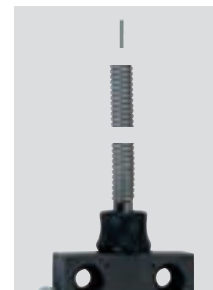
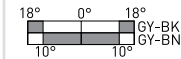
Ex 12 DD



Snap action

1 change-over contact

Ex 12 TL



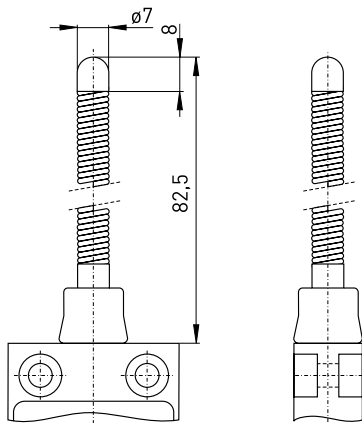
Features/Options

- No safety switch!
- With rounded steel tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 18°

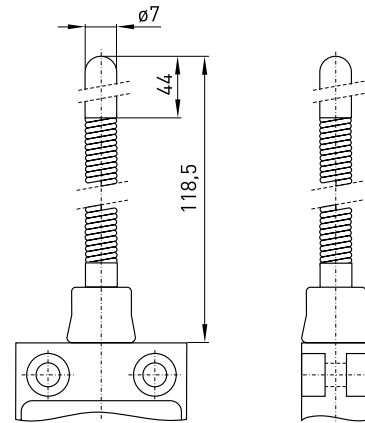
Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 18°

// Spring rod with rounded steel tip TF



// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Snap action

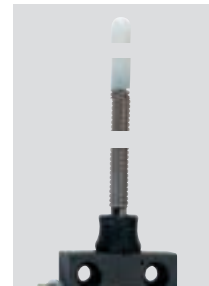
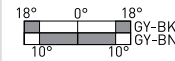
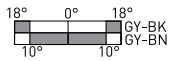
Snap action

1 change-over contact

1 change-over contact

Ex 12 TF

Ex 12 TK



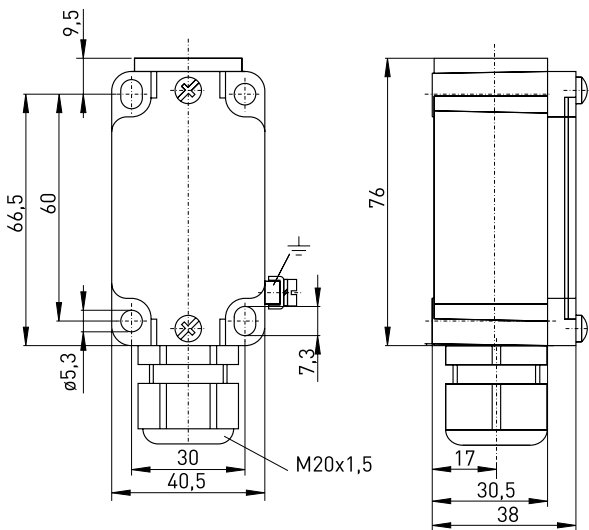
Ex position switches with/without safety function

// Series Ex 335

Features/Options

- Ex zone 1 and 21
- Design according to DIN EN 50041
- Available with contact overlapping
- Wiring compartment
- Actuator heads can be repositioned in 4 x 90° steps
- Angle of offset roller lever can be adjusted in 10° steps
- With gold-plated contacts available on request
- Special version only for dust Ex zone 22 available

// EX 335



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Design	DIN EN 50 041
Enclosure	zinc die-cast, enamelled
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 3.5 mm
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db

Approvals DMT 01 ATEX E 178, IECEx BVS 07.0014 X



Type code

Ex 335 S 1Ö/1S-3D

Equipment Categ. 3D, dust Ex zone 22
Contact type 1Ö/1S, (2Ö, UE)
Actuator S (R, 4VH, 4V7H-2138, etc.)
Series
Ex certified component

Ex position switches with/without safety function

// Series Ex 335, actuators

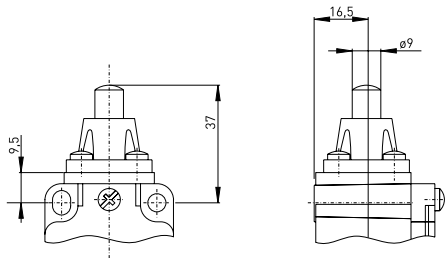
Features/Options

- Actuator type B to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 0^\circ$

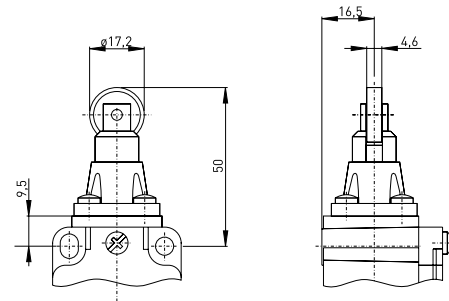
Features/Options

- Actuator type C to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$

// Plunger S



// Roller plunger R

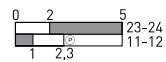


Contact variants: switch travel/contacts

Slow action

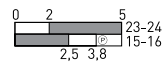
1 NC/1 NO contact

Ex 335 S 10/1S



1 NC/1 NO contact with overlapping

Ex 335 S UE



2 NC contacts

Ex 335 S 20

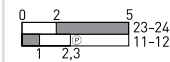


Contact variants: switch travel/contacts

Slow action

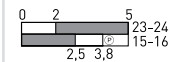
1 NC/1 NO contact

Ex 335 R 10/1S



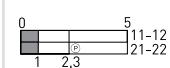
1 NC/1 NO contact with overlapping

Ex 335 R UE



2 NC contacts

Ex 335 R 20



Ex position switches with/without safety function

// Series Ex 335, actuators

Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from right
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

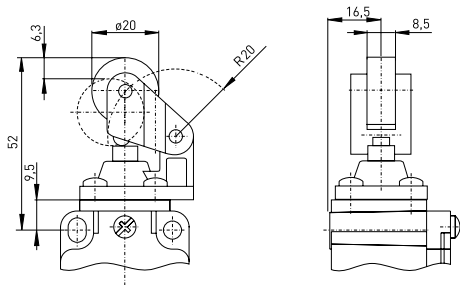
Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

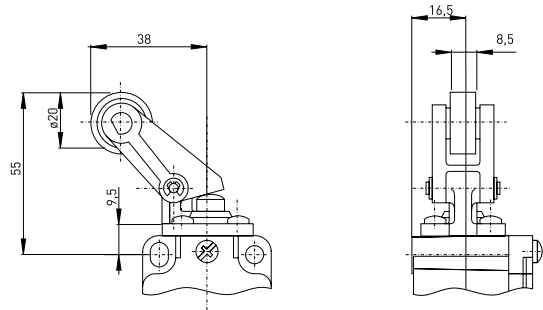
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

// Roller lever 1K



// Angled roller lever 3K



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Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 335 1K 10/1S
1 NC/1 NO contact with overlapping	Ex 335 1K UE
2 NC contacts	Ex 335 1K 20

	Slow action
1 NC/1 NO contact	Ex 335 3K 10/1S
1 NC/1 NO contact with overlapping	Ex 335 3K UE
2 NC contacts	Ex 335 3K 20



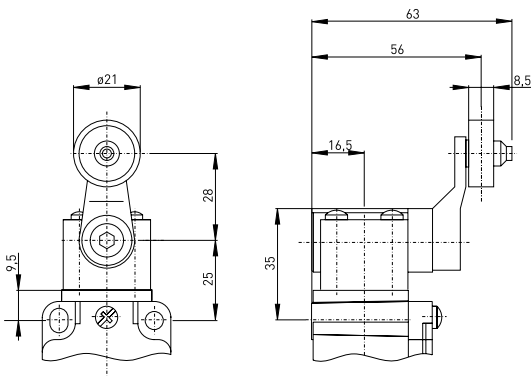
Features/Options

- Actuator type A to DIN EN 50 041
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

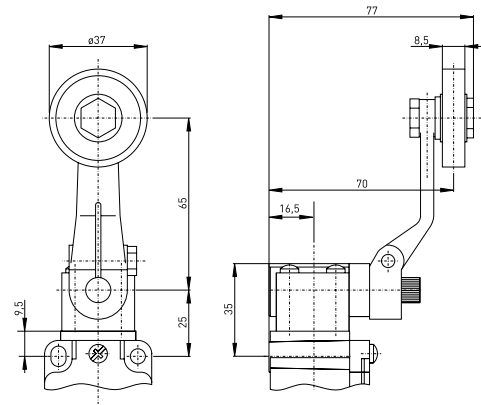
Features/Options

- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

// Rocking roller lever 4VH



// Long rocking roller lever 4V3H



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	<p>Ex 335 4VH 1Ö/1S</p> <p>85° 25°0'25° 85° </p>
1 NC/1 NO contact with overlapping	<p>Ex 335 4VH UE</p> <p>85° 20°0'20° 85° </p>
2 NC contacts	<p>Ex 335 4VH 2Ö</p> <p>85° 30° 0° 30° 85° </p>

	Slow action
1 NC/1 NO contact	<p>Ex 335 4V3H 1Ö/1S</p> <p>85° 25°0'25° 85° </p>
1 NC/1 NO contact with overlapping	<p>Ex 335 4V3H UE</p> <p>85° 20°0'20° 85° </p>
2 NC contacts	<p>Ex 335 4V3H 2Ö</p> <p>85° 30° 0° 30° 85° </p>



Ex position switches with/without safety function

// Series Ex 335, actuators

Features/Options

- No safety switch!
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Safety switch \ominus , positive break, ordering suffix -2138

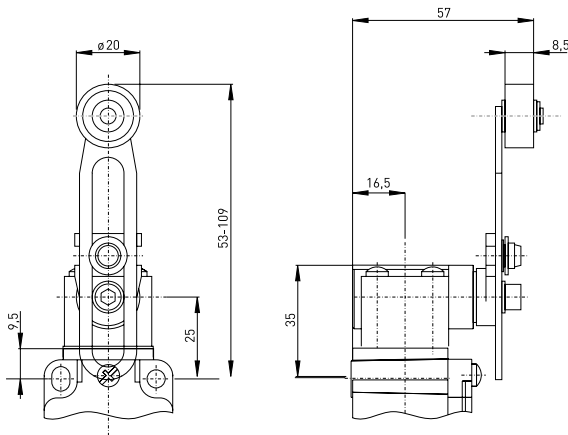
Note

Positive break angle \ominus only valid for Ex T4V7H 356 10/1S-2138

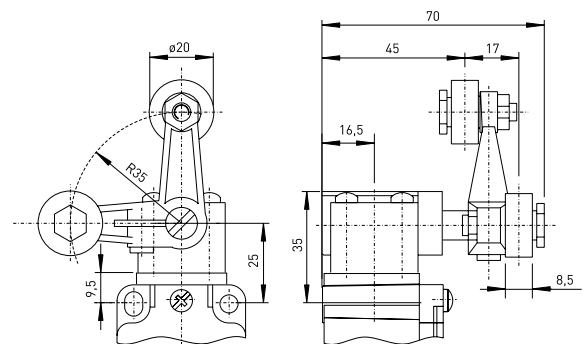
Features/Options

- No safety switch!
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

// Adjustable rocking lever 4V7H



// Forked lever latching 3V4D

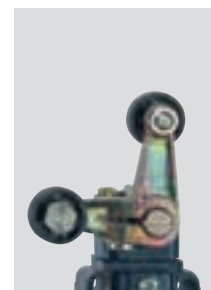
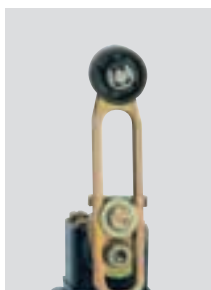


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 335 4V7H 10/1S
1 NC/1 NO contact with overlapping	Ex 335 4V7H UE
2 NC contacts	Ex 335 4V7H 20

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 335 3V4D 10/1S
1 NC/1 NO contact with overlapping	Ex 335 3V4D UE
2 NC contacts	Ex 335 3V4D 20



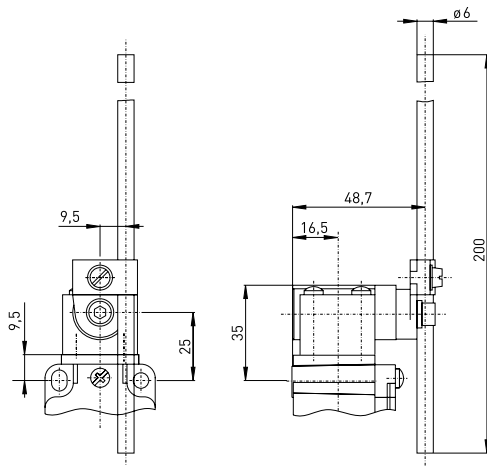
Features/Options

- No safety switch!
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuator type D to EN 50041

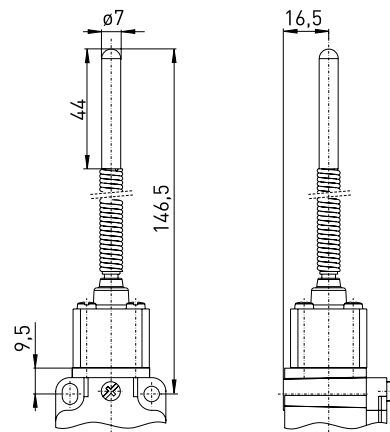
Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 12°

// Rod lever 4V10H



// Spring rod with plastic tip TK



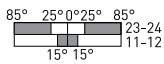
Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Slow action

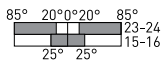
1 NC/1 NO contact

Ex 335 4V10H 10/1S



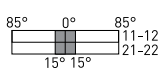
1 NC/1 NO contact with overlapping

Ex 335 4V10H UE



2 NC contacts

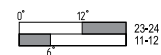
Ex 335 4V10H 2Ö



Slow action

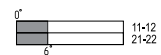
1 NC/1 NO contact

Ex 335 TK 10/1S



2 NC contacts

Ex 335 TK 2Ö



Ex position switches with/without safety function

// Series Ex 355

Features/Options

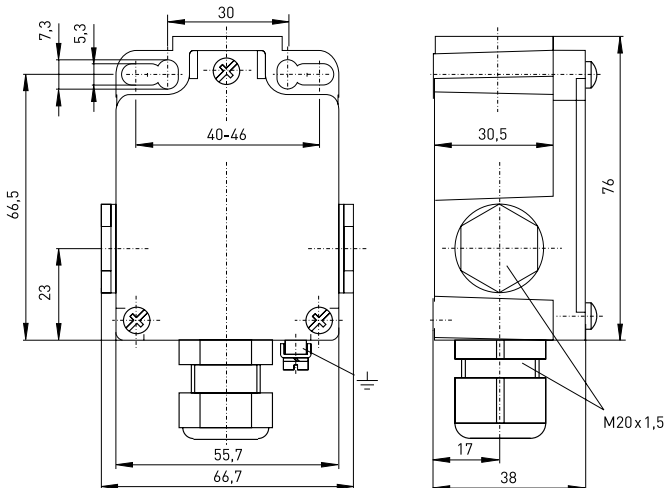
- Ex zone 1 and 21
- Mounting and switching details to EN 50041
- 3 cable entries
- Actuating elements can be repositioned by $4 \times 90^\circ$
- Rocking lever can be positioned in 10° steps
- With gold-plated contacts available on request
- Special version only for dust Ex zone 22

// EX 355



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Design	mounting dimensions and switching points to DIN EN 50 041
Enclosure	zinc die-cast, enamelled
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact \ominus
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 3.5 mm
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	BVS 04 ATEX E 126, IECEx BVS 07.0013



Type code

Ex 355 S 1Ö/1S-3D

Equipment Categ. 3D, dust Ex zone 22
Contact type 1Ö/1S, (2Ö, UE)
Actuator S (R, 4VH, 4V7H-2138, etc.)
Series
Ex certified component

Ex position switches with/without safety function

// Series Ex 355, actuators

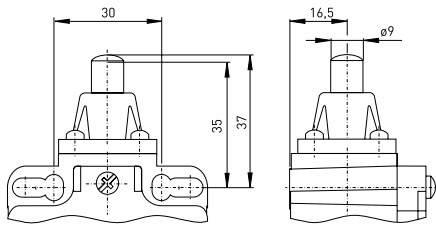
Features/Options

- Actuator type B to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 0^\circ$

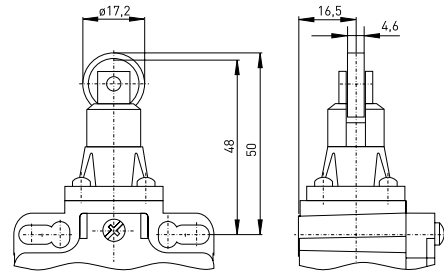
Features/Options

- Actuator type C to DIN EN 50 041
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$

// Plunger S



// Roller plunger R



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 S 10/1S
1 NC/1 NO contact with overlapping	Ex 355 S UE
2 NC contacts	Ex 355 S 20

	Slow action
1 NC/1 NO contact	Ex 355 R 10/1S
1 NC/1 NO contact with overlapping	Ex 355 R UE
2 NC contacts	Ex 355 R 20



Ex position switches with/without safety function

// Series Ex 355, actuators

Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from right
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

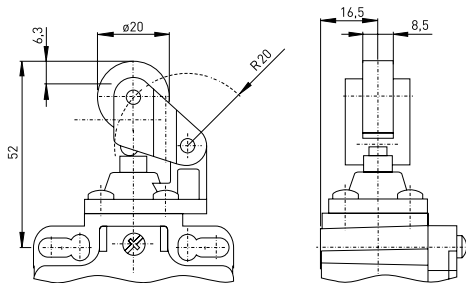
Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

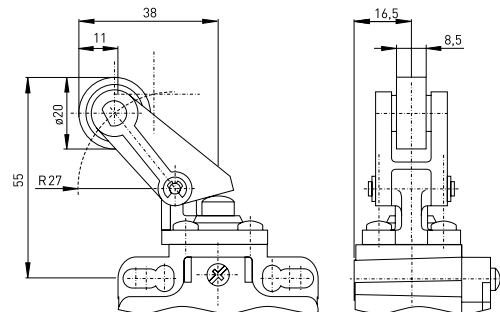
Features/Options

- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

// Roller lever 1K



// Angled roller lever 3K

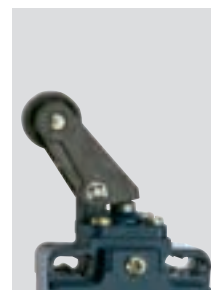
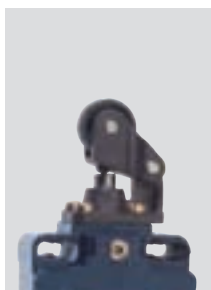


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 1K 10/1S
1 NC/1 NO contact with overlapping	Ex 355 1K UE
2 NC contacts	Ex 355 1K 20

	Slow action
1 NC/1 NO contact	Ex 355 3K 10/1S
1 NC/1 NO contact with overlapping	Ex 355 3K UE
2 NC contacts	Ex 355 3K 20



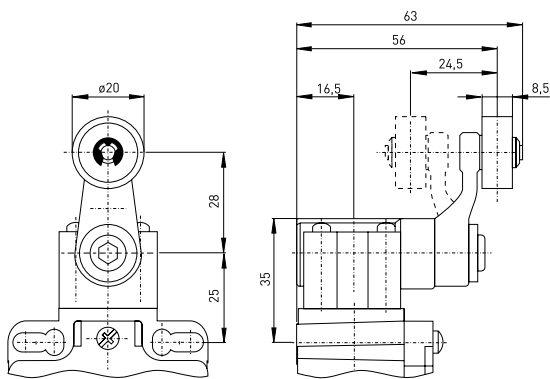
Features/Options

- Actuator type A to DIN EN 50 041
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

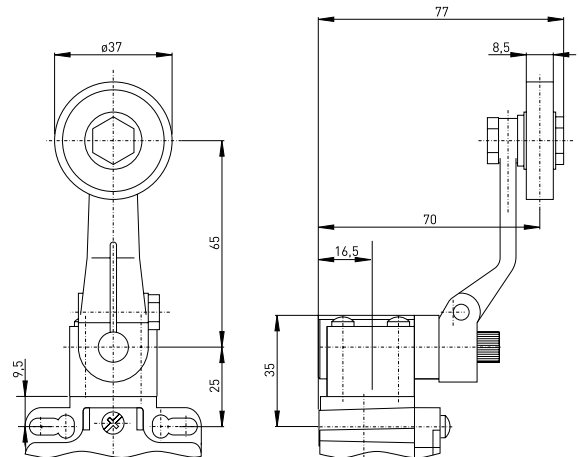
Features/Options

- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

// Rocking roller lever 4VH



// Long rocking roller lever 4V3H



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 4VH 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 355 4VH UE
2 NC contacts	Ex 355 4VH 2Ö

	Slow action
1 NC/1 NO contact	Ex 355 4V3H 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 355 4V3H UE
2 NC contacts	Ex 355 4V3H 2Ö



Ex position switches with/without safety function

// Series Ex 355, actuators

Features/Options

- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps
- Safety switch \ominus , positive break, ordering suffix -2138

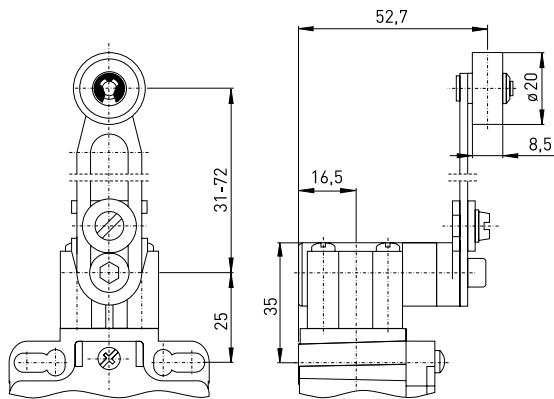
Note

Positive break angle \ominus only valid for Ex T4V7H 356 1Ö/1S-2138

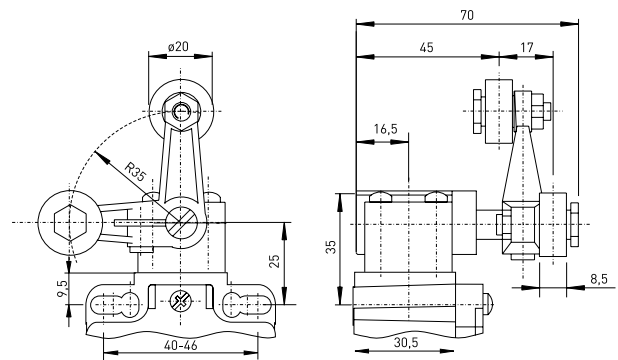
Features/Options

- No safety switch!
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in 4 x 90° steps

// Adjustable rocking lever 4V7H



// Forked lever latching 3V4D

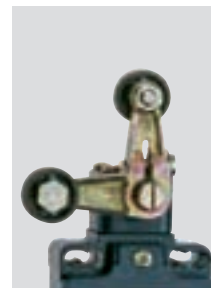
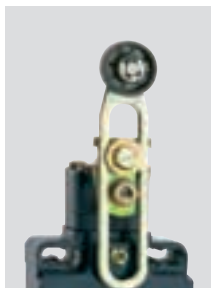


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 4V7H 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 355 4V7H UE
2 NC contacts	Ex 355 4V7H 2Ö

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 355 3V4D 1Ö/1S
1 NC/1 NO contact with overlapping	Ex 355 3V4D UE
2 NC contacts	Ex 355 3V4D 2Ö



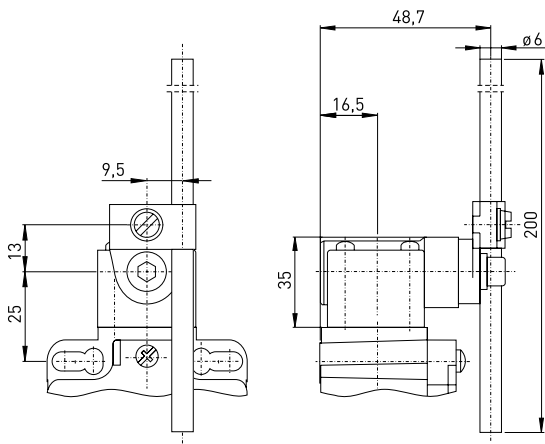
Features/Options

- No safety switch!
- Actuating speed 2.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuator type D to EN 50041

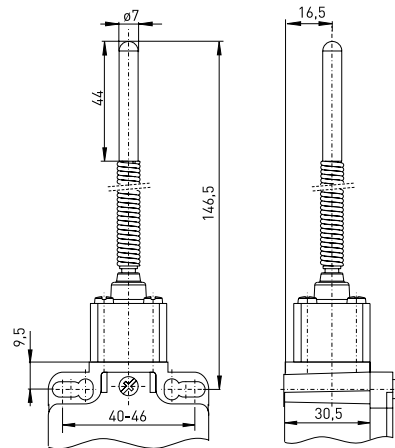
Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle of 12°

// Rod lever 4V10H



// Spring rod with plastic tip TK



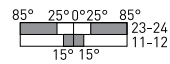
Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Slow action

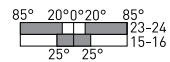
1 NC/1 NO contact

Ex 355 4V10H 10/1S



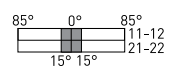
1 NC/1 NO contact with overlapping

Ex 355 4V10H UE



2 NC contacts

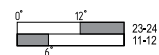
Ex 355 4V10H 2Ö



Slow action

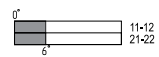
1 NC/1 NO contact

Ex 355 TK 10/1S



2 NC contacts

Ex 355 TK 2Ö



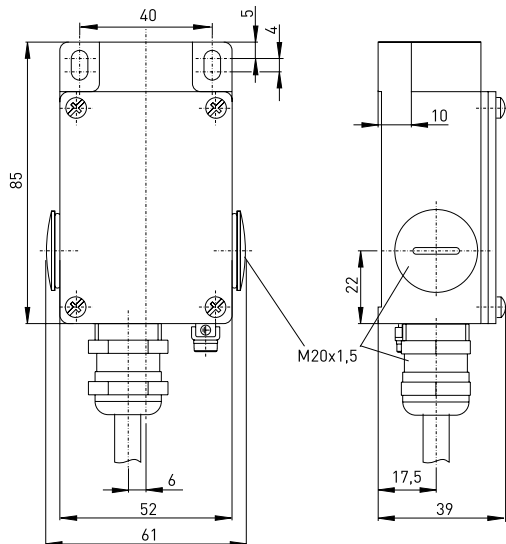
Ex position switches with/without safety function

// Series Ex/ExM 61

Features/Options

- Ex zone 1 and 21
- Safety switch only version with slow action
- Metal enclosure
- With pre-wired cable, cable length 3 metres
- Available with actuator heads repositioned by 4 x 90°

// EX/EXM 61



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamelled
Cover	steel, enamelled
Switch insert	Ex 14, ExM 14
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	snap or slow action, positive break NC contact ⊖
Switching elements	ExM 61: change-over contact with single break, Form C, Ex 61: change-over contact with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F, 3/4 x 0.75 mm ²
Cable length	3 m
B_{10d} (10 % load)	Ex 61: 2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... + 65 °C; T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Schaltfrequenz	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 4.5 mm
Ex marking	⊕ II 2G Ex d IIC T6/T5, II 2D Ex tb IIIC T80°C/T95°C IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C
Approvals	Ex 61: PTB 03 ATEX 1070 X*; IECEx PTB 06.0098 X* ExM 61: PTB 03 ATEX 1069 X*



*referring to the switch insert

Type code

ExM 61 W 1Ö/1S-3m	
ExM 61	Series
W	Actuator W (WH, WHL, WPH, etc. ...)
1Ö/1S	Contact type 1Ö/1S
3m	Cable length 3 m
	Snap action
	Ex certified component

Ex position switches with/without safety function

// Series Ex/ExM 61, actuators

Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 15°
- Exact repeatability of switching point
- Collar to protect against the entry of foreign bodies

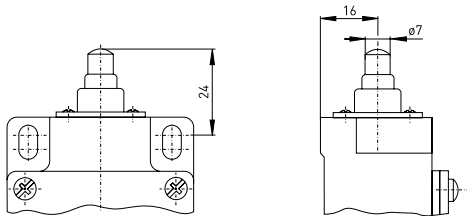
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Wear-resistant thermoplastic roller
- Available with actuator repositioned by $4 \times 90^\circ$
- Collar to protect against the entry of foreign bodies
- With metal roller available on request

Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

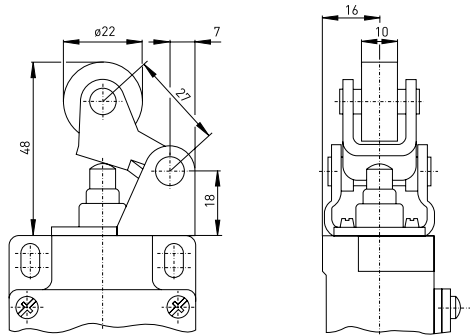
// Plunger W



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 W 	Ex 61 W 1Ö/1S

// Roller lever with collar WH



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 WH 	Ex 61 WH 1Ö/1S

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Ex position switches with/without safety function

// Series Ex/ExM 61, actuators

Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Wear-resistant thermoplastic roller
- Available with actuator repositioned by $4 \times 90^\circ$
- Collar to protect against the entry of foreign bodies
- With metal roller available on request

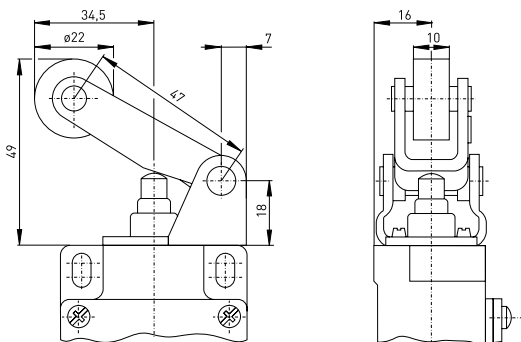
Note

Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

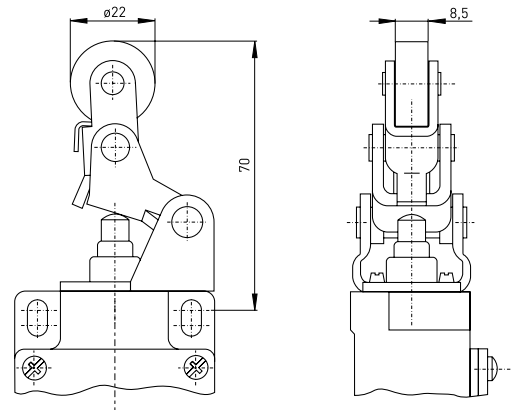
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of α and $\beta = 40^\circ$
- Actuation only possible from right-hand side
- Free movement of actuator from the other side
- Wear-resistant thermoplastic roller
- Actuator heads can be repositioned in $4 \times 90^\circ$ steps
- Collar to protect against the entry of foreign bodies
- With metal roller available on request

// Long roller lever with collar WHL



// Rocking roller lever WHK

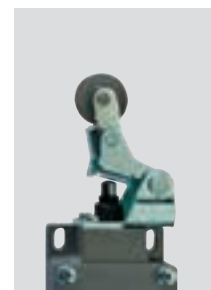


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 WHL 0 3,5 11,5 GY-BK GY-BN	Ex 61 WHL 10/1S 0 7 11,5 BK-GY BN-BU 3,5

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 WHK 0 2,5 7,5 GY-BK GY-BN	Ex 61 WHK 10/1S 0 5 7,5 BK-GY BN-BU 2,5



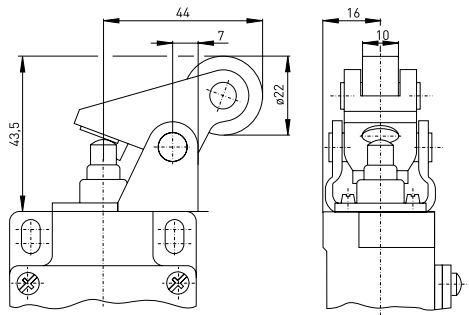
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of $\alpha = 30^\circ$
- Actuation parallel to switch from below
- Wear-resistant thermoplastic roller
- Available with actuator repositioned by $4 \times 90^\circ$
- Collar to protect against the entry of foreign bodies
- With metal roller available on request

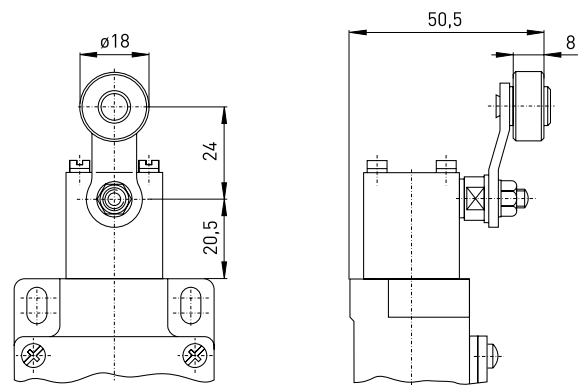
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

// Parallel roller lever with collar WPH



// Roller lever D



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 WPH 	Ex 61 WPH 10/1S

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 D 	Ex 61 D 10/1S



Ex position switches with/without safety function

// Series Ex/ExM 61, actuators

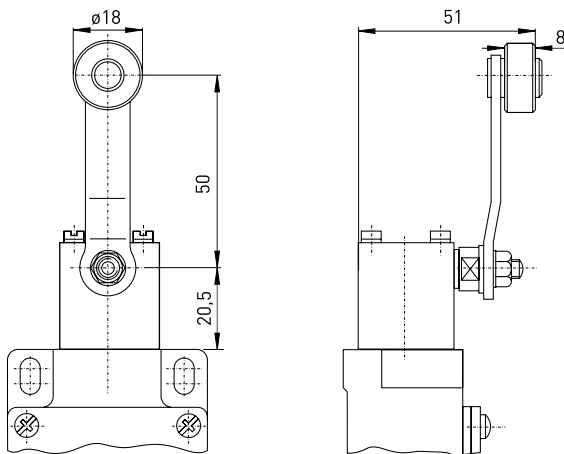
Features/Options

- Safety switch only version with slow action
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

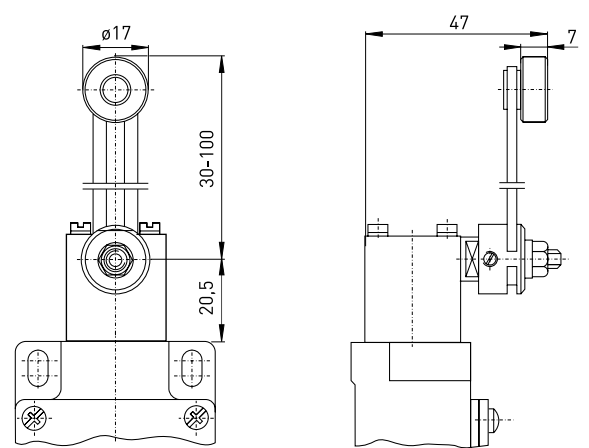
Features/Options

- No safety switch!
- Actuating speed 0.5 m/s with an actuating angle of 45°
- Wear-resistant thermoplastic roller
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°
- With metal roller available on request

// Long roller lever DL



// Adjustable-length roller lever DS



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 DL 70° 15° 0° 15° 70° GY-BK GY-BN	Ex 61 DL 1Ö/1S 70° 35° 0° 35° 70° BK-GY BN-BU 15° 15°

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 DS 70° 15° 0° 15° 70° GY-BK GY-BN	Ex 61 DS 1Ö/1S 70° 35° 0° 35° 70° BK-GY BN-BU 15° 15°



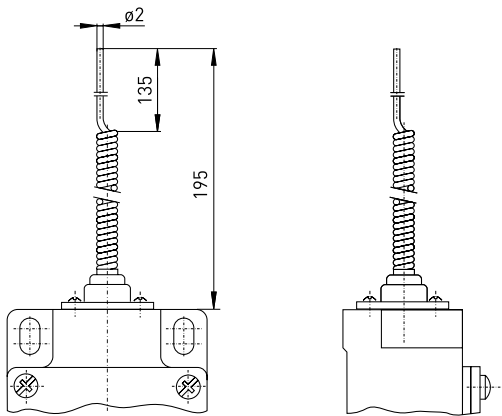
Features/Options

- No safety switch!
- Spring rod can be actuated from any direction
- Spring rod can be shortened 30 mm in actuating area
- Exact linear actuation not necessary
- Elasticity of spring allows for deflection above the max. switching angle

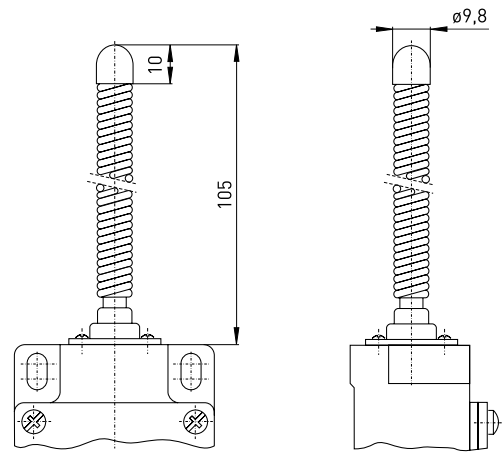
Features/Options

- No safety switch!
- With rounded steel tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle

// Long spring rod TL



// Spring rod with rounded steel tip TF



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 TL 	Ex 61 TL 10/1S

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 TF 	Ex 61 TF 10/1S



Ex position switches with/without safety function

// Series Ex/ExM 61, actuators

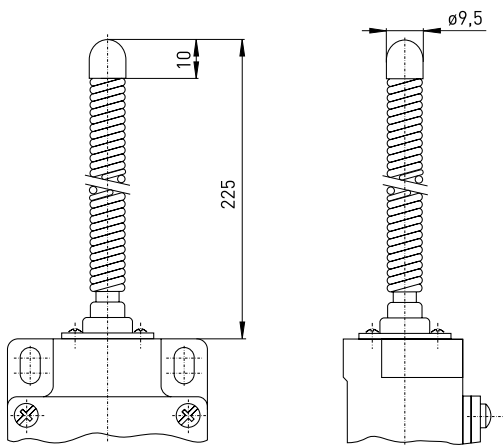
Features/Options

- No safety switch!
- With rounded steel tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle

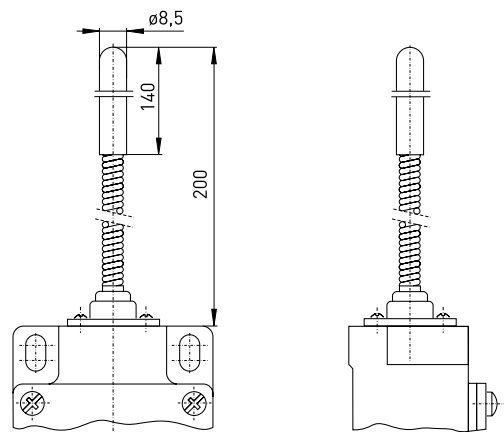
Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of spring allows for deflection above the max. switching angle

// Long spring rod rounded steel tip TFL



// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

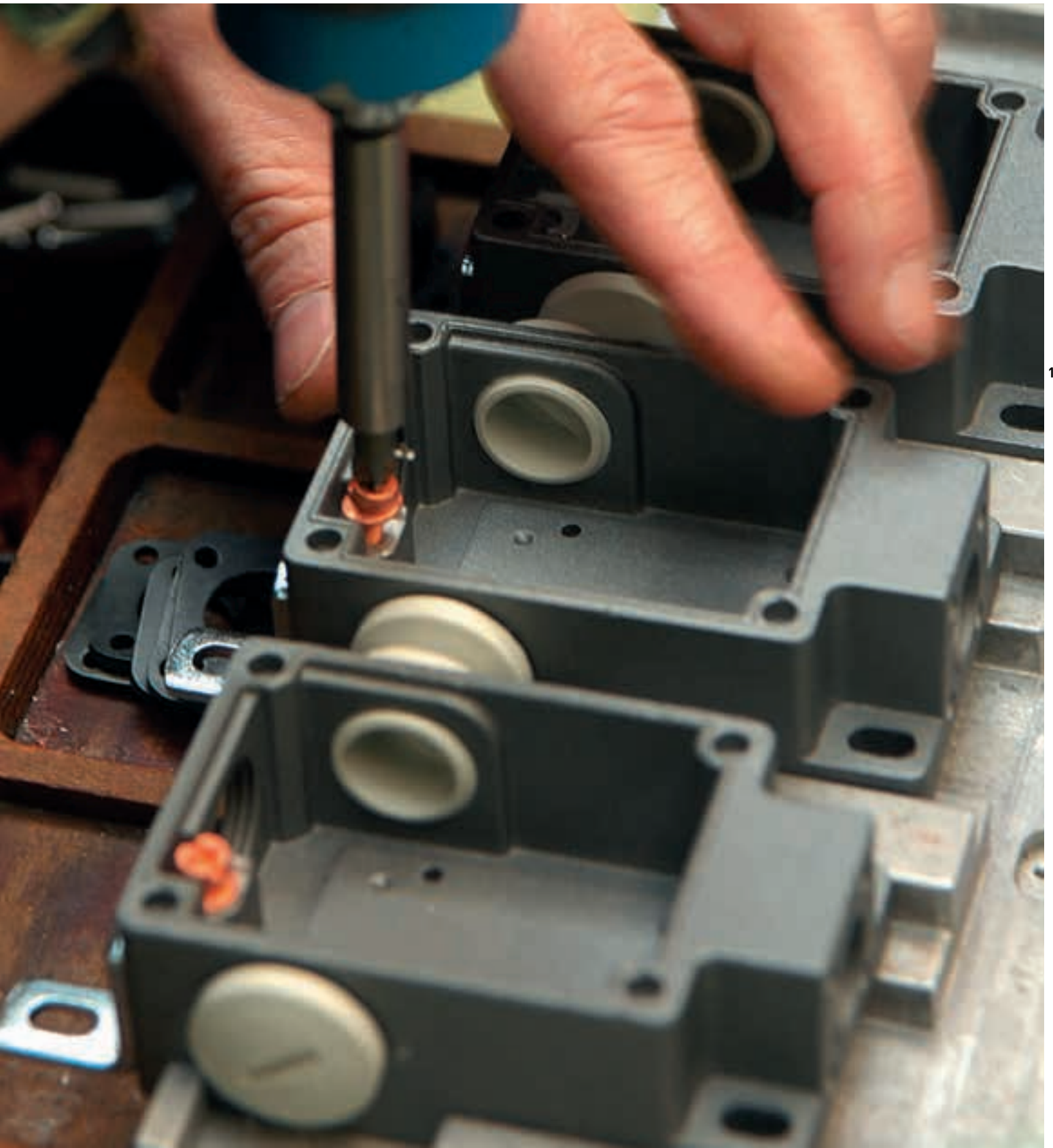
Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 TFL GY-BK GY-BN	Ex 61 TFL 1Ö/1S BK-GY BN-BU

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 TK GY-BK GY-BN	Ex 61 TK 1Ö/1S BK-GY BN-BU



PRODUCTION PROCESS ASSEMBLY
FIXING THE GROUND SCREW





Ex command devices



Thermoplastic enclosure

// Series Ex 14

from page 184

// Series Ex BF 80

from page 190



Ex command devices

Range of application

Ex command devices can be mounted in Ex»e«switchboards, control panels, two-hand control panels, directly on the machine enclosure and in the lift industry. On manual actuation, the devices start or terminate operating sequences and functional processes.

There are versions as push buttons, semi-rotary, key-operated and emergency stop switches. The emergency stop devices are wired in the safety circuit of machinery or plants. They fulfil the requirements of EN 60204-1.

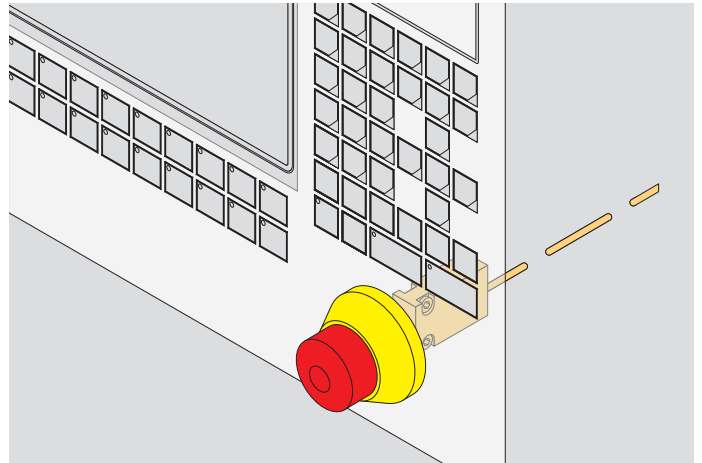
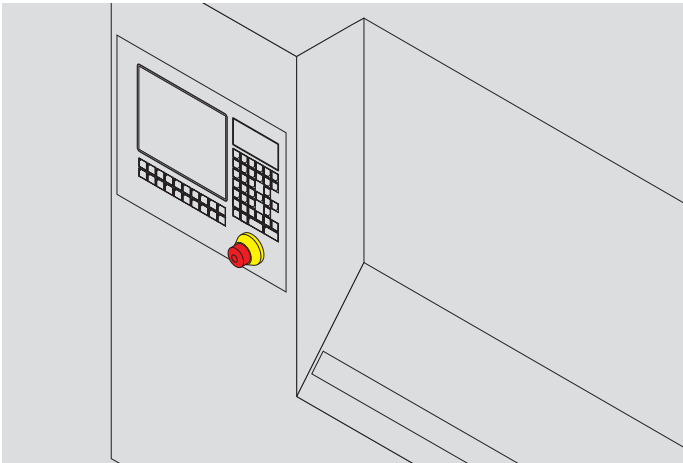
Design and operating principle

The Ex command devices are fit for \varnothing 22.5 mm mounting holes and suitable for spacings of 30 mm between centres. All Ex command devices provide IP 65 degree of protection and are double insulated for class II. The actuator is connected to the Ex 14 switch by a bayonet fastener. Available switching elements with slow action are: emergency-stop push-buttons, push-buttons with and without diaphragm, selectors, control switches and key-operated switches.

All Ex command devices shown in this chapter bear the CE mark according to the Low Voltage Directive 06/95/EC and the emergency-stop push-buttons according to the Machinery Directive 2006/42/EC, as well as to ATEX 94/9/EC. The Ex command devices per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Application

as emergency-stop push button in a switchboard



Ex command devices

// Series Ex 14

Features/Options

- Ex zone 1 and 21
- Double insulated □
- Mounting hole diameter 22.5 mm
- With pre-wired cable, cable length 1 metre
- Special version only for dust Ex zone 22

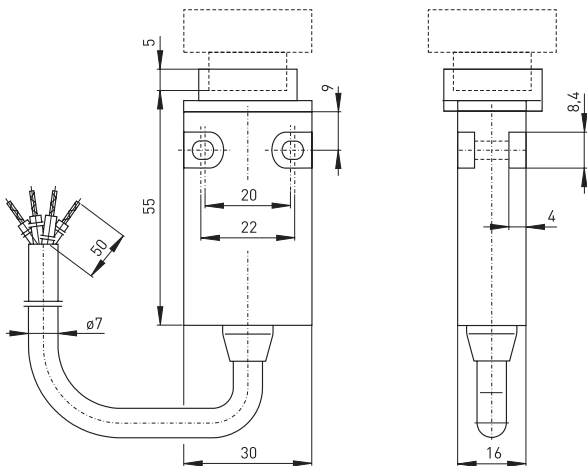
// EX 14



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F
Cable section	4 x 0.75mm ²
Cable length	1 m
B_{10d} (10 % load)	60 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
I_e/U_e	6 A/250 VAC; 0,25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +95 °C
Mechanical life	> 30 000 operations
Switching frequency	1800/h
Note	Switch must be protected from mechanical damage!
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1070 X, IECEx PTB 06.0098 X

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Type code

Ex 14 RUV 1Ö/1S-s-1m-3D

Equipment Categ. 3D,
dust Ex zone 22
Cable length 1 m
Cable entry on side
Contact type 1Ö/1S (2Ö only for RUV)
Actuator RUV (RT, RSSA, RW, etc. ...)
Series
Ex certified component

Ex command devices

// Series Ex 14, Actuator

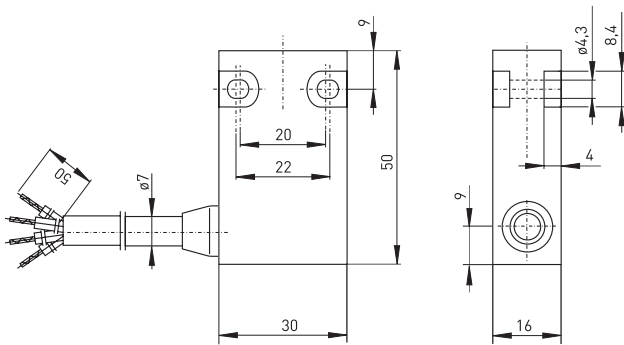
Features/Options

- Slow action with 2 NC contacts available
- With gold-plated contacts available on request
- With actuator made of stainless steel, ordering suffix -V2A
- Available with stainless steel actuators: push buttons, semi-rotary, key-operated or key-operated switches

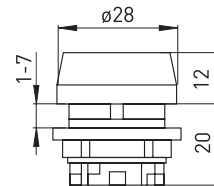
Features/Options

- With pre-wired cable, cable length 1 metre
- Protection class IP 65

// Cable on side



// Push button RT



// Ex 14 RT-V2A



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 14 RT

// Ex 14 RST-V2A



Ex command devices

// Series Ex 14, Actuator

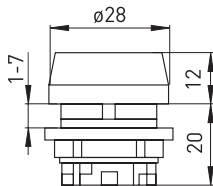
Features/Options

- Diaphragm of transparent silicon material
- IP 67 for actuators with diaphragm
- With pre-wired cable, cable length 1 metre
- Available with actuator made of stainless steel

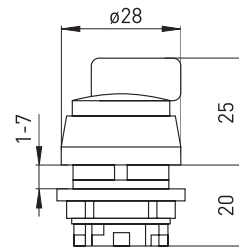
Features/Options

- Selector with rest positions
- Available in 3 different versions
- Protection class IP 65
- With pre-wired cable, cable length 1 metre
- Available with actuator made of stainless steel

// Push button with diaphragm RTM



// Selector RW



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Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 14 RTM

	Slow action
1 NC/1 NO contact	Ex 14 RW ...
2 switching positions Switching angle 90° 0 - I or I - II	Ex 14 RWA 0 - I Ex 14 RWA I - II
3 switching positions Switching angle -45° + 45° I - 0 - II	Ex 14 RWB I - 0 - II
Control switch actuated selector Left-hand side switching, right-hand side stroke Switching angle -45° + 45° I - 0 ← II	Ex 14 RWC I - 0 ← II



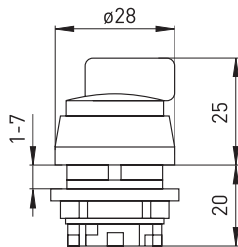
Features/Options

- RST with spring return
- Available in 2 different versions
- Protection class IP 65
- With pre-wired cable, cable length 1 metre
- Available with actuator made of stainless steel

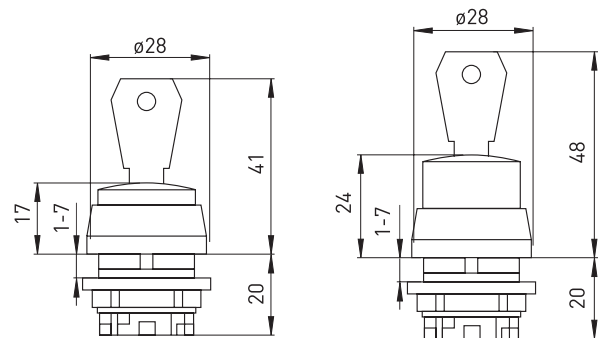
Features/Options

- RSSA key switch with safety cylinder lock (locks against turning)
- Normal version always has same key number
- Available in 9 different versions
- Up to 20 lock combinations available on request
- Protection class IP 65
- With pre-wired cable, cable length 1 metre
- Available with actuator made of stainless steel

// Control switch RST



// Key switch RSSA



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 14 RST ...
Switching angle 90° with return to left position, 0 ← I	Ex 14 RSTA 0 ← I
Switching angle -45° + 45° with return to central position I → 0 ← II	Ex 14 RSTB I → 0 ← II

Contact variants: switch travel/contacts

	Slow action	2 Schaltstellungen	3 Schaltstellungen
1 NC/1 NO contact	Ex 14 RSSA ... 		
Key switch		Ex 14 RSSA 14 	Ex 14 RSSA 12
		Ex 14 RSSA 15 	Ex 14 RSSA 13
		Ex 14 RSSA 17 	Ex 14 RSSA 23
		Ex 14 RSSA 18 	Ex 14 RSSA 24
		Ex 14 RSSA 27 	

Legend

- Switching position
- Spring return
- Position for key removal



Ex command devices

// Series Ex 14, Actuator

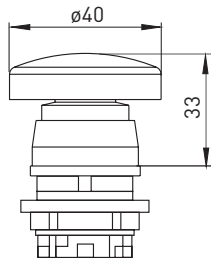
Features/Options

- Thermoplastic actuator
- Protection class IP 65
- With pre-wired cable, cable length 1 metre
- 1 NC and 1 NO contact, double break, type Zb or 2 NC contacts

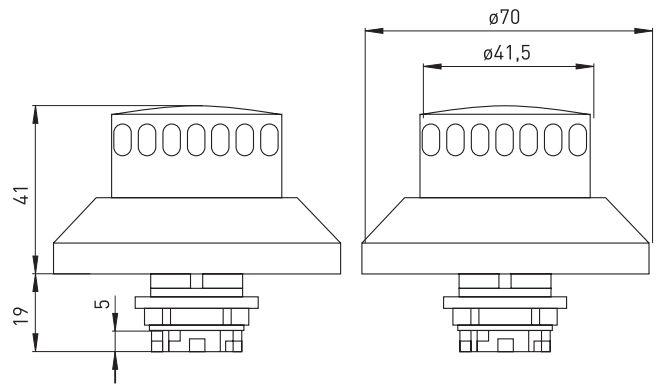
Features/Options

- Thermoplastic actuator
- according to EN ISO 13850
- 1 NC and 1 NO contact, double break, type Zb or 2 NC contacts
- Projection from front of panel 41 mm
- With collar to prevent blocking
- Reset by turning clockwise
- With pressure-point to protect against unintentional actuation
- Protection class IP 65
- With pre-wired cable, cable length 1 metre

// Push button RS SW



// Emergency-stop push button RUV



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 14 RS SW BK — GY BU — BN
2 NC contacts	Ex 14 RS SW 2Ö BK — GY BU — BN

	Slow action
1 NC/1 NO contact	Ex 14 RUV BK — GY BU — BN
2 NC contacts	Ex 14 RS RUV 2Ö BK — GY BU — BN



PRODUCTION PROCESS ASSEMBLY
ASSEMBLY OF CONTACT BRIDGES



Ex Command devices

// Series Ex BF 80

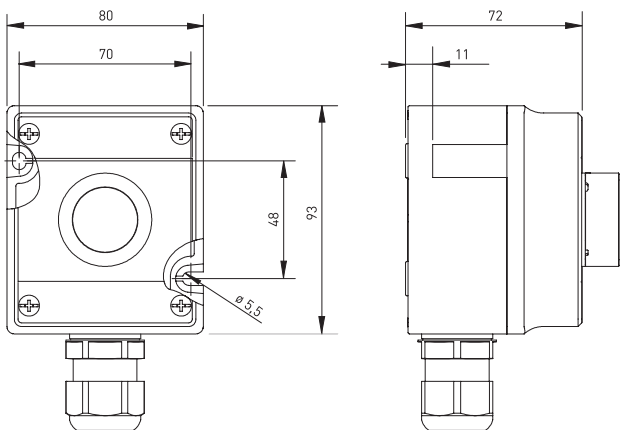
Features/options

- Ex zone 1 and 21
- Polyester resin enclosure
- PU foam gaskets
- Different actuating elements like push-buttons, selector- or key switches available
- Versions with two or three actuating elements available
- 3 enclosure sizes

// EX BF 80



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Technical Data

Standards	EN 60079-0, EN 60079-1, EN 60079-5, EN 60079-7, EN 60079-11, EN 60079-18; EN 61241-0, EN 61241-1; EN ISO 13849-1
Enclosure	Polyester resin (glass fibre-reinforced)
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action, positive break NC contacts
Connection	screw terminals, max. 6 mm ² (incl. conductor ferrules), serial/connection clamps max. 4 mm ²
Ambient temperature	T6: -40 °C ... +40 °C, T5: -40 °C ... +55 °C; - 50 °C ... + 60 °C on request
B_{10d} (10 % load)	6050
T_M	max. 20 years
Mechanical life	50 000 operations
Contact element	
I_e/U_e	23 A/500 V
Utilisation category	AC-1; DC-1
Rated operating current/voltage	6 A/690 VAC; 6 A/220 VDC
Control switch	
I_e/U_e	16 A/750 V
Utilisation category	AC-15; DC-13
Rated operating current/voltage	16 A/400 VAC; 16 A/110 VDC
Signalling device LM	
I_e/U_e	max. 16 A/750 V
Power consumption	max. 1.5 W
Ex marking	⊕ II 2G Ex edqm ia/ib [ia/ib] II, IIA, IIB, IIC, T6/T5/T4 II 2D Ex tD A21 IP65 T80°C, T95°C, T130°C
Approvals	PTB 10 ATEX 1018, IECEx in 2012

Type code

Ex BF 80 3 DT/DT/DT

Actuator DT (LDT, DDT, LM, WS, SLS, PZTNA)
3 enclosure (1=single, 2=double, 3=triple)
Series
Command device
Ex certified component

Ex Command devices

// Series Ex BF 80, actuators

Features/Options

- Three different sizes of enclosures available for 1, 2, or 3 actuators

// Emergency-stop push-button PZTNA



Features/Options

- With 1 NC/1 NO contact or 2 NC/1NO contacts
- Different diameters available: 38 mm or 55 mm

Diameter 38 mm

Ex BF 80 1 PZTNA 1Ö/1S 38 mm

Ex BF 80 1 PZTNA 2Ö/1S 38 mm

Order Number

6810053001

6810053002

Diameter 55 mm

Ex BF 80 1 PZT55NA 1Ö/1S 55 mm

Order Number

6810073001

// Emergency-stop push-button with key unlocking PZSTNA



Features/Options

- With 1 NC/1 NO contact
- Diameter 38 mm

Diameter 38 mm

Ex BF 80 1 PZSTNA 1Ö/1S 38 mm

Order Number

6810123001

// Black mushroom push-button PZDTSW



Features/Options

- Black mushroom push-button

Mushroom push-button

Ex BF 80 1 PZDTSW 1Ö/1S

Order Number

6810033001

// Push-button DT



Features/Options

- Push-buttons DT can be equipped with red 0 plate or green I plate

Push-button
Ex BF 80 1 DT 1Ö/1S

Order Number
6810013001

// Illuminated push-button LDT



Features/Options

- Colours: clear, red, yellow, green, blue

Illuminated push-button
Ex BF 80 1 LDT 1Ö/1S

Order Number
6810133004

// Double push-button DDT



Features/Options

- Double push-buttons DDT can be equipped with red 0 plate or green I plate
- Red push-button: 1 NC contact, green push-button: 1 NO contact

Double push-button
Ex BF 80 1 DDT 1Ö/1S

Order Number
6810113001

Ex Command devices
// Series Ex BF 80, actuators

// Signalling device LM



Features/Options

- All coloured filters included: clear, red, yellow, green, blue

Signalling device
Ex BF 80 1 LM LED

Order Number
6810143005

// Selector switch WS



Features/Options

- Two versions available: 0 - I and I - 0 - II

Version 0 - I
Ex BF 80 1 WS 0 - I 10/1S

Order Number
6810043001

Version I - 0 - II
Ex BF 80 1 WS I - 0 - II 1S/1S

Order Number
6810043003

// Key switch SLS



Features/Options

- Two versions available: 0 - I and I - 0 - II

Version 0 - I
Ex BF 80 1 SLS 0 - I 10/1S

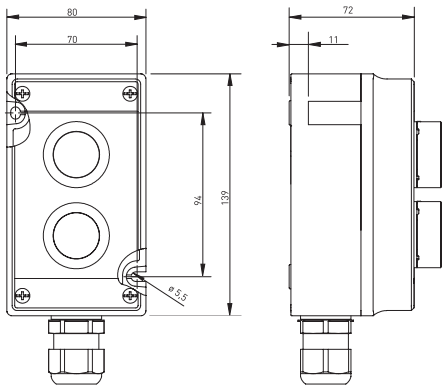
Order Number
6810083001

Version I - 0 - II
Ex BF 80 1 SLS I - 0 - II 1S/1S

Order Number
6810083003

Ex Command devices
// Series Ex BF 80, actuators

// Version with 2 push-buttons



Features/Options

- With 1 NC/1 NO contact per push-button

2 push-buttons
 Ex BF 80 2 DT/DT 1ÖS/1ÖS

Order Number
 6820223006

1 signalling device, 1 push-buttons
 Ex BF 80 2 LM/DT LED/1ÖS

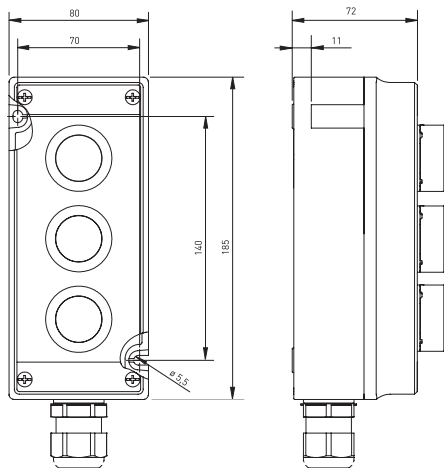
Order Number
 6820233007

1 signalling device, 1 double push-button
 Ex BF 80 2 LM/DDT LED/1ÖS

Order Number
 6820243007

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// Version with 3 push-buttons



Features/Options

- With 1 NC/1 NO contact per push-button

3 push-buttons
 Ex BF 80 3 DT/DT/DT 1ÖS/1ÖS1ÖS/

Order Number
 6830253008

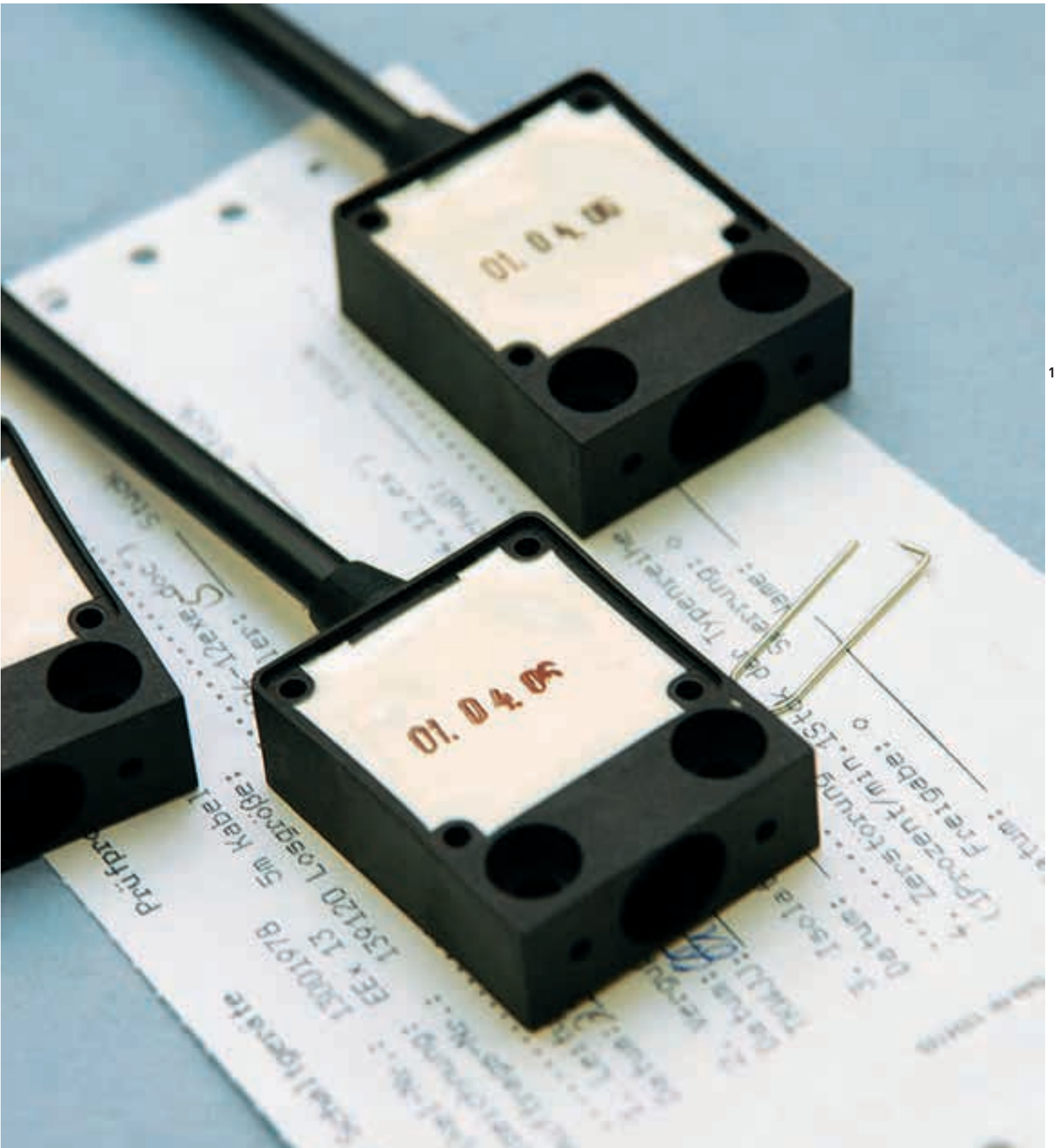
1 signalling device, 2 push-buttons
 Ex BF 80 3 LM/DT/DT LED/1ÖS/1ÖS

Order Number
 6830263009

1 signalling device, 1 double push-b., 1 e.-stop
 Ex BF 80 3 LM/DDT/PZSTNA 38mm LED/1ÖS/1ÖS

Order Number
 6830273009

PRODUCTION PROCESS
POTTED SWITCHES





Ex foot switches

Single-pedal types

// Series Ex GF

from page 200

// Series Ex GFS

from page 202

// Series Ex GFI

from page 204

// Series Ex GFSI

from page 205

Double-pedal types

// Series Ex GF 2

from page 206

// Series Ex GFS 2

from page 208

Triple-pedal types

// Series Ex GF 3

from page 210

// Series Ex GFS 3

from page 211



Ex foot switches

Range of application

Ex foot switches are mounted on machines and plants in cases where operation by hand is not possible. They are used to start and stop operations and production processes. Depending on the environmental conditions and mechanical duty, different versions of foot switches are used.

Design and operating principle

The Ex GFS and Ex GFSI range foot switches are mounted with a shield to protect against unintentional actuation.

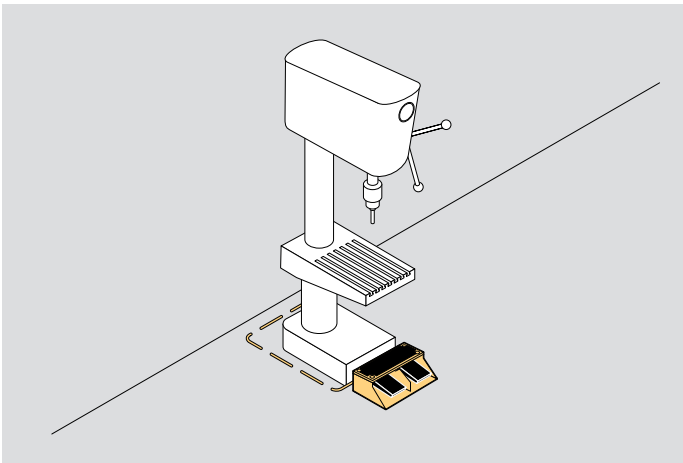
All Ex foot switches are equipped with slow or snap action contacts. They have IP 65 degree of protection.

All foot switches series Ex GF, Ex GFS, Ex GFI and Ex GFSI are Ex approved according to ATEX.

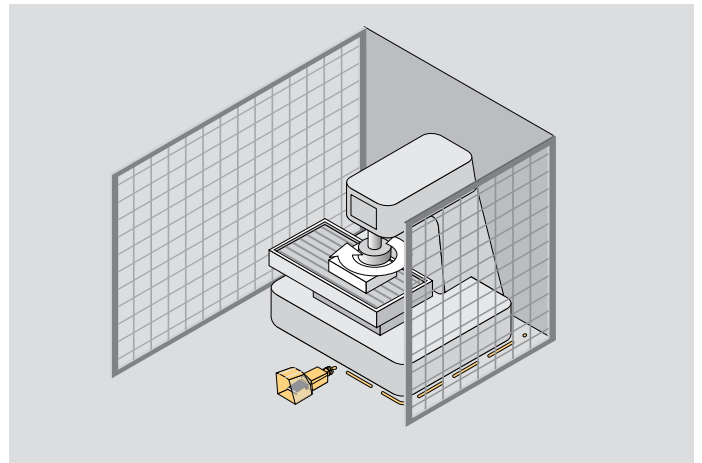
The foot switches bear the CE mark according to the Low Voltage Directive 06/95/EC and to ATEX 94/9/EC. The Ex foot switches per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Application

Foot switch on a drill machine



Foot switch on a CNC machining centre






Ex foot switches

// Series Ex GF

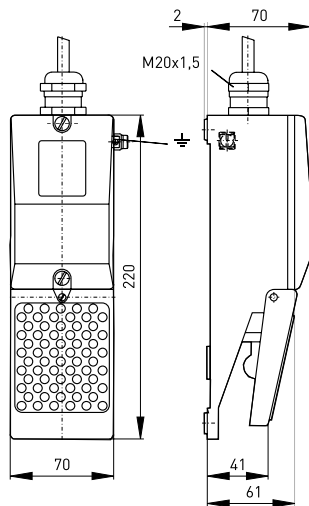
Features/Options

- Ex zone 1 and 21
- Single-pedal
- Metal enclosure
- Without protective shield
- Max. 2 contacts
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Cover	glass-fibre reinforced thermoplastic
Pedal	glass-fibre reinforced thermoplastic
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 1Ö/1S
B_{10d} (10 % load)	Ex GF: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0.16 A/230 VDC
Max. fuse rating	Ex GF: 6 A gG/gN-fuse Ex GFM: 5 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +60 °C; T5: -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEX Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GF: IECEx   

// EX GF



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Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	Ex GFM 1Ö/1S GY 23 → 24 BK BU 11 → 12 BN	Ex GF 1Ö/1S BN 11 → 12 BU BK 23 → 24 GY
1 change-over	Ex GFM BN → GY BK	

Type code

Ex GFM K 1Ö/1S-3D-3m

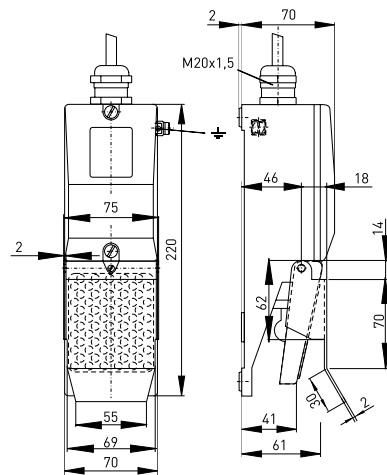
Cable length 3 m
Equipment Categ. 3D,
dust Ex zone 22
1 NC/1 NO contact
Pedal cover
M Snap action (without M slow action)
Series
Ex certified component

Ex foot switches
// Series Ex GF, variants

// Pedal cover K



// Pedal cover K






Ex foot switches

// Series Ex GFS

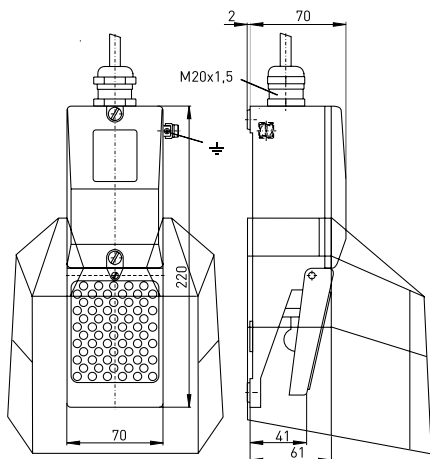
Features/Options

- Ex zone 1 and 21
- Single-pedal
- Metal enclosure
- With protective shield
- Max. 2 contacts
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Pedal	glass-fibre reinforced thermoplastic
Protective shield	aluminium die-cast, enamel finish, RAL 5011
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 10/1S
B_{10d} (10 % load)	Ex GFS: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0.16 A/230 VDC
Max. fuse rating	Ex GFS: 6 A gG/gN-fuse Ex GFSM: 5 A gG/gN-fuse
Ambient temperature	T ₆ : -20 °C ... +60 °C; T ₅ : -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GFS: IECEx   

// EX GFS




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Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	Ex GFSM 10/1S GY 23 → 24 BK BU 11 → 12 BN	Ex GFS 10/1S BN 11 → 12 BU BK 23 → 24 GY
1 change-over	Ex GFSM BN → GY BK	

Type code

Ex GFSM K 10/1S-3D-3m



Cable length 3 m
Equipment Categ. 3D,
dust Ex zone 22
1 NC/1 NO contact
Pedal cover
M Snap action (without M slow
action)
S Protective shield
Series
Ex certified component

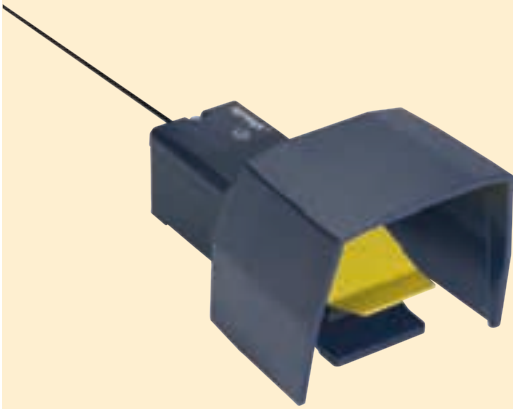
Ex foot switches

// Series Ex GFS, variants

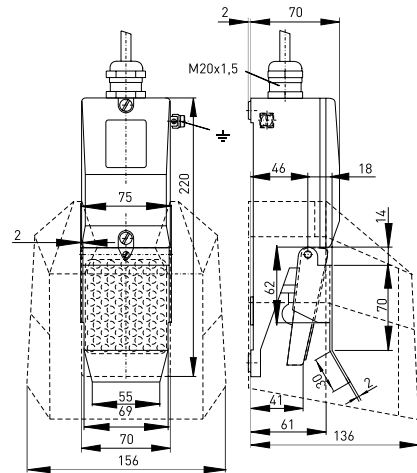
Features/Options

- Carrying handle:
stainless steel 1.1.4104 with thermoplastic grip

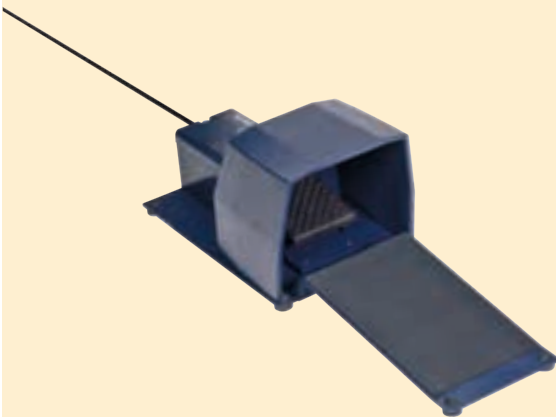
// Pedal cover K



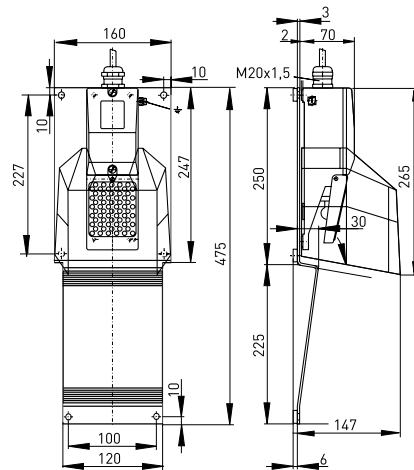
// Pedal cover K



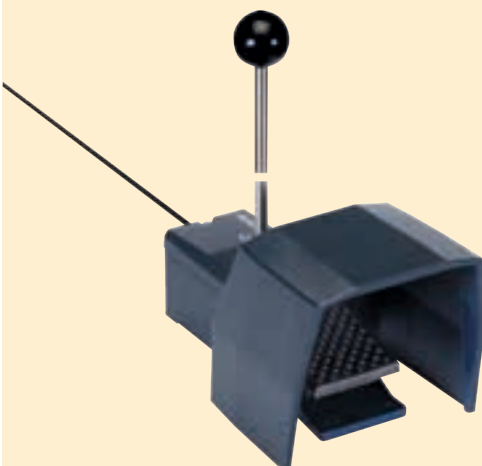
// Foot rest FST



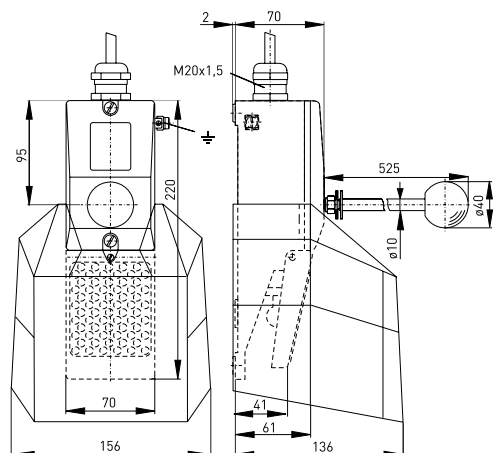
// Foot rest FST



// Carrying handle TST



// Carrying handle TST






Ex foot switches

// Series Ex GFI

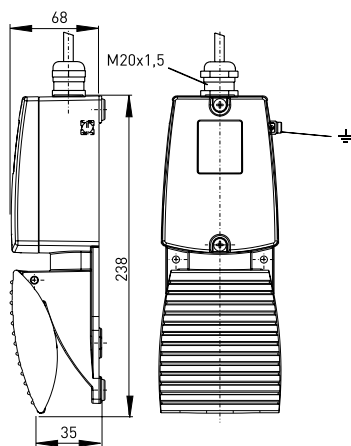
Features/Options

- Ex zone 1 and 21
- Single-pedal
- Metal enclosure
- Without protective shield
- Max. 2 contacts
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Cover	aluminium die-cast, enamel finish, RAL 2004
Pedal	aluminium die-cast, enamel finish, RAL 5011
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFIM: type C: ExM 14, type Za: ExM 14 10/1S
B_{10d} (10 % load)	Ex GFI: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0.16 A/230 VDC
Max. fuse rating	Ex GFI: 6 A gG/gN-fuse Ex GFIM: 5 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +60 °C; T5: -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GFI: IECEx   

// EX GFI



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	Ex GFIM 10/1S GY 23 → 24 BK BU 11 → 12 BN	Ex GFI 10/1S BN 11 → 12 BU BK 23 → 24 GY
1 change-over	Ex GFIM BN → GY BK	

Type code

Ex GFIM 10/1S-3D-3m

Cable length 3 m
Equipment Categ. 3D,
dust Ex zone 22
1 NC/1 NO contact
M Snap action (without M slow action)

Series
Ex certified component




Ex foot switches

// Series Ex GFSI

Features/Options

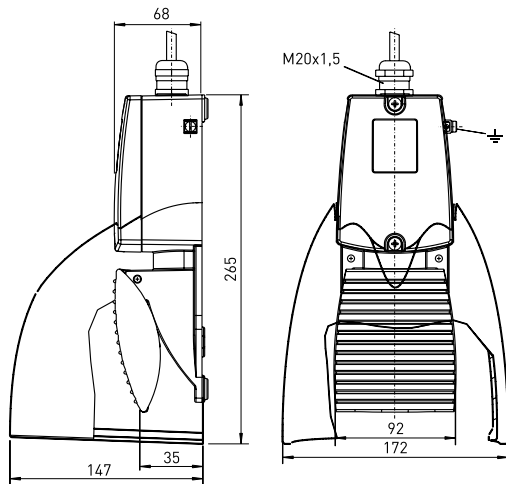
- Ex zone 1 and 21
- Single-pedal
- Metal enclosure
- With protective shield
- Max. 2 contacts
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Pedal	aluminium die-cast, enamel finish, RAL 5011
Protective shield	aluminium die-cast, enamel finish, RAL 2004
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 1Ö/1S
B_{10d} (10 % load)	Ex GFSI: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0.16 A/230 VDC
Max. fuse rating	Ex GFSI: 6 A gG/gN-fuse Ex GFSIM: 5 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +60 °C; T5: -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEX Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEX PTB 11.0090 X Ex GFSI: IECEX   

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// EX GFSI



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	Ex GFSIM 1Ö/1S GY 23 — 24 BK BU 11 — 12 BN	Ex GFSI 1Ö/1S BN 11 ; 12 BU BK 23 — 24 GY
1 change-over	Ex GFSIM BN — GY BK	

Type code

Ex GFSIM 1Ö/1S-3D-3m

Cable length 3 m
Equipment Categ. 3D,
dust Ex zone 22
1 NC/1 NO contact
M Snap action (ohne M Slow action)
Series, S Protective shield
Ex certified component




Ex foot switches

// Series Ex GF 2

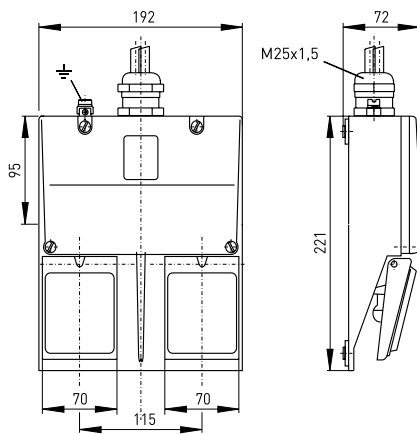
Features/Options

- Ex zone 1 and 21
- Double-pedal
- Metal enclosure
- Without protective shield
- Max. 2 contacts per pedal
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Cover	aluminium die-cast, enamel finish, RAL 5011
Pedal	glass-fibre reinforced thermoplastic
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 IÖ/1S
B_{10d} (10 % load)	Ex GF 2: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0,16 A/230 VDC
Max. fuse rating	Ex GF 2: 6 A gG/gN-fuse Ex GFM 2: 5 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +60 °C; T5: -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GF 2: IECEx   

// EX GF 2



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Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact per pedal	Ex GFM 2 IÖS/IÖS GY 23 → 24 BK BU 11 → 12 BN	Ex GF 2 IÖS/IÖS BN 11 → 12 BU BK 23 → 24 GY
1 change-over per pedal	Ex GFM 2 BN → GY BK	

Type code

Ex GFM 2 IÖS/IÖS-3D-3m

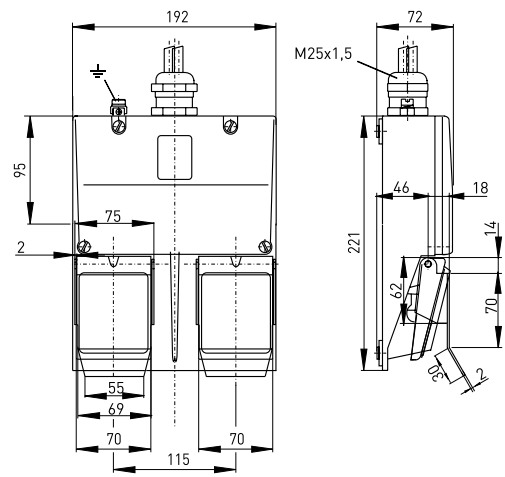
- Cable length 3 m
- Equipment Categ. 3D, dust Ex zone 22
- 1 NC/1 NO contact per pedal
- 2 pedals
- M Snap action (without M slow action)
- Series
- Ex certified component

Ex foot switches
// Series Ex GF 2, variants

// Pedal cover K



// Pedal cover K






Ex foot switches

// Series Ex GFS 2

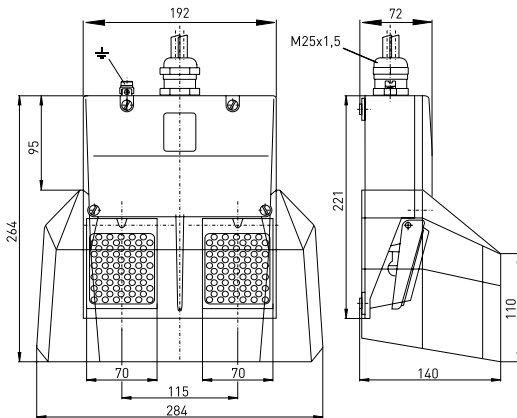
Features/Options

- Ex zone 1 and 21
- Double-pedal
- Metal enclosure
- With protective shield
- Max. 2 contacts per pedal
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Pedal	glass-fibre reinforced thermoplastic
Protective shield	aluminium die-cast, enamel finish, RAL 5011
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 10/1S
B_{10d} (10 % load)	Ex GFS 2: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0,16 A/230 VDC
Max. fuse rating	Ex GFS 2: 6 A gG/gN-fuse Ex GFSM 2: 5 A gG/gN-fuse
Ambient temperature	T ₆ : -20 °C ... +60 °C; T ₅ : -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GFS 2: IECEx   

// EX GFS 2



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact per pedal	Ex GFSM 2 10S/10S GY 23 → 24 BK BU 11 → 12 BN	Ex GFS 2 10S/10S BN 11 → 12 BU BK 23 → 24 GY
1 change-over per pedal	Ex GFSM 2 BN → GY BK	

Type code

Ex GFSM 2 K 10S/10S-3D-3m

Cable length 3 m
 Equipment Categ. 3D,
 dust Ex zone 22
 1 NC/1 NO contact
 per pedal
 Pedal cover
 2 pedals
 M Snap action (without M slow
 action)
 S Protective shield
 Series
 Ex certified component

Ex foot switches

// Series Ex GFS 2, variants

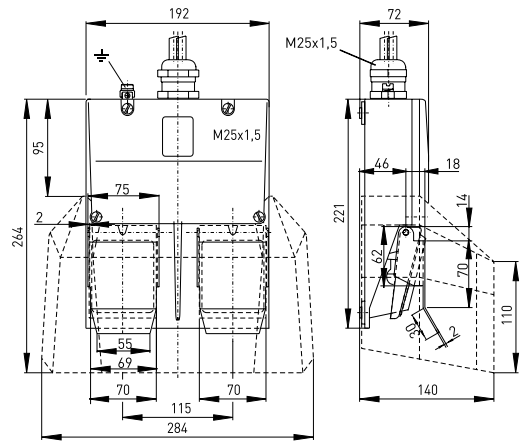
Features/Options

- Carrying handle:
stainless steel 1.4104 with thermoplastic grip

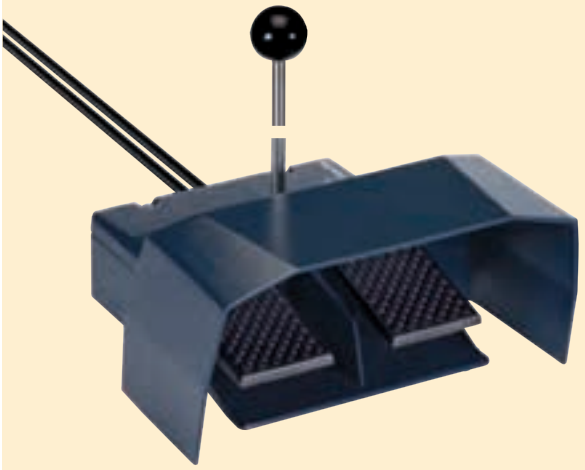
// Pedal cover K



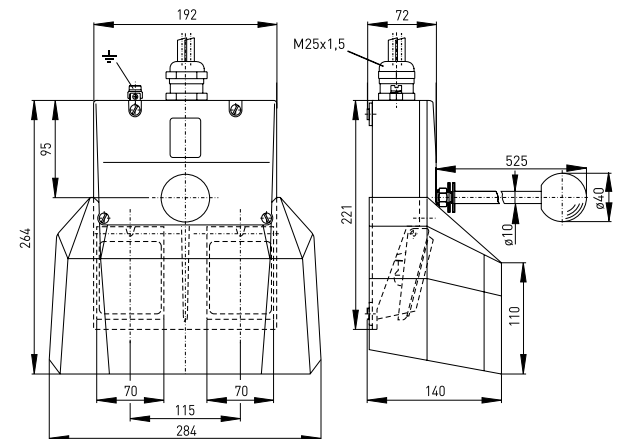
// Pedal cover K



// Carrying handle TST



// Carrying handle TST



Ex foot switches

// Series Ex GF 3

Features/Options

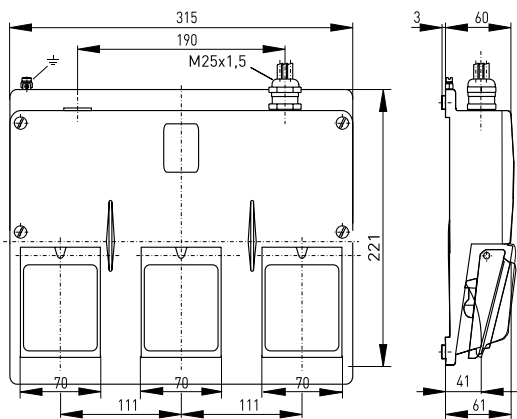
- Ex zone 1 and 21
- Triple-pedal
- Metal enclosure
- Without protective shield
- Max. 2 contacts per pedal
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

// EX GF 3



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Cover	aluminium die-cast, enamel finish, RAL 5011
Pedal	glass-fibre reinforced thermoplastic
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 10/1S
B_{10d} (10 % load)	Ex GF 3: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0,16 A/230 VDC
Max. fuse rating	Ex GF 3: 6 A gG/gN-fuse Ex GFM 3: 5 A gG/gN-fuse
Ambient temperature	T ₆ : -20 °C ... +60 °C; T ₅ : -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T80°C/T95°C Db IP65 II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GF 3: IECEx



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact per pedal	Ex GFM 3 10S/10S/10S GY 23 → 24 BK BU 11 → 12 BN	Ex GF 3 10S/10S/10S BN 11 → 12 BU BK 23 → 24 GY
1 change-over per pedal	Ex GFM 3 BN → GY BK	

Type code

Ex GFM 3 K 10S/10S/10S-3D-3m

Cable length 3 m
Equipment Category 3D, dust Ex zone 22
1 NC/1 NO contact per pedal
Pedal cover 3 pedals
M Snap action (without M slow action)
Series
Ex certified component




Ex foot switches

// Series Ex GFS 3

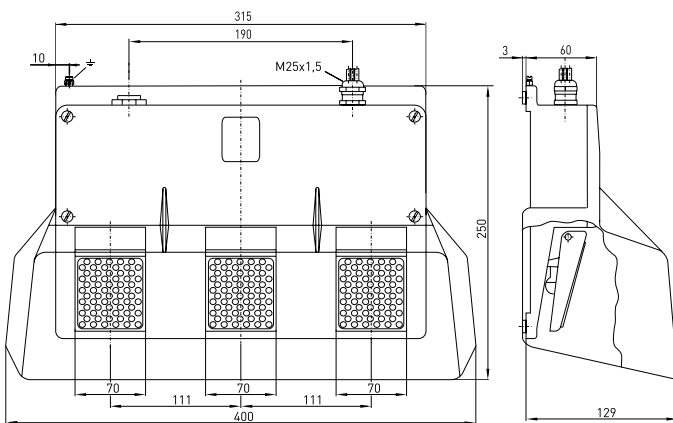
Features/Options

- Ex zone 1 and 21
- Triple-pedal
- Metal enclosure
- With protective shield
- Max. 2 contacts per pedal
- Low pedal height
- With pre-wired cable, cable length 3 metres
- Available with special finish in RAL colour tones
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish, RAL 5011
Pedal	glass-fibre reinforced thermoplastic
Protective shield	aluminium die-cast, enamel finish, RAL 5011
Connection	cable H05VV-F, length 3 m
Cable section	3 or 4 x 0.75mm ² (incl. conductor ferrules)
Contact material	silver
Protection class	IP 65 to IEC/EN 60529
Switching system	slow action type Zb: 1 NC/1 NO contact with positive break ⊖; snap action type C: change-over contact with single break, type Za: 1 NC/1 NO contact with double break
Switch insert	slow action Ex GF: type Zb: Ex 14 snap action Ex GFM: type C: ExM 14, type Za: ExM 14 10/1S
B_{10d} (10 % load)	Ex GFS 3: 2 million
T_M	max. 20 years
Utilisation category	AC-15; DC-13
I_e/U_e	type Zb: 6 A/250 VAC; 0,25 A/230 VDC, T > 65 °C: 3 A/250 VAC; 4 A/24 VDC; Form Za: 5 A/250 VAC; 0,2 A/230 VDC, type C: 5 A/250 VAC, 0.16 A/230 VDC
Max. fuse rating	Ex GFS 3: 6 A gG/gN-fuse Ex GFSM 3: 5 A gG/gN-fuse
Ambient temperature	T ₆ : -20 °C ... +60 °C; T ₅ : -20 °C ... +75 °C
Mechanical life	> 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 2002 X; IECEx PTB 11.0090 X Ex GFS 3: IECEx   

// EX GFS 3



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact per pedal	Ex GFSM 3 10S/10S/10S GY 23 — 24 BK BU 11 — 12 BN	Ex GFS 3 10S/10S/10S BN 11 ; 12 BU BK 23 — 24 GY
1 change-over per pedal	Ex GFSM 3 BN — GY BK —	

Type code

Ex GFSM 3 K 10S/10S/10S-3D-3m

Cable length 3 m
Equipment Category 3D, dust Ex zone 22
1 NC/1 NO contact per pedal
Pedal cover
3 pedals
M Snap action (without M slow action)
S Protective shield
Series
Ex certified component



Ex emergency pull-wire switches

// Selection table

from page 218

// Pre-stress and travel limitation

from page 219

One-side actuation

// Series Ex ZS 71

from page 220

// Series Ex ZS 73

from page 224

// Series Ex ZS 75

from page 228

// Series Ex ZS 80

from page 232

Two-side actuation

// Series Ex ZS 73 S

from page 234

// Series Ex ZS 75 S

from page 238

// Series Ex ZS 90 S

from page 242

// Accessories

from page 244



Ex emergency pull-wire switches

Application

Ex emergency pull-wire switches are of great importance for the man-machine interface in the area of industrial applications. They are, for example, applied on transport and conveyor systems. After manual actuation, work and functional processes are initiated or switched off.

When the new harmonised European standard EN 60947-5-5 concerning functional aspects and design guidelines for emergency-stop devices has come into effect, new requirements must have to be met by these command devices. All emergency pull-wire switches described in this chapter meet the requirements of this standard.

Design and mode of operation

On emergency pull-wire switches the emergency-stop command can be initiated from any point along the pull-wire. They have a positive linkage between the NC contacts and the pull-wire. The emergency pull-wire switches are brought into the operational condition

by pre-tensioning the pull-wire, i.e. the NC contacts are then closed and the NO contacts are open. All devices are equipped with wire-breakage detection. In the chapter accessories of the appendix the required accessories for installation are presented.

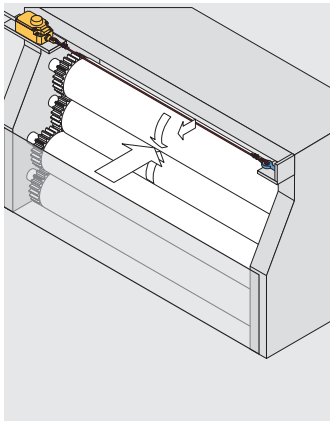
Ex emergency pull-wire switches without mechanical latching VD do not conform to the EN ISO 13850 and IEC/EN 609745-5-5. It is possible to meet the requirements of these two standards by suitable measurement of the circuitry and control technology.

There are devices with one- and two-side actuation. The wire length, the number of contacts and the mounting position, in the middle or on one side of the system, are the main features when selecting an emergency pull-wire switch.

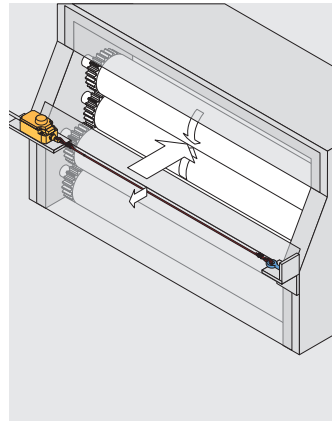
All emergency pull-wire switches bear the CE mark according to the Machinery Directive 2006/42/EC.

Application

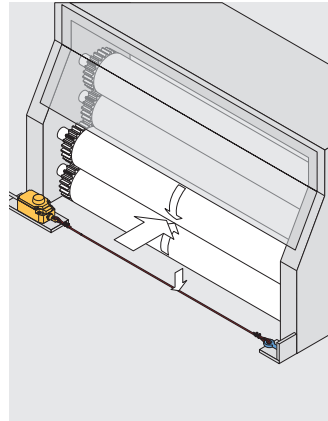
Mounting at head level



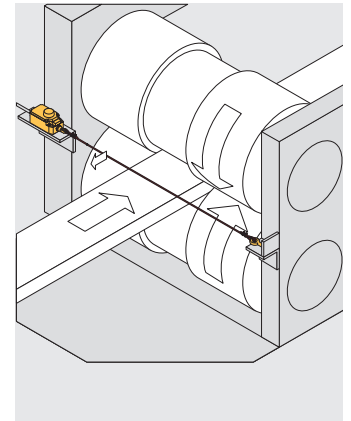
Mounting at hand level



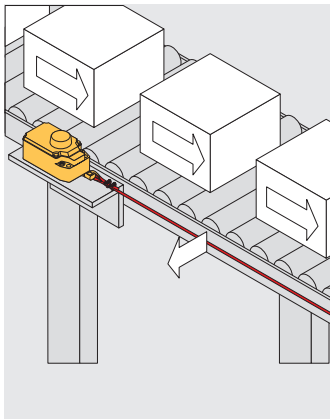
Mounting at foot level



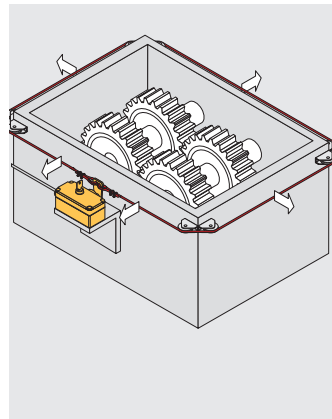
Mounting at hazardous inrunning nips



Mounting at conveyor-belts



Complete fencing



Ex emergency pull-wire switches

// Technical information

Function principle

All emergency pull-wire switches from steute are provided with a wire-break detection so that the wire must with be mounted with a defined pre-tension force. This value of the pre-tension force vaies depending on the different devices. The appropriate value can be found on the data sheet of the emergency pull-wire switch. With an incorrect mounting cannot be taken in operation, i. e. an unlocking is not possible. By vertically pulling the pull-wire the switching function is carried out. The actuating force is exclusively depending on the spring rate of the reset spring. There are emergency pull-wire switches with one-side and two-side actuatioun, see drawings below. Ex emergency pull-wire switches with two-side actuation must always be mounted with two compensation springs. According to EN 60947-5-5 the maximum values of the actuating force $F = 200 \text{ N}$ and of the actuating travel $s = 400 \text{ mm}$ must not be exceeded on vertical actuation of the emergency pull-wire switch. In addition, the pull-wire must withstand the 10 times higher vertical pulling force that is required in order to generate the emergency-stop signal.

Maximum pull-wire length

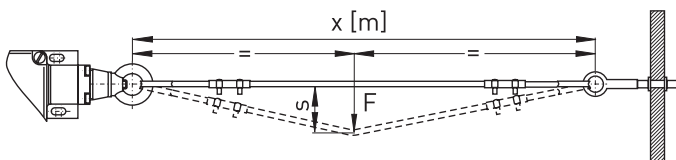
The maximum pull-wire length is mainly limited by two basic conditions. On the one hand by the maximum admissible actuating travel s of 400 mm and on the other hand by the thermal change in length of the pull-wire with a fluctuating ambient temperature that may not lead to an undesired actuation of the switch. Because the first basic condition requires a preferably low and the second requires a preferably high elasticity of the system it is necessary to optimise such systems in respect to both basic conditions depending on the operational conditions. In addition, it must be checked if the actuating force F of 200 N is adhered.

Application of compensation springs / Travel limitation

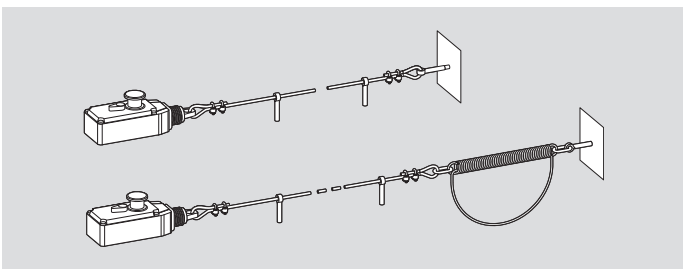
Compensation springs are applied to compensate thermal changes in lengths of the pull-wire and therefore allow for higher pull-wire lengths. In general the following is valid:

- Soft compensation spring with a low spring rate can compensate higher thermal changes in length.
- Though on pull-wire actuation soft compensation springs have a high expansion behaviour and therefore earlier reach the limit of the maximum actuating travel $s = 400 \text{ mm}$. Thus the expansion behaviour limitates the maximum pull-wire length at a constant temperature range or the temperature range at a constant pull-wire length.
- The dimensioning of the compensation spring is determined by the reset spring of the switches (Value of the pre-tension force and

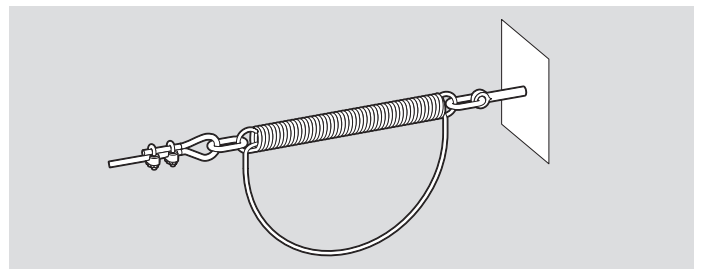
Interrelation of actuating travel / distance wire support



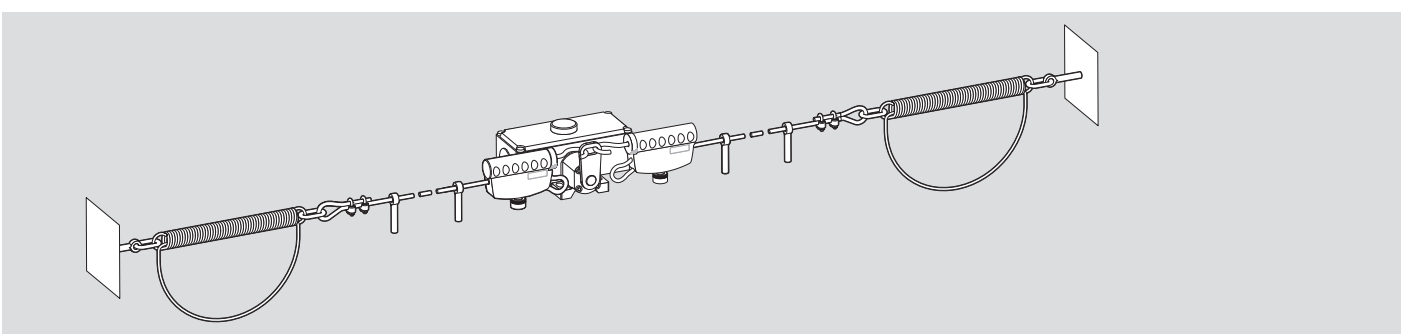
Mounting of one-side actuation



Compensation spring with travel limitation



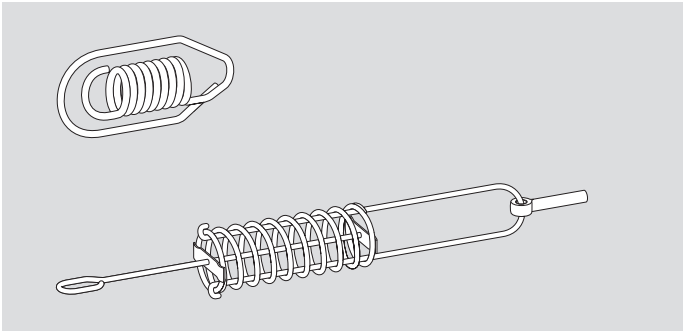
Mounting of two-side actuation



Ex emergency pull-wire switches

// Technical information

Examples of other compensation springs variants

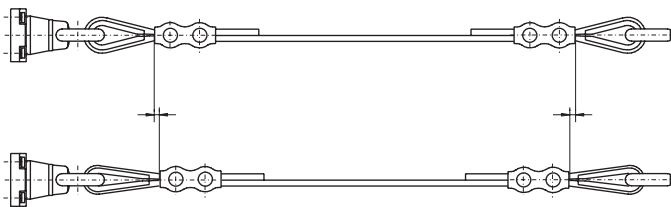


spring rate of the rest spring), the pull-wire length (length and elasticity of the pull-wire) and the maximum actuating travel of $s = 400$ mm.

- With two-side actuation a travel limitation must be installed, see drawing left page, in order to prevent overstressing of the tension spring
- Before mounting the pull-wire, the red PVC sheath must be removed from the pull-wire in the clamping range of the pull-wire!

An overstress of the compensation spring is in general prevented by a travel limitation. In practice either additional travel limitations are applied or self-protecting compensation springs are used. Additional travel limitations made of catch-ropes are critical when the function relevant length of the travel limitation is set but have a clear advantage in cost in comparison to compensation springs.

Wire thimble deformation



Distance of wire support

The actuating travel required to vertically actuate the switch results from the sum of the spring travels of the switch, pull-wire and where required compensation spring as well as the distance of the wire supports x [m]. This means a larger actuating travel is required with a larger distance of the wire supports when actuating the pull-wire in order to achieve the same actuating distance. Securing a safe switching at a constant pull-wire length the distance of the wire supports must be reduced in order to aim for a wider temperature range.

Type of pull-wire

The expansion behaviour of the pull-wire is determined by the type of wire. Besides elastic elongation permanent elongations can occur when actuating the pull-wire. Under certain conditions higher pre-tension forces can lead to relaxation processes (temporal pre-tension loss). Statistical spread of the manufacturing process also have an effect on the expansion behaviour.

Therefore it is urgently recommended at least for longer pull-wire lengths to apply pull-wires from steute. These are much tougher and thus optimised for such applications.

Pull-wires from other manufacturers often lengthen gradually because of the creep characteristics of the plastic core (relaxation). If so, it is necessary to regularly check the pull-wire tension and if required to retension the pull-wire. The appropriate security note in the mounting and wiring instructions and the standard application of a tensioner are the prerequisite for a safe function.

Mounting notes



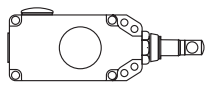
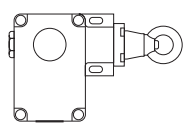
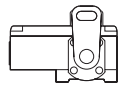
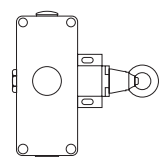
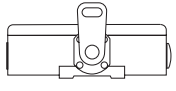
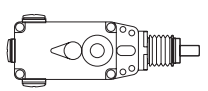
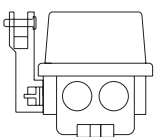
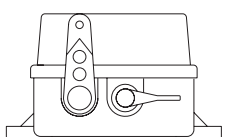
- After fitting the wire, pull strongly on it several times, as the pull-wire and the wire thimble will deform.
- Subsequently, retense the wire using the wire clamp, eye-bolt or tensioner.
- In order to guarantee safe operation, observe the enclosed mounting and wiring instructions.
- According to EN ISO 13850, pulleys may only be mounted such that the complete length of the pull-wire can be observed.

Selection table

Ex emergency pull-wire switches

// Series

// Maximum pull-wire length

		→	↔	
				
<p>Ex ZS 71, on page 220</p> <ul style="list-style-type: none"> - Metal enclosure - One-side actuation - 2 contacts 		35 m	-	
<p>Ex ZS 73, on page 224 and 234</p> <ul style="list-style-type: none"> - Metal enclosure - One-side actuation: ZS 73 - two-side actuation: ZS 73 S - 2 contacts 		130 m	2 x 100 m	
<p>Ex ZS 75, on page 228 and 238</p> <ul style="list-style-type: none"> - Metal enclosure - One-side actuation: ZS 75 - Two-side actuation: ZS 75 S - 4 contacts 		130 m	2 x 100 m	
<p>Ex ZS 80, on page 232</p> <ul style="list-style-type: none"> - Metal enclosure - One-side actuation - 2 contacts 		100 m	-	
<p>Ex ZS 90 S, on page 242</p> <ul style="list-style-type: none"> - Polyester resin enclosure - Two-side actuation - 4 contacts 		-	2 x 50 m	

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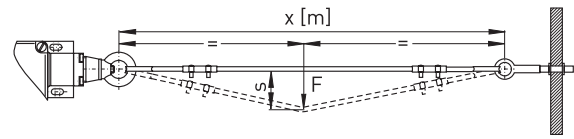
Ex emergency pull-wire switches

// Pre-stress and actuating forces

Notes

- The values are indicated for an ambient temperature of 20 °C at the stated wire length.
- The linear expansion of the wire due to strain and deformation of the wire thimble is not considered.
- The actuating forces are only approximate values, due to the spring forces being subject to tolerances.

Actuating forces and travel between supports



Emergency pull-wire switch	Wire length betw. supports x [m]	Pre-stress force [N]	Actuating travel s [cm]	Actuating force F [N]	Wire length [m]	Ordering index
Ex ZS 71	3	100	7	12	10	
Ex ZS 73	5	120-180	13	19-25	50-130	/120-180N
Ex ZS 73 S	5 4	295-390 -	13 13	38-60 51-85	50-130 2 x 30-65	/295-390N -
Ex ZS 75	5	120-180	13	19-25	50-130	/120-180N
Ex ZS 75 S	5 4	295-390 -	13 13	38-60 51-85	50-130 2 x 30-65	/295-390N -
Ex ZS 80	5	100	22	32	75	-
Ex ZS 90 S	4	-	15	40	2 x 50	-

Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 71

Features/Options

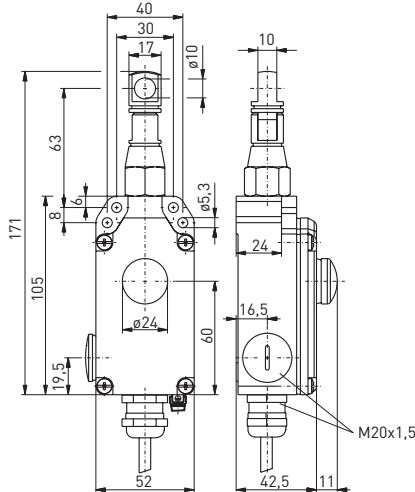
- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Small design
- Wire length up to 35 m
- Release by push button
- Available without unlocking mechanism (per DIN EN 60947-5-1)
- Wire pull and breakage detection
- Special version only for dust Ex zone 22
- IP 69K version available, see www.steute.com section »Extreme«

// EX ZS 71



Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure Cover	aluminium die-cast, enamel finish glass-fibre reinforced, shock-proof thermoplastic, ultramid
Switch insert	Ex 14
Protection class	Ex ZS 71 VD, Ex ZS 71 WVD: IP 65; to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊖
Switching elements	change-over contact with double break or 2 NC contacts
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	Ex ZS 71: 2 million Ex ZS 71 VD/VS: 200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C, T5: -20 °C ... +90 °C
Mechanical life	Ex ZS 71: > 1 million operations Ex ZS 71 VD/VS: > 100 000 operations
Max. wire length	35 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 1003 X, IECEx PTB 07.0034 X



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 71 10/1S
2 NC contacts	Ex ZS 71 20

Type code

Ex ZS 71	10/1S	WVD-A/100 N-3D
		Ex zone 22
		100 N Pre-stress force
		A Position indicator
		VD Push button release (blank without latching)
		W Watertight collar
		1 NC/1 NO contact (20)
		Series
		Emergency pull-wire switch
		Ex certified component

At 3 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces see table on page 219.

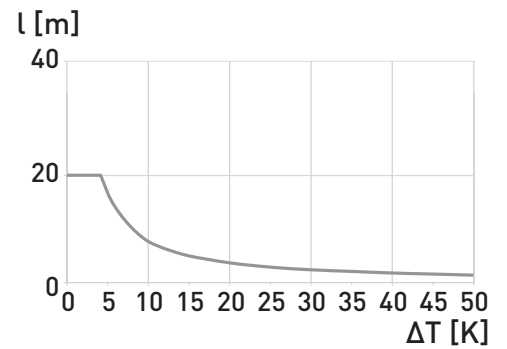
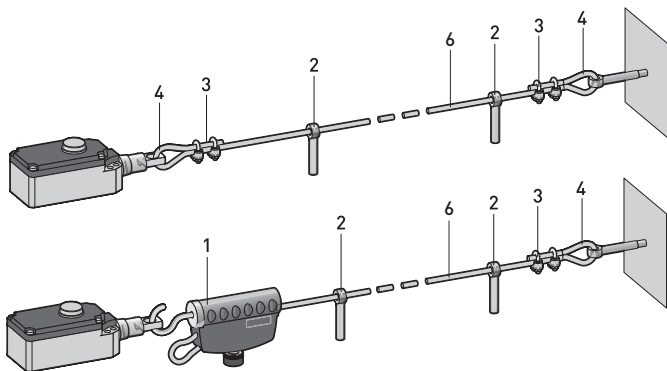
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 71, mounting

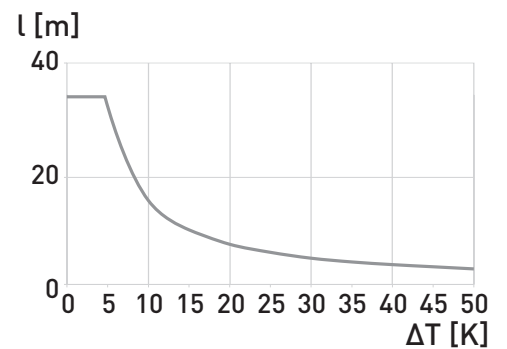
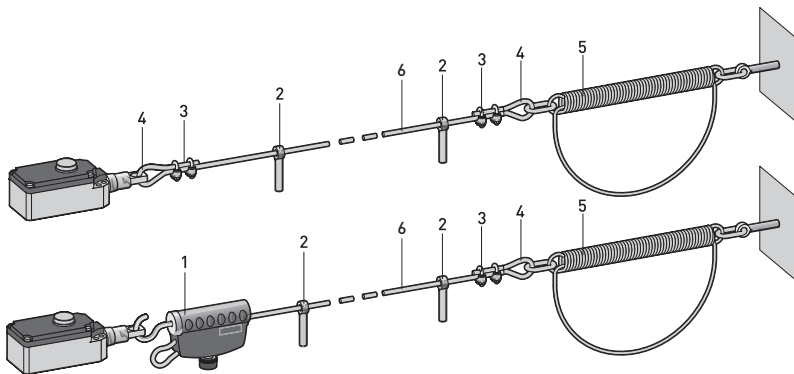
Legend

1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring ZS 71-100N	04.00.7154
6 Pull-wire per metre	01.09.0011

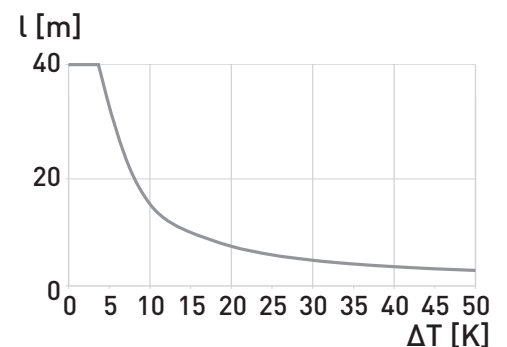
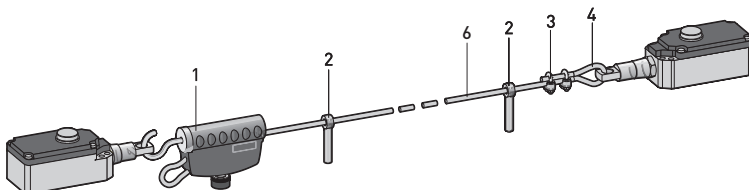
// Mounting without tension spring



// Mounting with tension spring



// Mounting with 2 emergency pull-wire switches



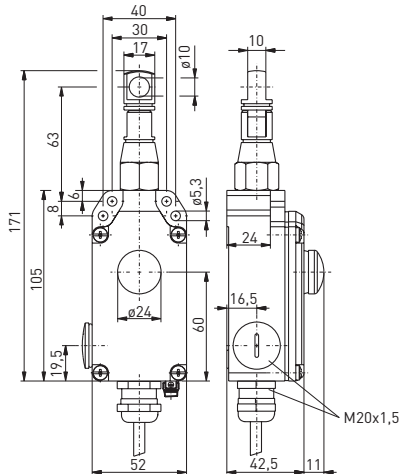
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 71, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position in the left side cable entry
- Ex emergency pull-wire switches are also available without mechanical latching
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

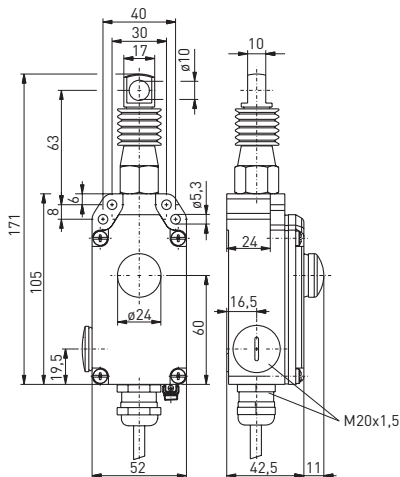
// Push-button release VD



Push-button release
 Ex ZS 71 1Ö/1S VD/100 N-3m
 Ex ZS 71 2Ö VD/100 N-3m

Order Number
 71041312
 71541303

// Watertight collar W

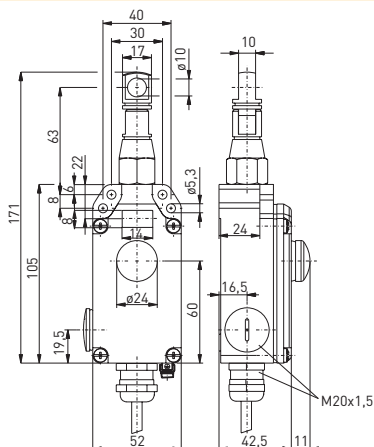


Features/Options
 - Watertight collar for protection against penetration of dirt

Watertight collar/Push-button release
 Ex ZS 71 1Ö/1S WVD/100 N-3m
 Ex ZS 71 2Ö WVD/100 N-3m

Order Number
 71042307
 71542311

// Position indicator A



Position indicator
 Ex ZS 71 1Ö/1S VD-A/100 N-3m
 Ex ZS 71 2Ö VD-A/100 N-3m

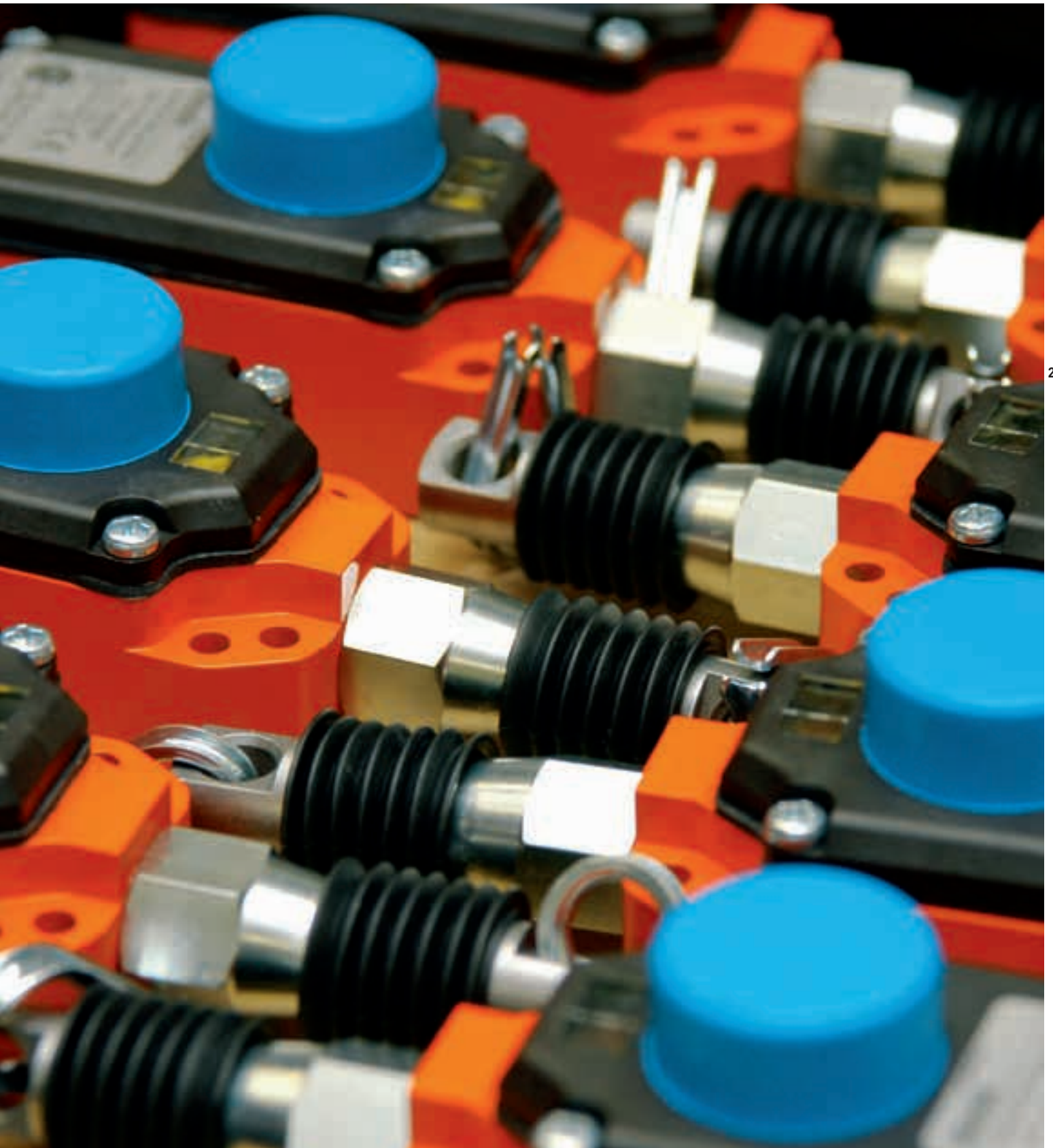
Order Number
 71041313
 71541304

Position indicator/Watertight collar
 Ex ZS 71 1Ö/1S WVD-A/100 N-3m
 Ex ZS 71 2Ö WVD-A/100 N-3m

Order Number
 71042308
 71542312

PRODUCTION PROCESS ASSEMBLY

EMERGENCY PULL-WIRE SWITCH AFTER FINAL QUALITY CHECK



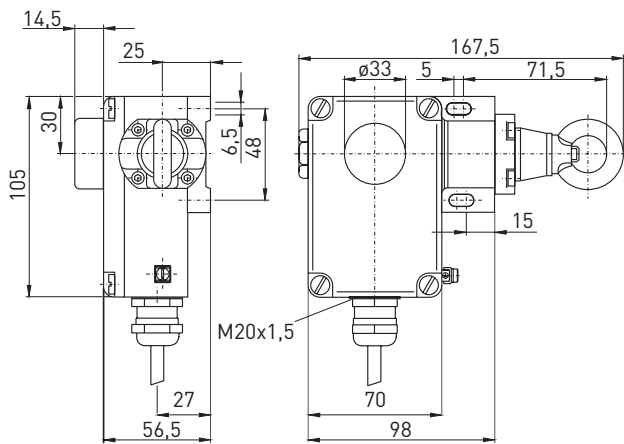
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 73

// EX ZS 73



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Features/Options

- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Wire length up to 130 m
- 2 various spring force variants (actuating forces)
- Available without unlocking mechanism (per DIN EN 60947-5-1)
- Release by push button
- Wire pull and breakage detection
- Special version only for dust Ex zone 22

Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish; ZS 73 NIRO: aluminium die-cast, hard-coated and enamelled
Cover	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Switch insert	Ex 14
Protection class	Ex ZS 73 WVD: IP 65; Ex ZS 73 VD, to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊕
Switching elements	change-over contact with double break or 2 NC contacts
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	Ex ZS 73: 2 million; Ex ZS 73 VD/VS: 200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mechanical life	Ex ZS 73: > 1 million operations Ex ZS 73 VD/VS: > 100 000 operations
Max. wire length	130 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 1003 X, IECEx PTB 06.0034 X

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 73 10/1S BK-GY BN-BU
2 NC contacts	Ex ZS 73 20 BK-GY BN-BU

Type code

Ex ZS 73 10/1S WVD-NIRO/120-180 N-3D
Zone 22
120-180 N Pre-stress force (295-390 N)
Stainless steel pull-wire unit
VD Push button release (blank without mechanical latching)
W Watertight collar
1 NC/1 NO contact (20)
Series
Emergency pull-wire switch
Ex certified component

At 5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces see table on page 219.

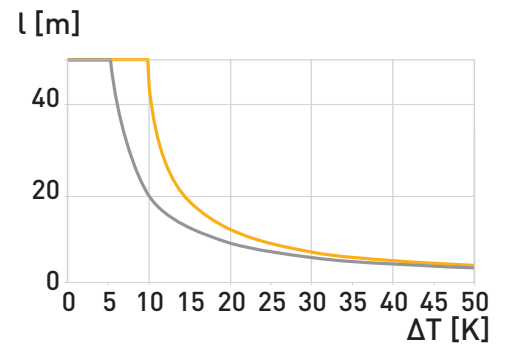
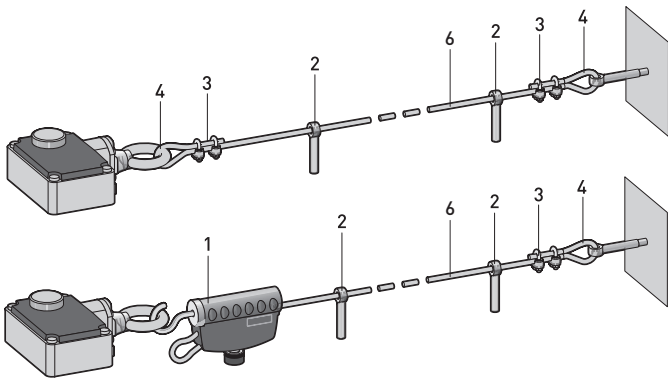
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 73, mounting

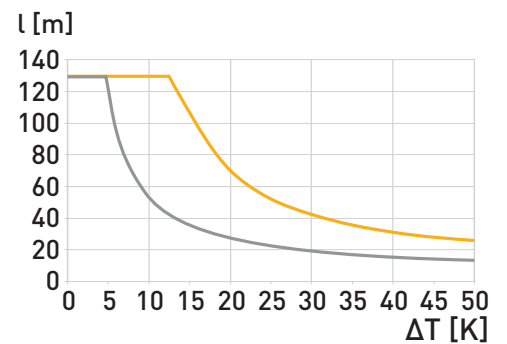
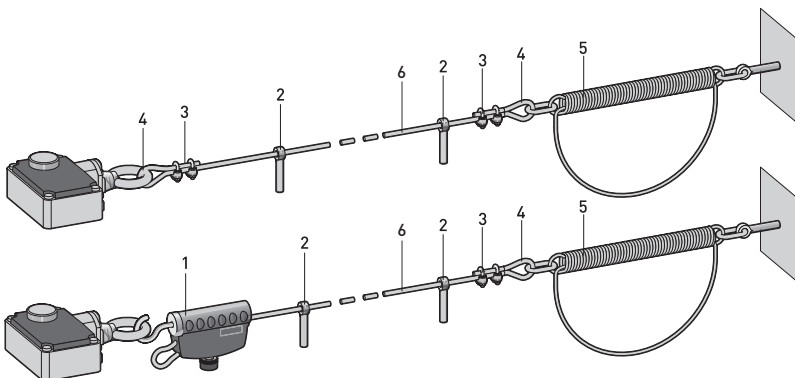
Legend

1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring ZS 73/75-200N for spring force variant 120-180N	04.00.7155
Tension spring ZS 73/75-400N for spring force variant 295-390N	04.00.7157
6 Pull-wire per metre	01.09.0011

// Mounting without tension spring



// Mounting with tension spring



Temperature difference/ Wire length

Legend

- 120-180 N standard version
- 295-390 N for long pull-wire lengths and strong vibrations

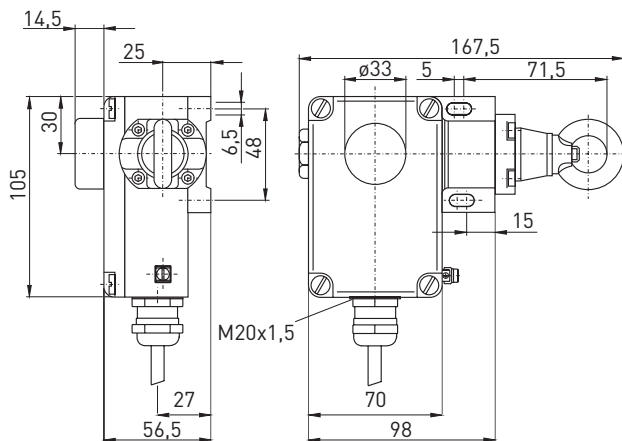
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 73, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position in the left side cable entry, other positions possible on request
- With 2 cable entries available on request for zone 22
- Ex emergency pull-wire switches are also available without mechanical latching
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

// Push-button release VD



Push-button release

Ex ZS 73 1Ö/1S VD/120-180 N-3m

Ex ZS 73 1Ö/1S VD/295-390 N-3m

Ex ZS 73 2Ö VD/120-180 N-3m

Ex ZS 73 2Ö VD/295-390 N-3m

Order Number

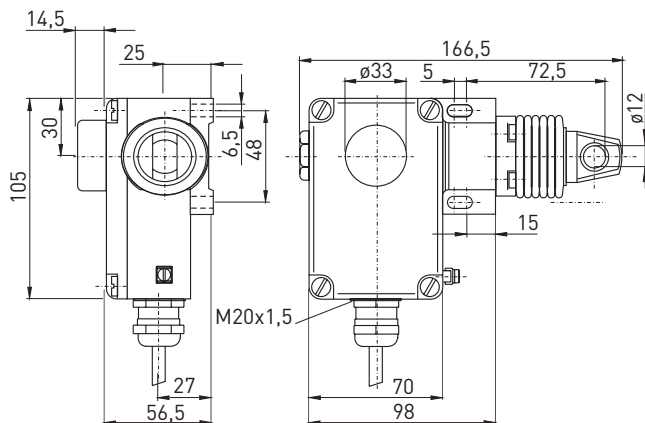
73041306

73041303

73541302

73541301

// Watertight collar W



Features/Options

- Watertight collar for protection against penetration of dirt

Watertight collar/Push-button release

Ex ZS 73 1Ö/1S WVD/120-180 N-3m

Ex ZS 73 1Ö/1S WVD/295-390 N-3m

Ex ZS 73 2Ö WVD/120-180 N-3m

Ex ZS 73 2Ö WVD/295-390 N-3m

Order Number

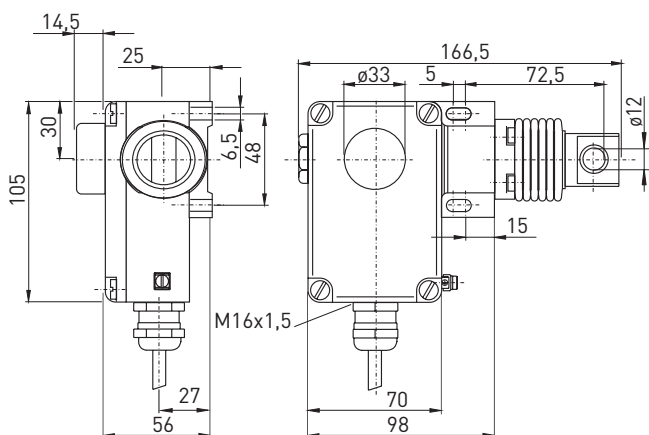
73042318

73042302

73542302

73542304

// Stainless Steel ZS 73 NIRO



Features/Options

- Ex ZS 73 NIRO: pull-wire unit and screws made of stainless steel 1.4305, hard-coated enclosure with enamel finish

Stainless Steel/Push-button release

Ex ZS 73 1Ö/1S WVD/120-180 N Niro-3m

Ex ZS 73 1Ö/1S WVD/295-390 N Niro-3m

Ex ZS 73 2Ö WVD/295-390 N Niro-3m

Order Number

on request

on request

on request

PRODUCTION PROCESS ASSEMBLY
ASSEMBLY OF EMERGENCY PULL-WIRE SWITCHES



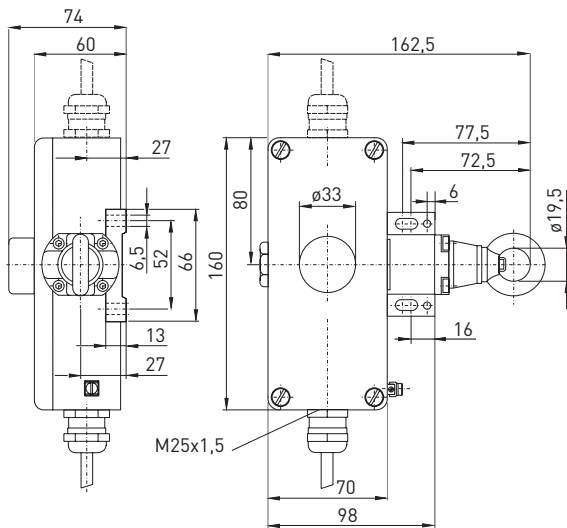
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 75

Features/Options

- Ex zone 1 and 21
- Metal enclosure
- 2 or 4 contacts
- Wire length up to 130 m
- 2 various spring force variants (actuating forces)
- Release by push button
- Available without unlocking mechanism (per DIN EN 60947-5-1)
- Wire pull and breakage detection
- Special version only for dust Ex zone 22

// EX ZS 75



Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	aluminium die-cast, enamel finish
Switch insert	Ex 14
Protection class	Ex ZS 75 WVD: IP 65; Ex ZS 75 VD, to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊕
Switching elements	change-over contact with double break or 2 NO/2 NC or 4 NC contacts
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules) per switch insert
B_{10d} (10 % load)	Ex ZS 75: 2 million Ex ZS 75 VD/VS: 200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mechanical life	Ex ZS 75: > 1 million operations Ex ZS 75 VD/VS: > 100 000 operations
Max. wire length	130 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 1003 X, IECEx PTB 07.0034 X

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 75 10/1S
2 NC/2 NO contact	Ex ZS 75 20/2S
4 NC contacts	Ex ZS 75 40

Type code

Ex ZS 75 10/1S WVD/120-180 N-3D
Ex Zone 22
120-180 N Pre-stress force (295-390 N)
VD Push button release (blank without mechanical latching)
W Watertight collar
1 NC/1 NO contact (20/2S, 40)
Series
Emergency pull-wire switch
Ex certified component

At 5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces see table on page 219.

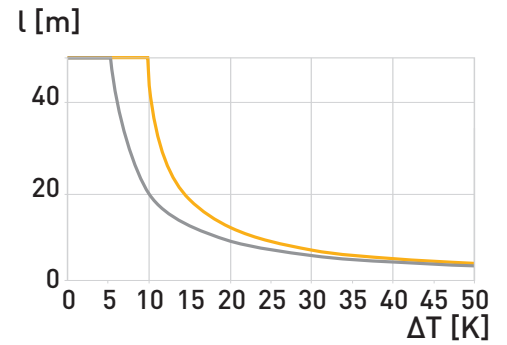
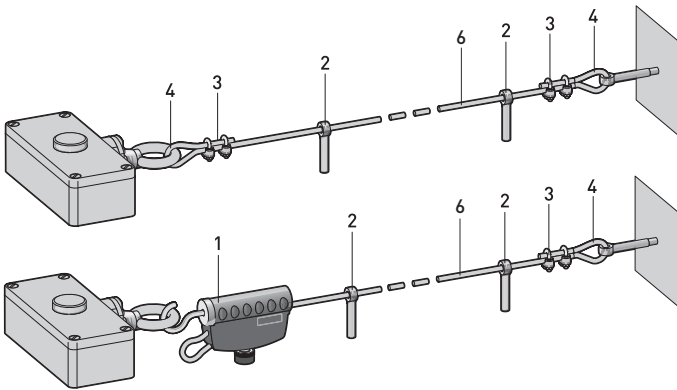
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 75, mounting

Legend

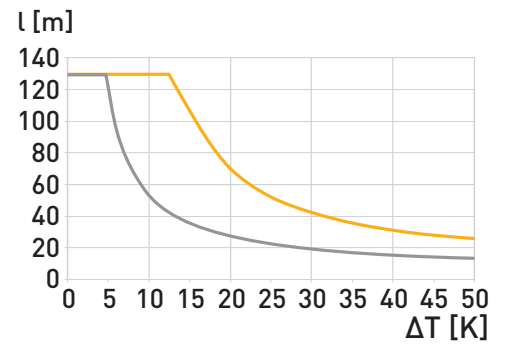
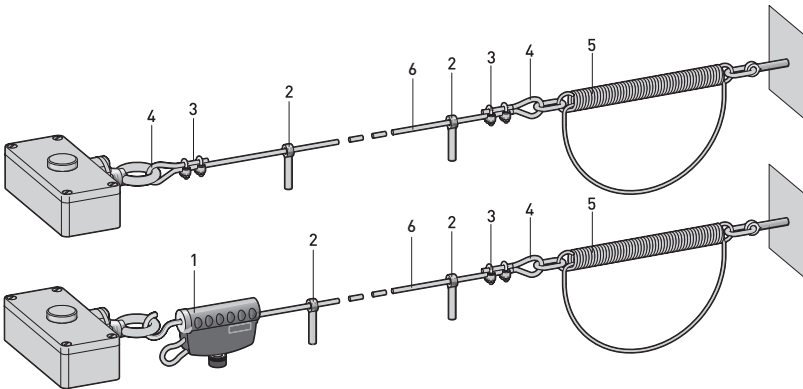
1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring ZS 73/75-200N for spring force variant 120-180N	04.00.7155
Tension spring ZS 73/75-400N for spring force variant 295-390N	04.00.7157
6 Pull-wire per metre	01.09.0011

// Mounting without tension spring



229

// Mounting with tension spring



Temperature difference/ Wire length

Legend

- 120-180 N standard version
- 295-390 N for long pull-wire lengths and strong vibrations

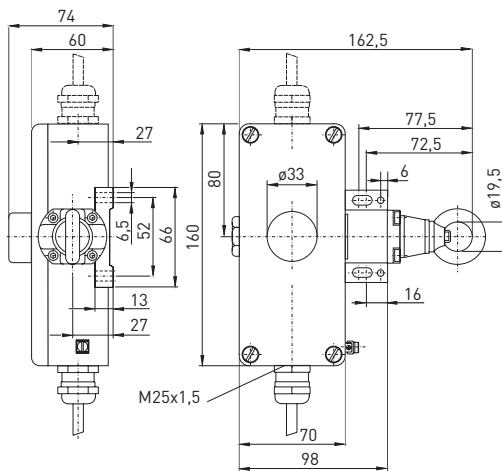
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 75, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position on the left side, other positions possible on request
- Ex emergency pull-wire switches are also available without mechanical latching
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

// Push-button release VD



Push-button release

Ex ZS 75 1Ö/1S VD/120-180 N-3m

Ex ZS 75 1Ö/1S VD/295-390 N-3m

Ex ZS 75 2Ö/2S VD/120-180 N-3m

Ex ZS 75 2Ö/2S VD/295-390 N-3m

Order Number

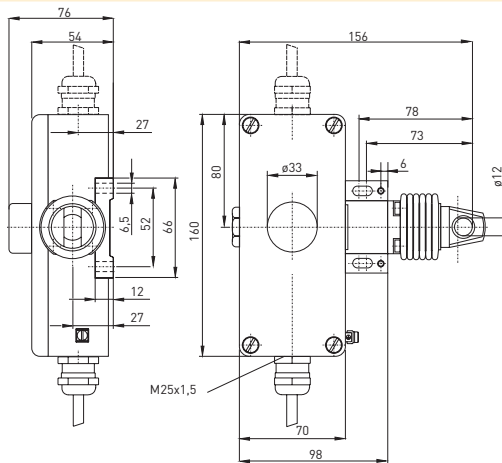
on request

75041301

75341306

75341301

// Watertight collar W



Features/Options

- Watertight collar for protection against penetration of dirt

Watertight collar/Push-button release

Ex ZS 75 1Ö/1SWVD/120-180 N-3m

Ex ZS 75 1Ö/1S WVD/295-390 N-3m

Ex ZS 75 2Ö/2S WVD/120-180 N-3m

Ex ZS 75 2Ö/2S WVD/295-390 N-3m

Order Number

75042304

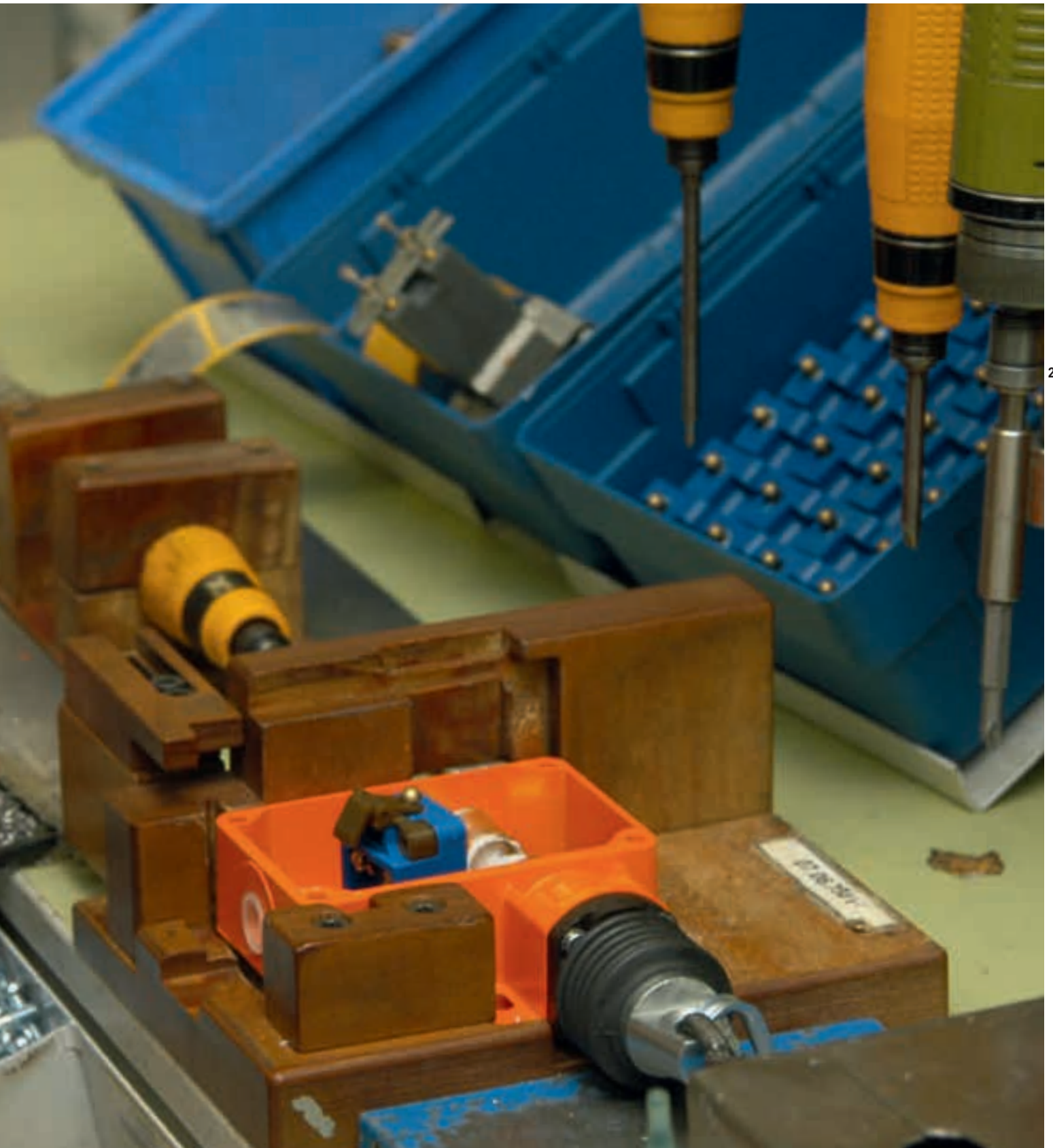
75042301

75342920

75342301

PRODUCTION PROCESS ASSEMBLY

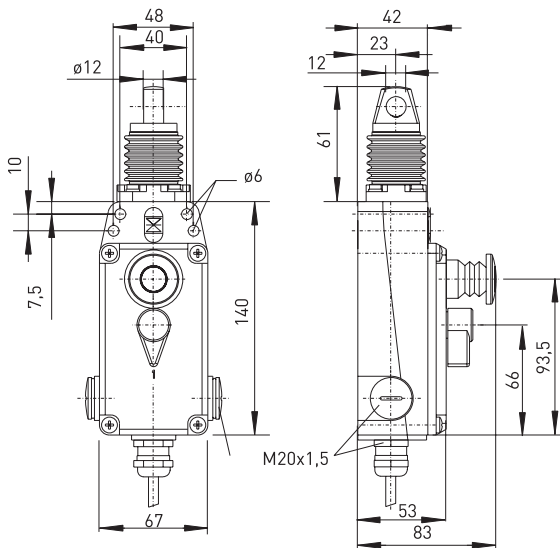
MOUNTING OF THE SWITCH INSERTS AT EMERGENCY PULL-WIRE SWITCHES



Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 80

// EX ZS 80



Features/Options

- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Position indicator and integrated emergency-stop push button
- Wire length up to 100 m
- Pretensioning force 100 N
- Lever for release and position indication
- Watertight collar
- Wire pull and breakage detection
- Special version only for dust Ex zone 22

Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Switch insert	Ex 14
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊕
Switching elements	1 NC/1 NO contact or 2 NC contacts with double break
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mechanical life	> 100 000 operations
Max. wire length	100 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 1003 X, IECEx PTB 07.0034 X



Contact variants: switch travel/contacts

	Slow action	Order Number
1 NC/1 NO contact	Ex ZS 80 10/1S WVD 	72042301
2 NC contacts	Ex ZS 80 20 WVD 	72542301

Type code

Ex ZS 80 10/1S WVD-3D

Ex ZS 80 10/1S WVD-3D
 3D dust Ex zone 22
 VD Lever release
 W Watertight collar
 1 NC/1 NO contact (10)
 Series
 Emergency pull-wire switch
 Ex certified component

At 5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces see table on page 219.

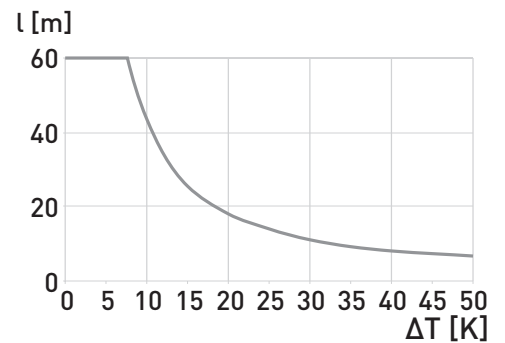
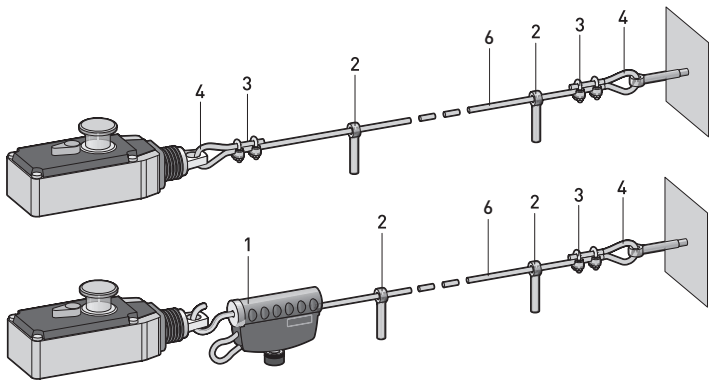
Ex emergency pull-wire switches, one-side actuation

// Series Ex ZS 80, mounting

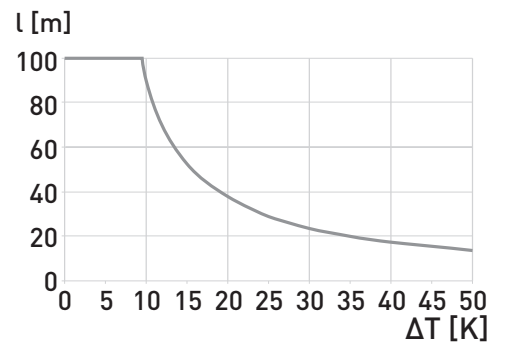
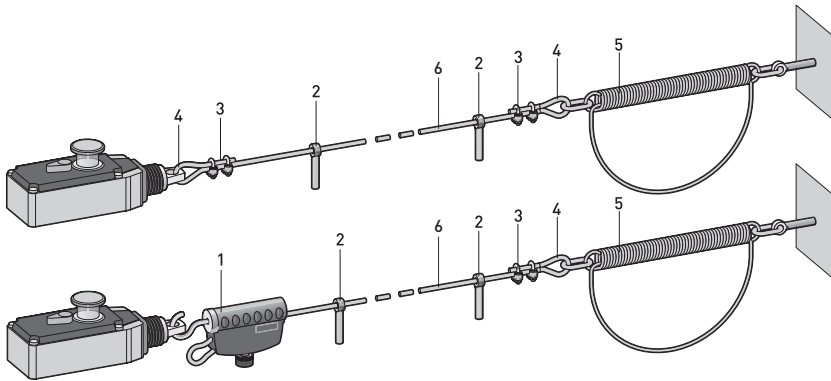
Legend

1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring ZS 80	04.00.7156
6 Pull-wire per metre	01.09.0011

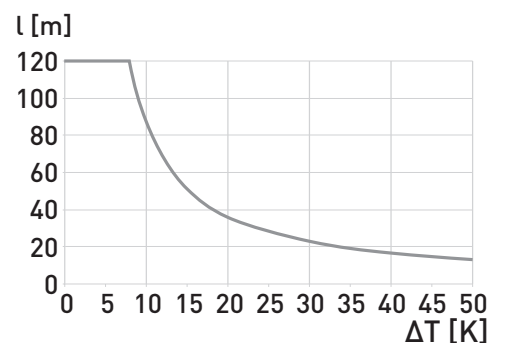
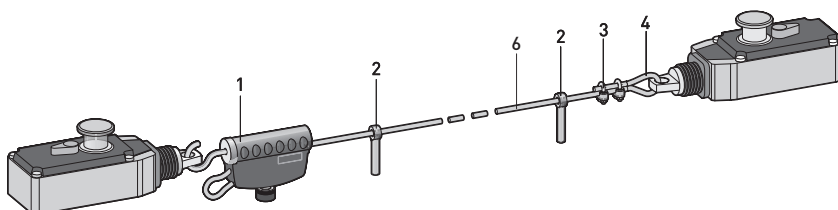
// Mounting without tension spring



// Mounting with tension spring



// Mounting with 2 emergency pull-wire switches



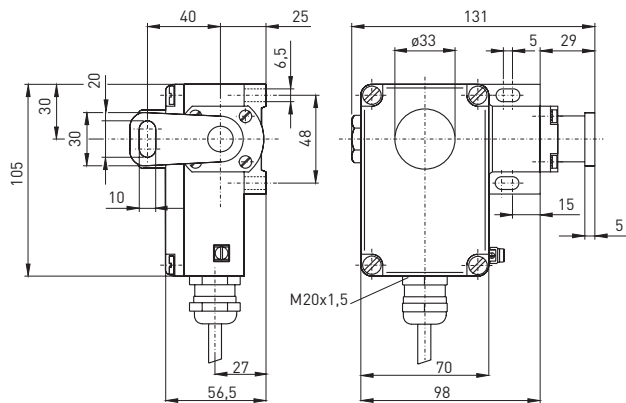
Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 73 S

// EX ZS 73 S



234



Features/Options

- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Wire length up to 2 x 100 m
- Release by push button
- Available without unlocking mechanism (per DIN EN 60947-5-1)
- Wire pull and breakage detection
- Special version only for dust Ex zone 22

Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish; Ex ZS 73 NIRO: aluminium die-cast, hard-coated and enamelled
Cover	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Switch insert	Ex 14
Protection class	Ex ZS 73 S VD: IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊕
Switching elements	change-over contact with double break or 2 NC contacts
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	Ex ZS 73 S: 2 million Ex ZS 73 S VD/VS: 200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mechanical life	Ex ZS 73 S: > 1 million operations Ex ZS 73 S VD/VS: > 100 000 operations
Max. wire length	2 x 100 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 1003 X, IECEx PTB 07.0034 X



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 73 S 1Ö/1S
2 NC contacts	Ex ZS 73 S 2Ö

Type code

Ex ZS 73 S 1Ö/1S VD-NIRO-3D
Ex ZS 73 S
1Ö/1S
VD
NIRO
3D
Dust Ex zone 22
Stainless steel pull-wire unit
VD Push button release (blank without mechanical latching)
1 NC/1 NO contact (2Ö)
S Two-side actuation
Series
Emergency pull-wire switch
Ex certified component

At 4 m distance intermediate wire supports are required. Details related to pre-stress and actuating forces are indicated at the end of this chapter. Two tension springs type ZS 73/75 S must be installed. See chapter accessories on page 244.

Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 73 S, mounting

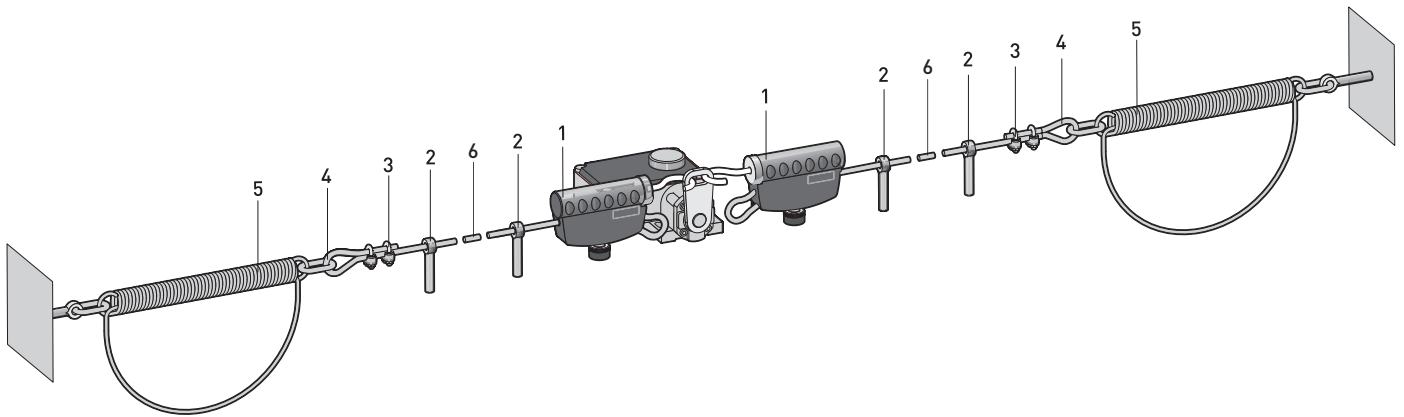
Legend

1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring ZS 73/75 S	04.00.7158
6 Pull-wire per metre	01.09.0011

Note

- Always mount emergency pull-wire switch in middle position.

// Mounting with tension spring



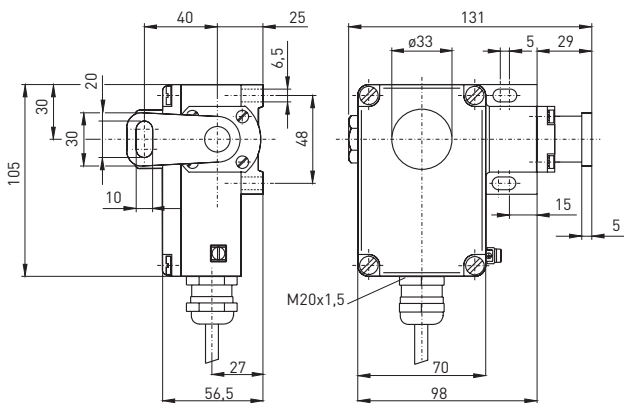
Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 73 S, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position in the left side cable entry, other positions possible on request
- With 2 cable entries available on request for zone 22
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

// Push-button release VD



Push-button release
Ex ZS 73 S 10/1S VD-3m

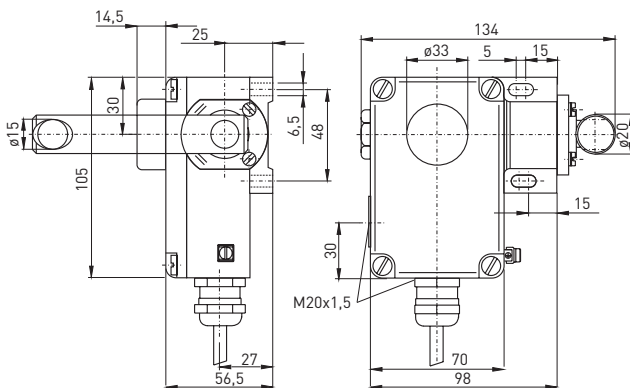
Order Number
73030301

Ex ZS 73 S 20 VD-3m

73530301

236

// Stainless Steel ZS 73 S NIRO



Features/Options

- ZS 73 NIRO: pull-wire lever and screws made of stainless steel 1.4305, hard-coated enclosure with enamel finish

Stainless Steel/Push-button release
Ex ZS 73 S 10/1S VD Niro-3m

Order Number
on request

QUALITY MANAGEMENT

SHOCK TEST OF AN EMERGENCY PULL-WIRE SWITCH



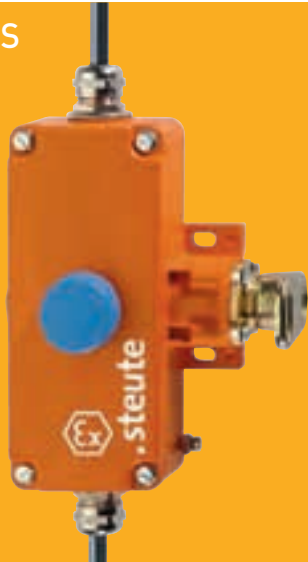
Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 75 S

Features/Options

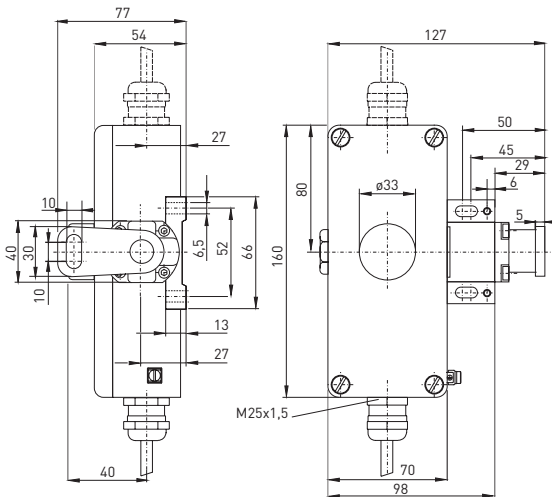
- Ex zone 1 and 21
- Metal enclosure
- 2 or 4 contacts
- Wire length up to 2 x 100 m
- Release by push button
- Available without unlocking mechanism (per DIN EN 60947-5-1)
- Wire pull and breakage detection
- Special version only for dust Ex zone 22

// EX ZS 75 S



Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	aluminium die-cast, enamel finish
Switch insert	Ex 14
Protection class	Ex ZS 75 S VD: IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊖
Switching elements	change-over contact with double break or 2 NO/2 NC or 4 NC contacts
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	Ex ZS 75 S: 2 million Ex ZS 75 S VD/VS: 200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mechanical life	Ex ZS 75 S: > 1 million operations Ex ZS 75 S VD/VS: > 100 000 operations
Max. wire length	2 x 100 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 11 ATEX 1003 X, IECEx PTB 07.0034 X



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 75 S 1Ö/1S
2 NC/2 NO contact	Ex ZS 75 S 2Ö/2S
4 NC contacts	Ex ZS 75 S 4Ö

Type code

Ex ZS 75 S	2Ö/2S	VD-3D
		Dust Ex zone 22
		VD Push button release (blank without mechanical latching)
		2 NC/2 NO contacts (1Ö/1S, 4Ö)
		S Two-side actuation
		Series
		Emergency pull-wire switch
		Ex certified component

At 4 m distance intermediate wire supports are required. Details related to pre-stress and actuating forces are indicated at the end of this chapter. Two tension springs type ZS 73/75 S must be installed. See chapter accessories on page 244.

Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 75 S, mounting

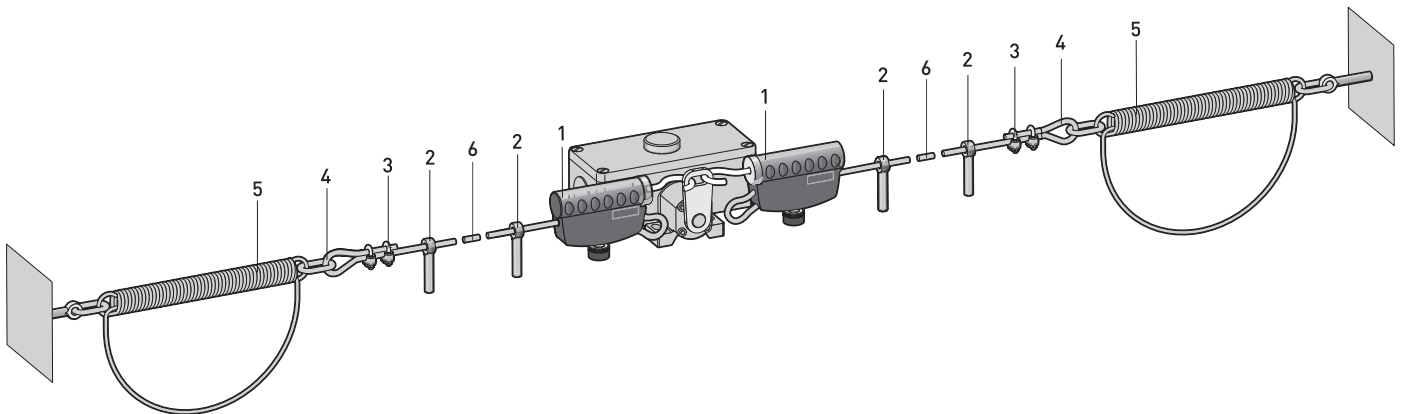
Legend

1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring ZS 73/75 S	04.00.7158
6 Pull-wire per metre	01.09.0011

Note

- Always mount emergency pull-wire switch in middle position.

// Mounting with tension spring



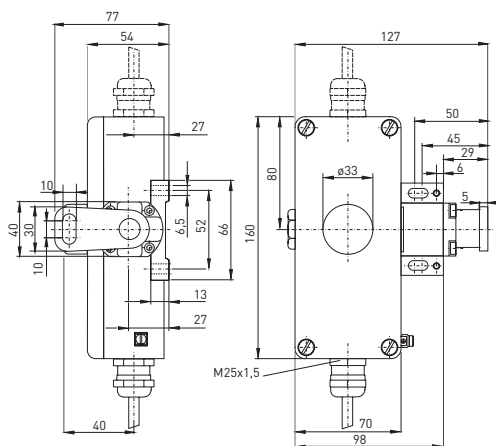
Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 75 S, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position on the left side, other positions possible on request
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

// Push-button release VD



Push-button release

Ex ZS 75 S 1Ö/1S VD-3m

Order Number

75030301

Ex ZS 75 S 2Ö/2S VD-3m

75330301

QUALITY MANAGEMENT
LIFE TEST OF UNLOCKING MECHANISM



Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 90 S

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- 4 contacts
- Wire length up to 2 x 50 m
- Release by lever possible
- Available without unlocking mechanism (per DIN EN 60947-5-1)
- Wire pull and breakage detection

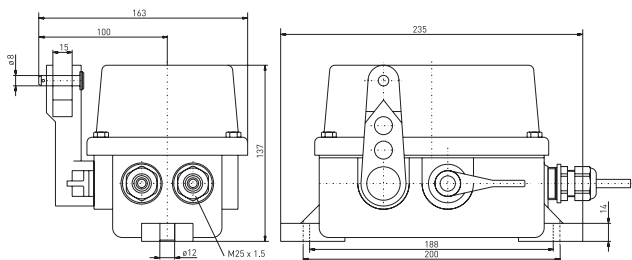
// EX ZS 90 S



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13850; EN ISO 13849-1
Enclosure	Duroplast, UV-resistant to EN ISO 4892
Cover	Duroplast, UV-resistant to EN ISO 4892
Switch insert	Ex 14
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	2 NO/2 NC contacts with double break
Switching system	slow action, positive break NC contacts ⊖
Connection	cable H05 VV-F, length 3 m
B_{10d} (10% Nennlast)	200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A, T5: 3 A
Utilisation category	AC-15; DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mech. life	> 100 000 operations
Max. wire length	2 x 50 m
Features	wire pull and breakage detection
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1070 X*, IECEx PTB 06.0098 X

* referring to the switch insert



Contact variants: switch travel/contacts

	Slow action	Order Number
2 NC/2 NO contacts	Ex ZS 90 S 2Ö/2S VD 	76430301

Type code

Ex ZS 90 S 2Ö/2S VD

- Ex certified component
- Emergency pull-wire switch
- Series
- S two-side actuation
- 2 NC/2 NO contacts
- VD lever release (blank without manual latching)

At 4 m distance intermediate wire supports are required. Details related to pre-stress and actuating forces are indicated at the end of this chapter. Two tension springs type RZ 130K must be installed. See chapter accessories on page 244.

Ex emergency pull-wire switches, two-side actuation

// Series Ex ZS 90 S, mounting

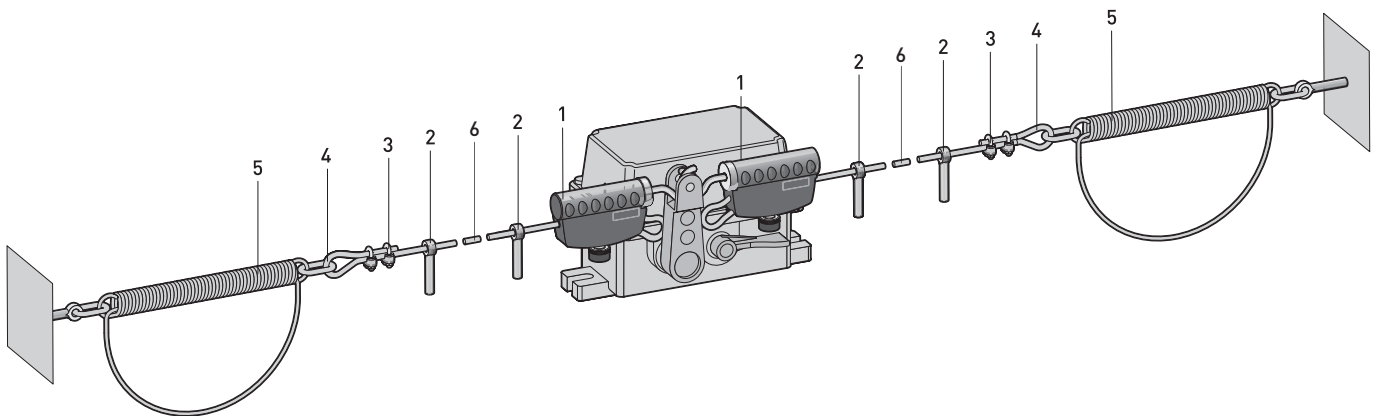
Legend

1 Cable tensioner system TS 65	04.71.7101
2 Eye bolt M8 x 70 with nut	04.00.7112
3 Wire clamp	01.10.0003
4 Wire thimble 3B	01.10.0001
5 Tension spring RZ-130K	04.76.7101
6 Pull-wire per metre	01.09.0011

Note

- Always mount emergency pull-wire switch in middle position.

// Mounting with tension spring



Ex emergency pull-wire switches

// Accessories

// Accessories

// Order number

<p>Indicator lamp Multi-LED coloured</p> <ul style="list-style-type: none"> - Lamp cap red, green or yellow - M20 x 1.5 - 24 VDC - Ordering unit: 1 piece 		<p>Indicator lamp Ex-LED rot 24 VDC M20-3G 04.00.7122 Indicator lamp Ex-LED grün 24 VDC M20-3G 04.00.7123 Indicator lamp Ex-LED gelb 24 VDC M20-3G 04.00.7124</p>
<p>Indicator lamp Multi-LED clear</p> <ul style="list-style-type: none"> - Lamp cap clear - M20 x 1.5 - 24 VDC, 115 VAC or 230 VAC - Ordering unit: 1 piece 		<p>Indicator lamp Ex-LED klar 24 VDC M20-3G 04.00.7125</p>
<p>Pulley</p> <ul style="list-style-type: none"> - To guide the pull-wire where the path is not a straight line - For pull-wire with red PVC sheath Ø 5 mm (steel core Ø 3 mm) - Ordering unit: 1 piece 		<p>Pulley 04.73.9102</p>
<p>Pull-wire</p> <ul style="list-style-type: none"> - Steel core Ø 3 mm with red PVC sheath - Total diameter 5 mm - Ordering unit: per metre - Available with stainless steel core 		<p>Pull-wire Ø 5 mm per metre 01.09.0011 Pull-wire stainless steel Ø 5 mm per metre 01.10.0059</p>
<p>Complete Pull-wire set</p> <ul style="list-style-type: none"> - 5 m pull-wire Ø 3 mm with 2 mm PVC sheath, 2 wire clamps DIN 741, 1 wire thimble DIN 6899, 1 eye bolt DIN 444 and 1 Duplex wire clamp 		<p>Complete pull-wire set, 5 m 04.61.7101 Complete pull-wire set, 10 m 04.61.7106 Complete pull-wire set, 15 m 04.61.7107 Complete pull-wire set, 20 m 04.61.7118 Complete pull-wire set, 25 m 04.61.7108 Complete pull-wire set, 50 m 04.61.7115</p>
<p>Pull-wire for emergency pull-wire sw.</p> <ul style="list-style-type: none"> - Pull-wire yellow (polypropylene) - 1, 2, 3 or 4 m long - With rubber ball and mounting clamp 		<p>Pull-wire with ball emergency pull-wire sw. 1 m 04.73.7101 Pull-wire with ball emergency pull-wire sw. 2 m 04.73.7103 Pull-wire with ball emergency pull-wire sw. 3 m 04.73.7104 Pull-wire with ball emergency pull-wire sw. 4 m 04.73.7102</p>
<p>Pull-wire for pull-wire switches</p> <ul style="list-style-type: none"> - Pull-wire yellow (polypropylene) - 1, 2, 3 or 4 m long - With rubber ball and Duplex wire clamp - Ordering unit: 1 piece 		<p>Pull-wire with ball pull-wire switches 1 m 04.73.7106 Pull-wire with ball pull-wire switches 2 m 04.73.7107 Pull-wire with ball pull-wire switches 3 m 04.73.7108 Pull-wire with ball pull-wire switches 4 m 04.73.7109</p>
<p>Wire clamp</p> <ul style="list-style-type: none"> - For pull-wire with steel core Ø 3 mm - Ordering unit: 1 piece - Wire clamp made of stainless steel available 		<p>Wire clamp 3 mm 01.10.0003 Wire clamp 3 mm stainless steel 01.10.0061</p>
<p>Duplex wire clamp</p> <ul style="list-style-type: none"> - For pull-wire with steel core Ø 3 mm - Ordering unit: 1 piece 		<p>Duplex wire clamp 01.10.0004</p>

// Accessories

// Order number

<p>Egg-shaped wire clamp - For pull-wire with steel core \varnothing 3 mm - Ordering unit: 1 piece</p>		<p>Egg-shaped wire clamp 3 mm</p> <p>01.10.0091</p>
<p>Wire thimble 3B - Per DIN 6899 - For pull-wire with steel core \varnothing 3 mm - Wire clamp made of stainless steel available</p>		<p>Wire thimble 3B Wire thimble Niro</p> <p>01.10.0001 01.10.0084</p>
<p>Eye bolt incl. nut - Per DIN 444 - Available made of stainless steel - Ordering unit: 1 piece</p>		<p>Eye bolt M8x70 with nut Eye bolt M8 x 70 stainless steel Eye bolt BM10 x 40 with nut</p> <p>04.00.7112 01.03.0210 01.03.0208</p>
<p>Compensation spring/travel limitation - Adaption of length expansions caused by changes in temperature - Stainless steel 1.4310 - Ordering unit: 1 piece</p>		<p>Compensation spring ZS 71-100N Compensation spring ZS 73/75-200N Compensation spring ZS 73/75-400N Compensation spring ZS 73/75 S Compensation spring ZS 80</p> <p>04.00.7154 04.00.7155 04.00.7157 04.00.7158 04.00.7156</p>
<p>Compens. spring RZ130K for ZS 90 S - Adaption of length expansions caused by changes in temperature - Stainless steel 1.4310 - Ordering unit: 1 piece</p>		<p>Compensation spring RZ-130K</p> <p>04.76.7101</p>
<p>Tensioner M6 - For precise adjustment of pull-wire pre-stress - Per DIN 1480 - Adjustable von 145 mm bis 225 mm</p>		<p>Tensioner M6</p> <p>01.10.0010</p>
<p>Tensioner M8 - For precise adjustment of pull-wire pre-stress - Made of stainless steel, adjustable from 160 mm to 255 mm</p>		<p>Tensioner M8 Niro</p> <p>01.10.0062</p>
<p>Cable tensioner system TS 65 - For pull-wire with steel core \varnothing 4 - 6 mm incl. sheath - Adjustment range max. 65 mm - Diameter of eyebolt min. 8 mm - Pull-wire length max. 75 m</p>		<p>Cable tensioner system TS 65</p> <p>04.71.7101</p>





Ex ZS 73 SR

Ex belt-alignment switches

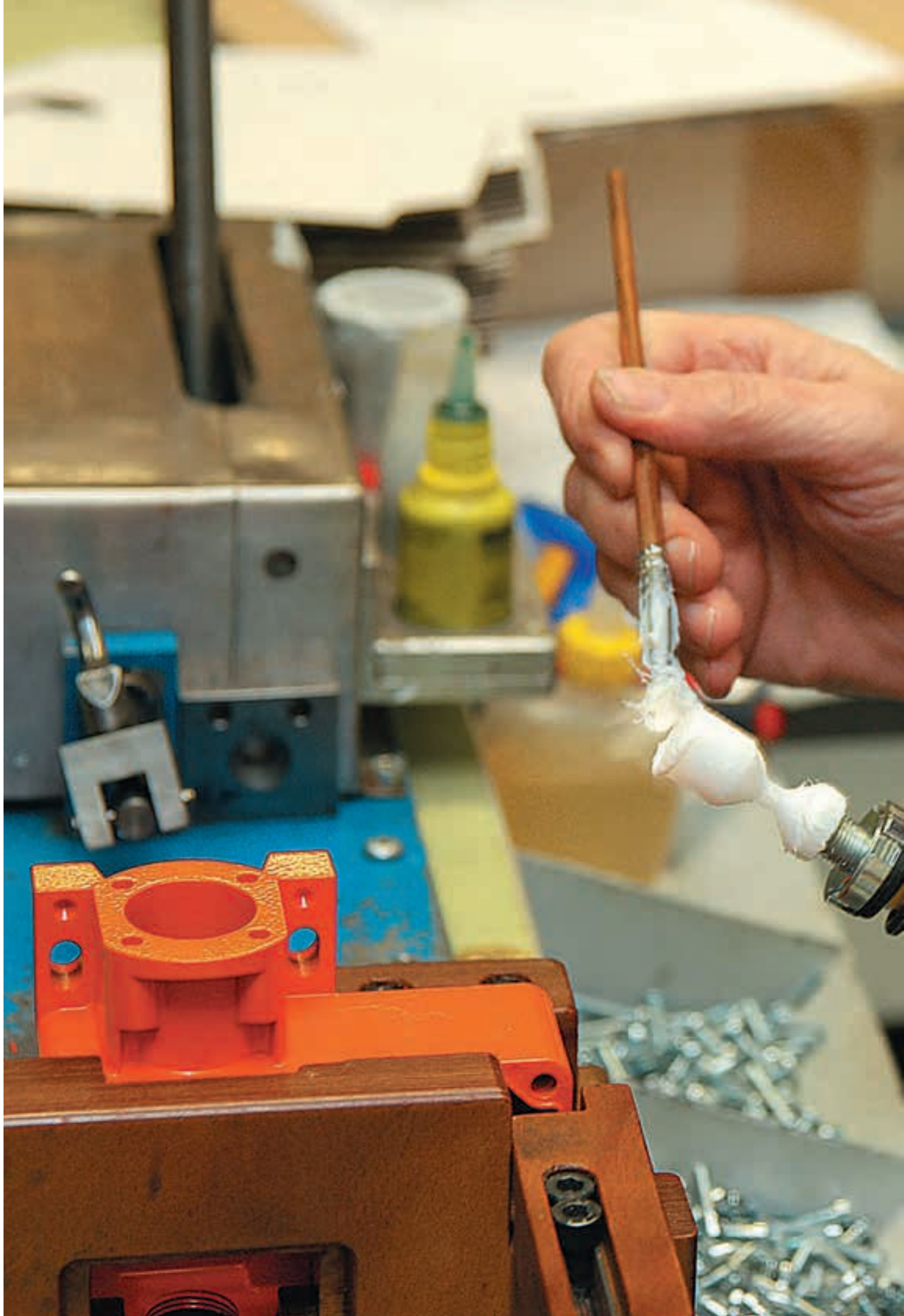
// Series Ex 335 4VSR
from page 250

// Series Ex 355 4VSR
from page 251

// Series Ex ZS 73 SR
from page 252

// Series Ex ZS 75 SR
from page 254

// Series Ex ZS 90 SR
from page 256



Ex belt-alignment switches

Range of application

Ex belt-alignment switches are suitable for applications with handling equipment. Here they are installed e.g. at both sides of a conveyor belt in order to monitor the misalignment of the belt.

Ex belt misalignment, evoked by, for example, goods not in the middle of conveyor belt positioned or pollution of track idlers and deflection pulleys, can without any monitoring measurements lead to damage, destruction, material covering and dropping.

Design and operating principle

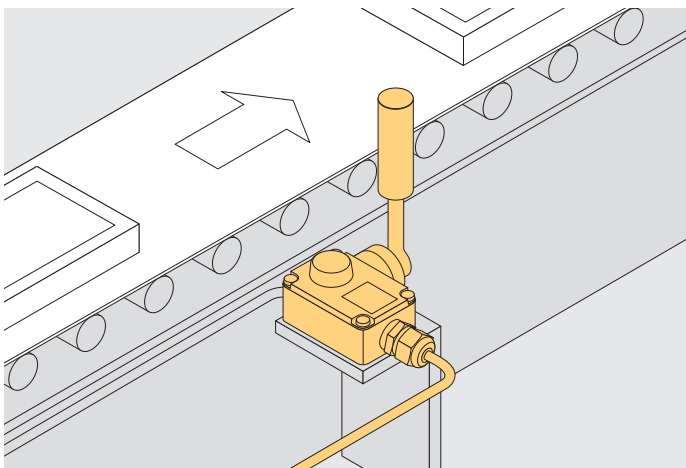
Ex belt-alignment switches are actuated when the conveyor belt becomes misaligned. Depending on the plant arrangements, this signal can either be used to switch the equipment off or to provide automatic correction of the belt alignment. Thus they should be installed at both sides of the conveyor belt close to the deflection and drive pulleys. In the case of very long conveyor systems, further belt-alignment switches must be installed.

These are actuated with the misalignment of the conveyor belt. This signal can either switch the system off or start an automatic belt position correction, as well as at the same time generate an optical or acoustic indicating or warning signal. All Ex belt-alignment switches have positive break NC contacts and mechanical latching. At actuation the NC contacts are opened and latched mechanically. The release can be carried out by push button. Thus an unintentional, automatic restart of the conveyor belt is prevented.

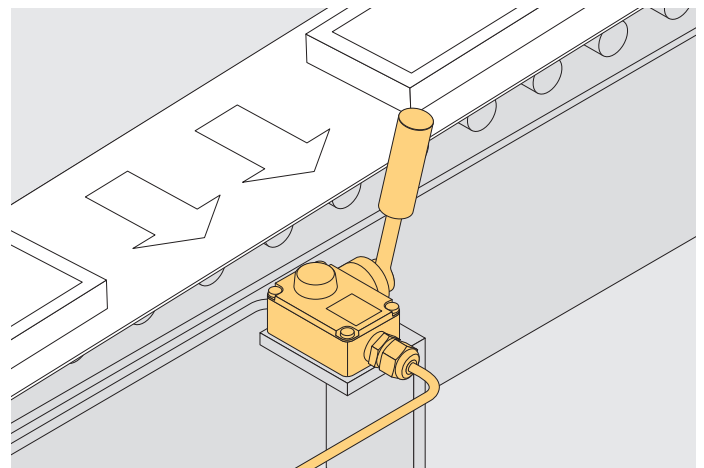
All belt-alignment switches bear the CE mark according to the Machinery Directive 2006/42/EC and to ATEX 94/9/EC. The Ex belt-alignment switches per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Application

Monitoring a conveyor belt



Belt-alignment switch in actuated state



Ex belt-alignment switches

// Series Ex 335 4VSR

Features/Options

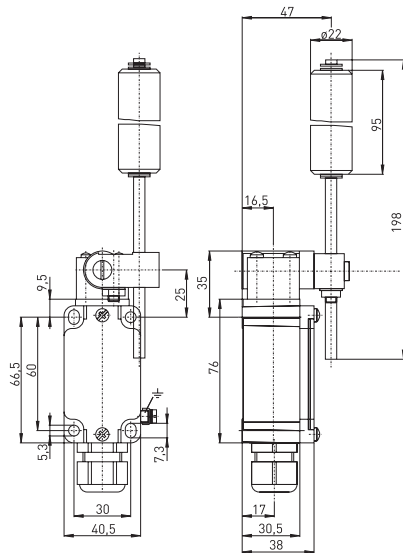
- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Mounting details to DIN EN 50 041
- Wiring compartment
- Adjustable-length rod lever with nylon roller
- For light- and medium-heavy applications
- Special version only for dust Ex zone 22 available

// EX 335 4VSR



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Enclosure	zinc die-cast, enamelled
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 3.5 mm
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	DMT 01 ATEX E 178, IECEx BVS 07.0014



Contact variants: switch travel/contacts

	Slow action	Order number
1 NC/1 NO contact	Ex 335 4VSR 10/1S 	93031301
1 NC/1 NO contact with overlapping	Ex 335 4VSR UE 	
2 NC contacts	Ex 335 4VSR 20 	93531301

Type code

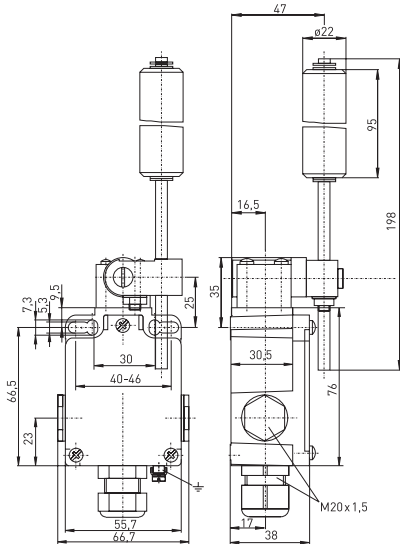
Ex 335 4VSR 10/1S-3D

Equipment Categ. 3D,
dust Ex zone 22
1 NC/1 NO contact (20, UE)
4VSR Belt-alignment lever
Series
Ex certified component

Ex belt-alignment switches

// Series Ex 355 4VSR

// EX 355 4VSR



Features/Options

- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Mounting details to DIN EN 50 041
- Wiring compartment
- Adjustable-length rod lever with nylon roller
- For light- and medium-strength applications
- Special version only for dust Ex zone 22 available

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7, EN 60079-31; EN ISO 13849-1
Enclosure	zinc die-cast, enamelled
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	-20 °C ... +60 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 3.5 mm
Ex marking	⊕ II 2G Ex de IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex de IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db

Approvals

BVS 04 ATEX E 126, IECEx BVS 07.0013



Contact variants: switch travel/contacts

	Slow action	Order number
1 NC/1 NO contact	Ex 355 4VSR 1Ö/1S 85° 25°0'25° 85° 30°15°15°30°	92031301
1 NC/1 NO contact with overlapping	Ex 355 4VSR UE 85° 20°0'20° 85° 40°25°25°40°	
2 NC contacts	Ex 355 4VSR 2Ö 85° 30° 0° 30° 85° 15°15°	92531301

Type code

Ex 355 4VSR 1Ö/1S-G-3D

Equipment Categ. 3D, dust Ex zone 22
Indicator lamp for 3D, see accessories
1 NC/1 NO contact (2Ö, UE)
4VSR Belt-alignment lever
Series
Ex certified component

Ex belt-alignment switches

// Series Ex ZS 73 SR

Features/Options

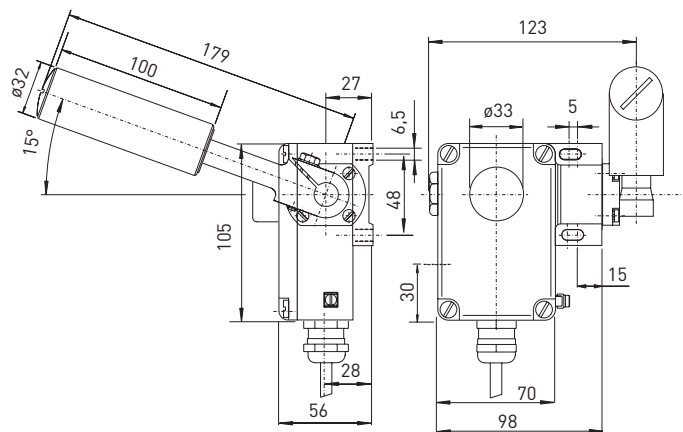
- Ex zone 1 and 21
- Metal enclosure
- 2 contacts
- Cable
- With latching and release by push button
- Belt-alignment roller made of stainless steel 1.4104
- Special version only for dust Ex zone 22 available

// EX ZS 73 SR



Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish; ZS 73 NIRO: aluminium die-cast, hard-coated and enamelled
Cover	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Switch insert	Ex 14
Protection class	Ex ZS 73 SR VD: IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊕
Switching elements	change-over contact with double break or 2 NC contacts
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	Ex ZS 73 SR: 2 million Ex ZS 73 SR VD/VS: 200 000
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +90 °C
Mechanical life	Ex ZS 73 SR: > 1 million operations; Ex ZS 73 SR VD/VS: > 100 000 operations;
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IP65 IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db IP65
Approvals	PTB 06 ATEX 1066 X, IECEx PTB 07.0034 X



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Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 73 SR 1Ö/1S
2 NC contacts	Ex ZS 73 SR 2Ö

Type code

Ex ZS 73 SR 1Ö/1S VD-G-3D

Equipment Categ. 3D, Ex Zone 22
Indicator lamp for 3D, see accessories
VD Push button release (blank without mechanical latching)
1 NC/1 NO contact (2Ö)
SR Belt-alignment lever
Series
Ex certified component

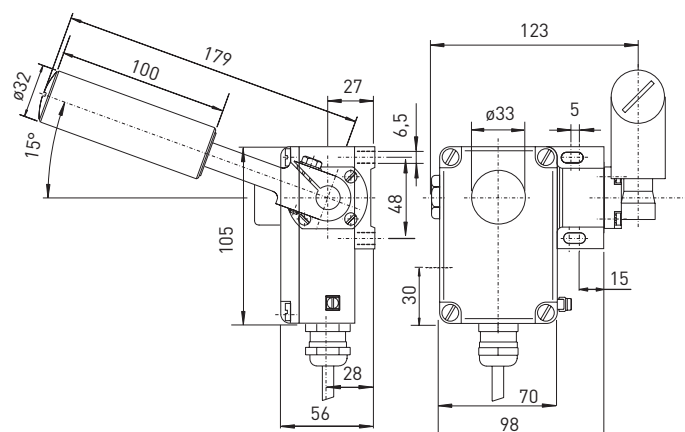
Ex belt-alignment switches

// Series Ex ZS 73 SR, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position on the left side, other positions possible on request
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

// Push-button release VD



Push-button release
Ex ZS 73 SR 10/1S VD-3m

Order Number
73031302

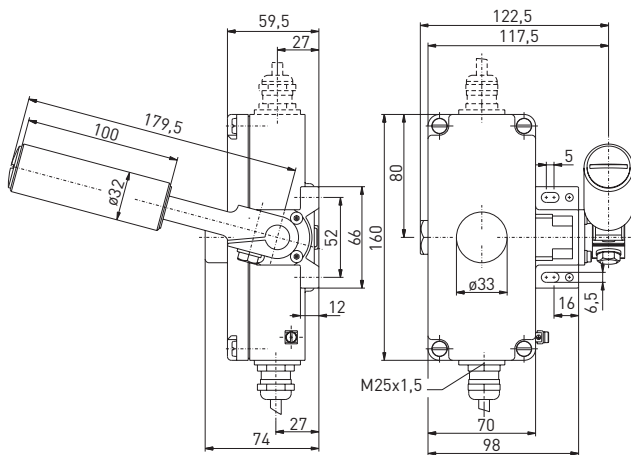
Ex belt-alignment switches

// Series Ex ZS 75 SR, variants

Features/Options

- Indicator lamps for zone 22 for 24VDC are indicated at the end of this chapter
- Indicator lamp position on the left side, other positions possible on request
- Version for equipment category 3D, dust Ex zone 22 is equipped with a wiring compartment

// Push-button release VD



Push-button release

Ex ZS 75 SR 10/1S VD-3m

Order Number

75031301

Ex ZS 75 SR 20/2S VD-3m

75331301

Belt-alignment switches

// Series Ex ZS 90 SR

// EX ZS 90 SR



Features/Options

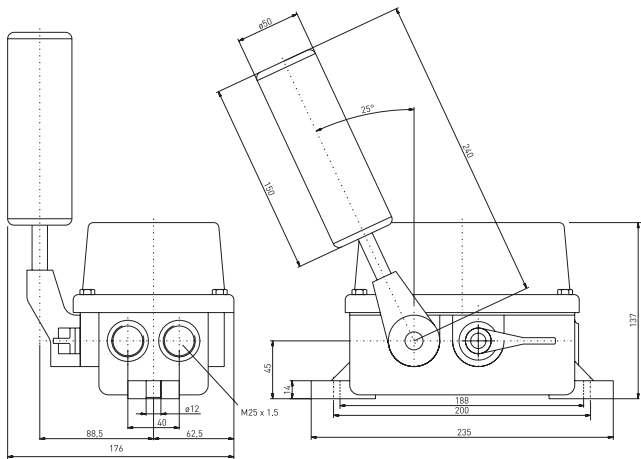
- Ex zone 1 and 21
- Thermoplastic enclosure
- 2 NC and 2 NO contacts
- With contact staggering:
 - 1 NC and 1 NO contact switching at 15°
 - 1 NC and 1 NO contact switching at 25°
- Possible with latching and release by lever
- Belt-alignment lever continuously adjustable

Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	Thermoset, UV resistant to EN ISO 4892
Cover	Thermoset, UV resistant to EN ISO 4892
Switch insert	Ex 14
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	1 NO/1 NC or 2 NO/2 NC contacts with double break
Switching system	slow action, positive break NC contacts ⊖
Connection	cable H05VV-F, length 3 m
B_{10d} (10 % load)	Ex ZS 90 SR VD: 200 000, Ex ZS 90 SR: 2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
Gebrauchskategorie	AC-15; DC 13
I_e/U_e	6 A/250 VAC; 0,25 A/230 VAC
Max. fuse rating	6 A gG D fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +95 °C
Mech. life	Ex ZS 90 SR VD: > 100 000 operations, Ex ZS 90 SR: > 1 million operations
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEX Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	PTB 03 ATEX 1070 X*, IECEX PTB 06.0098 X



* referring to the switch insert



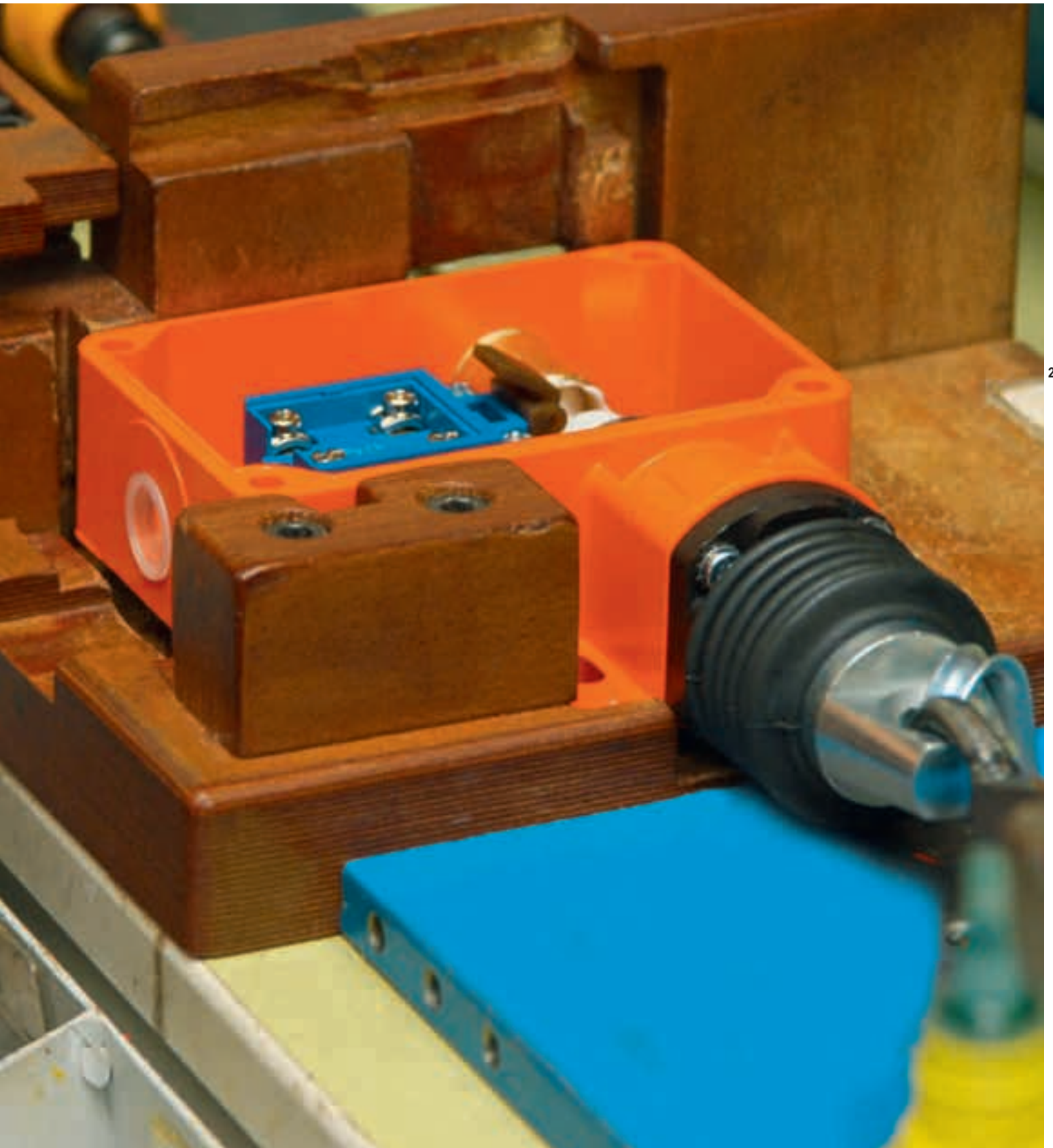
Contact variants: switch travel/contacts

	Slow action	Order number
2 NC/2 NO contacts	Ex ZS 90 SR 1ÖS/1ÖS 	76431302

Type code

Ex ZS 90 SR 1ÖS/1ÖS VD	VD lever release (blank without manual latching)
	2 NC/2 NO contacts
	SR belt-alignment lever
	Series
	Belt-alignment switch
	Ex certified component

PRODUCTION PROCESS ASSEMBLY
ASSEMBLY OF PULL-WIRE SWITCH







Ex pull-wire switches

// Series Ex 95 WH/90°

from page 263

// Series Ex/ExM 61 Z

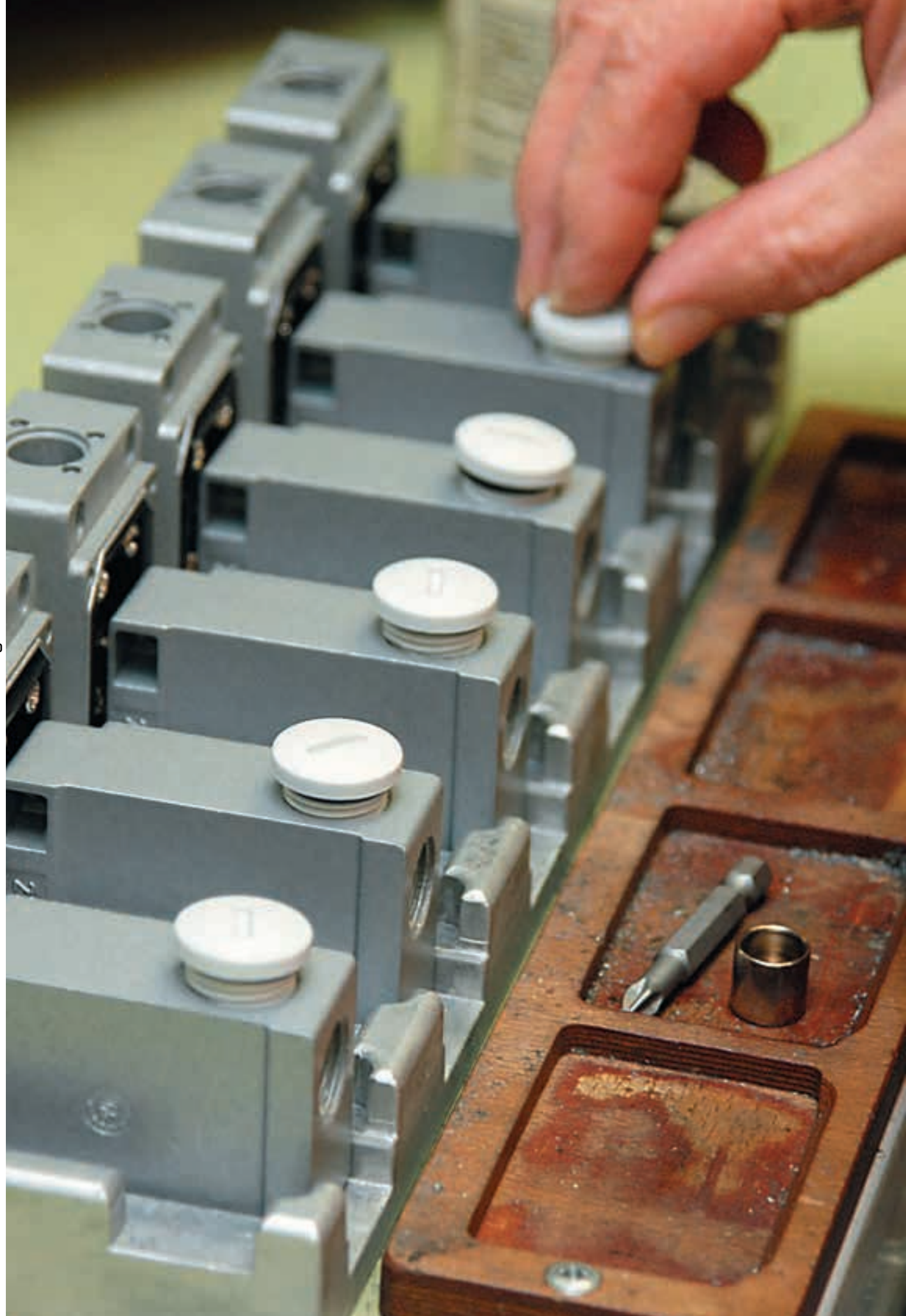
from page 264

// Series Ex ZS 71 Z

from page 266

// Accessories

from page 267



Ex pull-wire switches

Range of application

Ex pull-wire switches are suitable as transducers for starting machines or to open and close electrically-powered doors, gates and barriers.

Design and operating principle

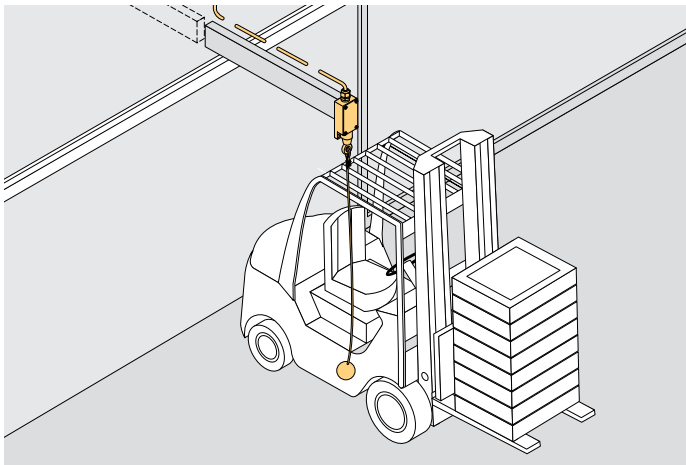
Ex pull-wire switches are actuated manually by pulling. The pull-wire switches generate a switching impulse on actuation.

In the appendix the mounting accessories for pull-wire switches can be selected.

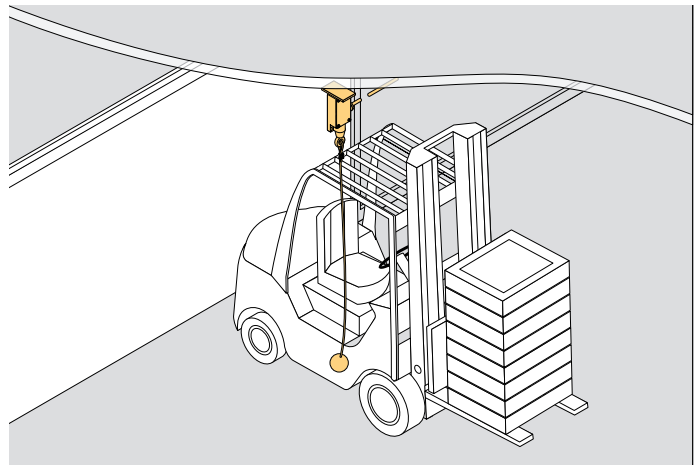
All Ex pull-wire switches presented in this chapter bear the CE mark according to the Low Voltage Directive 06/95/EC and to ATEX 94/9/EC. The Ex pull-wire switches per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

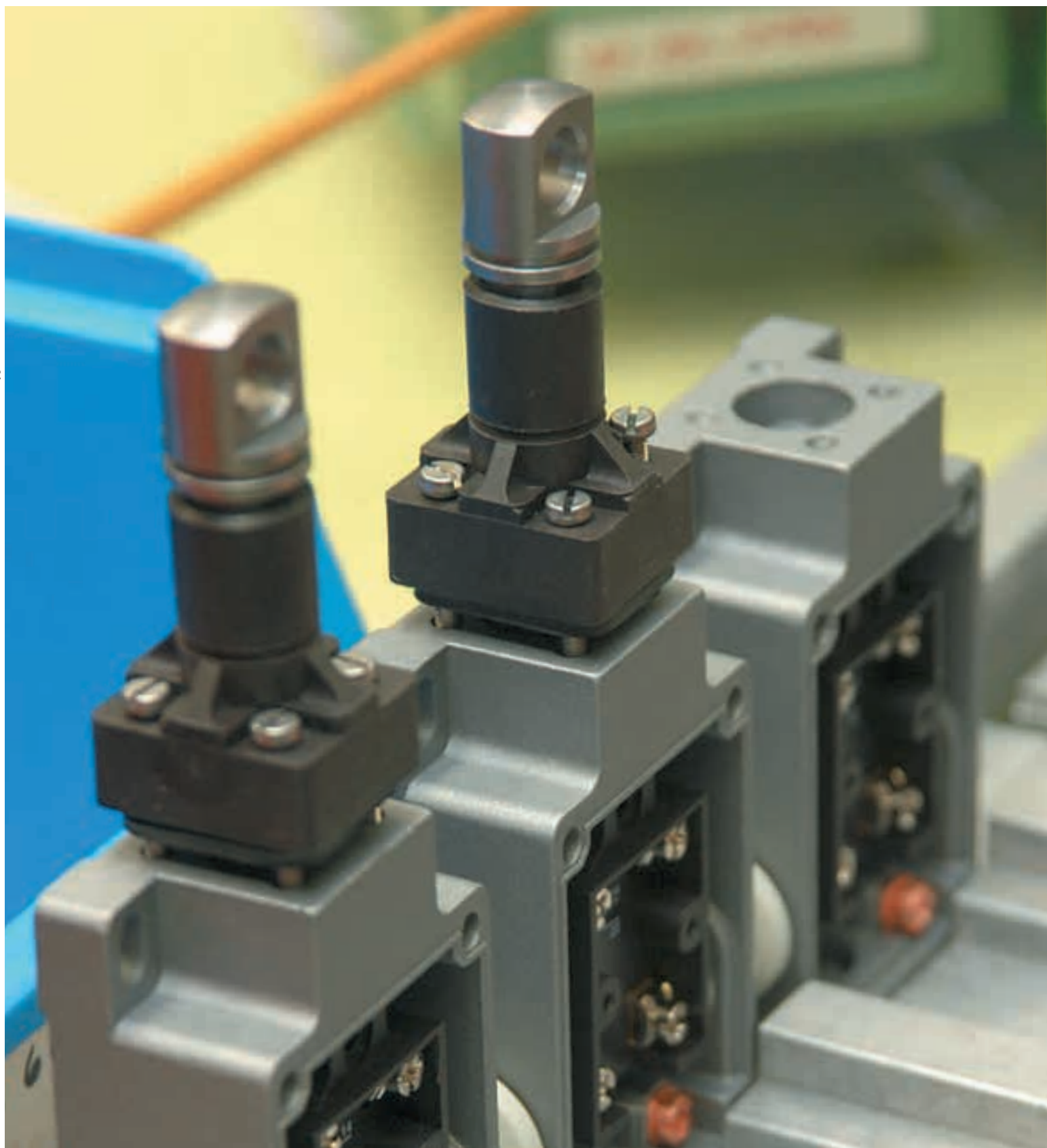
Application

Wall mounting as door opener



Ceiling mounting





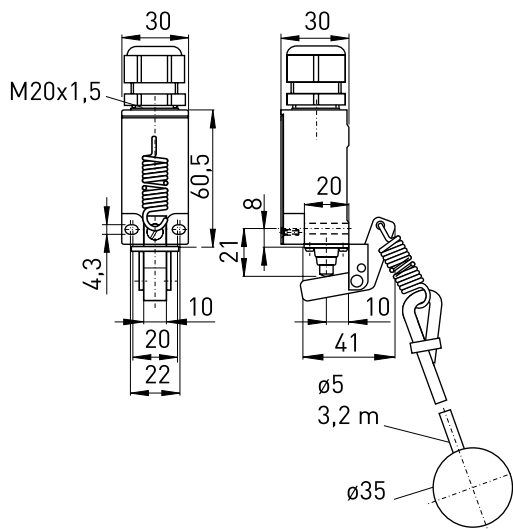
Ex pull-wire switches

// Series Ex 95 WH/90°

Features/Options

- Ex zone 1 and 21
- Thermoplastic enclosure
- Wall or ceiling mounting
- Slow action: 2 contacts
- With gold-plated contacts available on request
- Mounting details to EN 50 047
- Horizontal mounting slots
- Double insulated
- Special version only for dust Ex zone 22 available

// EX 95 WH/90°



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-7; EN 61241-0, EN 61241-1; EN ISO 13849-1
Design	DIN EN 50 047
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Switch insert	Ex 95
Protection class	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact ⊖
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	M3 screw clamps
Cable section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	M 20 x 1.5
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	6 A
Utilisation category	AC-15; DC-13
Ie/Ue	6 A/250 VAC; 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Mechanical life	> 1 million operations
Switching frequency	1800/h
Ambient temperature	- 20 °C ... + 60 °C
Actuating force	20 N
Features	pull-wire function
Ex marking	⊕ II 2G Ex de IIC T6, II 2D Ex td A21 IP67 T80°C
Approvals	DMT 01 ATEX E 118; IECEx in 2012

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Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex 95 WH/90° 10/1S

Type code

Ex 95 WH/90° 10/1S-3D	
	Equipment Categ. 3D, dust Ex zone 22
	1 NC/1 NO contact
	WH/90° Actuator with pull-wire
	Series
	Ex certified component

Ex pull-wire switches

// Series Ex/ExM 61 Z

Features/Options

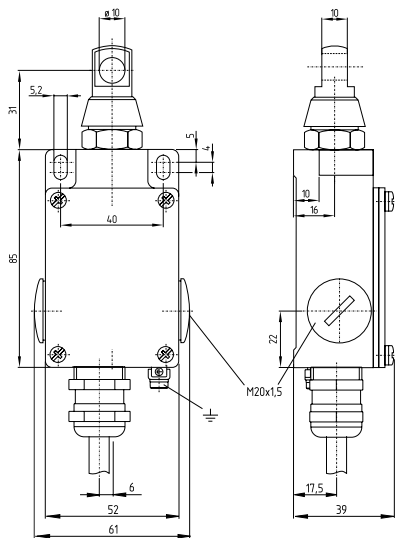
- Ex zone 1 and 21
- Metal enclosure
- Wall mounting
- Slow or snap action: 2 contacts
- Various spring force variants (actuating forces)
- Pull-wire function

// EX/EXM 61 Z



Technical data

Standards	EN 60947-5-1; EN 1088; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	steel, enamel finish
Switch insert	Ex 14, ExM 14
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action, positive break NC contact ⊖
Switching elements	ExM 61: change-over contact Form C, Ex 61: change-over with double break Zb, galvanically separated contact bridges
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	Ex 61 Z: 2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
I_e/U_e	6 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy	± 0.1 mm
Contact gap	max. 2 x 4.5 mm
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T95°C Db IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T95°C Db
Approvals	Ex 61: PTB 03 ATEX 1070 X*; IECEx PTB 06.0098X ExM 61: PTB 03 ATEX 1069 X*



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	ExM 61 Z 10/1S 	Ex 61 Z 10/1S

Type code

Ex M 61 WZ 10/1S

1 NC/1 NO contact
Z Actuator towing eye
W Watertight collar
Snap action
Series

Ex certified component: Ex Slow action (ExM Snap action)

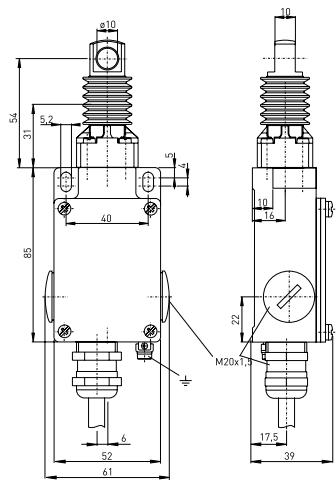
Ex pull-wire switches

// Series Ex/ExM 61 Z, variants

Features/Options

- Watertight collar W to protect against the entry of foreign bodies

// Watertight collar W



Ex pull-wire switches

// Series Ex ZS 71 Z

Features/Options

- Ex zone 1 and 21
- Metal enclosure
- Wall mounting
- Slow action: 2 contacts
- Pull-wire function
- Ex indicator lamp for zone 22 available, see accessories
- Special version only for dust Ex zone 22

Technical data

Standards	EN 60947-5-1, -5; EN 60079-0, EN 60079-1, EN 60079-31; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	thermoplastic, ultramid
Switch insert	Ex 14
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts \ominus to EN 60947-5-1
Switching elements	change-over contact with double break, galvanically separated contact bridges
Connection	cable H05VV-F, length 3 m
Cable section	4 x 0.75mm ² (incl. conductor ferrules)
B_{10d} (10 % load)	2 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	T6: 6 A; T5: 3 A
Utilisation category	AC-15, DC-13
I_e/U_e	6 A/250 VAC, 0.25 A/230 VDC
Max. fuse rating	6 A gG/gN-fuse
Ambient temperature	T6: -20 °C ... +65 °C; T5: -20 °C ... +95 °C
Mechanical life	> 1 million operations
Indicator lamp	as option
Switching frequency	1800/h
Features	pull-wire function
Ex marking	⊕ II 2G Ex d IIC T6/T5 Gb, II 2D Ex tb IIIC T80°C/T90°C Db IECEx Ex d IIC T6/T5 Gb, Ex tb IIIC T80°C/T90°C Db
Approvals	PTB 06 ATEX 1065 X, IECEx PTB 07.0034 X

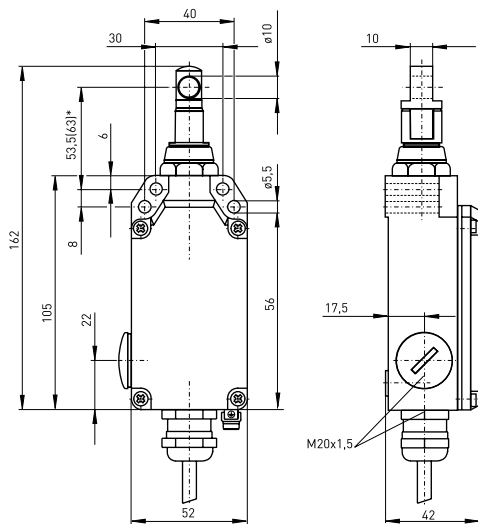


Type code

Ex ZS 71 W Z 10/1S-3D

Equipment Categ. 3D,
dust Ex zone 22
1 NC/1 NO contact
Z Actuator towing eye
W Watertight collar
Series
ZS Pull-wire switch
Ex certified component

// EX ZS 71 Z



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	Ex ZS 71 Z 10/1S

Ex pull-wire switches

// Accessories

// Accessories	// Order number
<p>Indicator lamp Multi-LED coloured</p> <ul style="list-style-type: none"> - Lamp cap red, green or yellow - M20 x 1.5 - 24 VDC - Ordering unit: 1 piece 	<div data-bbox="576 383 699 544" data-label="Image"> </div> <div data-bbox="863 376 1458 461" data-label="Text"> <p>Indicator lamp Ex-LED rot 24 VDC M20-3G 04.00.7122 Meldeleuchte Ex-LED grün 24 VDC M20-3G 04.00.7123 Indicator lamp Ex-LED gelb 24 VDC M20-3G 04.00.7124</p> </div>
<p>Indicator lamp Multi-LED clear</p> <ul style="list-style-type: none"> - Lamp cap clear - M20 x 1.5 - 24 VDC, 115 VAC or 230 VAC - Ordering unit: 1 piece 	<div data-bbox="576 584 699 745" data-label="Image"> </div> <div data-bbox="863 573 1458 600" data-label="Text"> <p>Indicator lamp Ex-LED klar 24 VDC M20-3G 04.00.7125</p> </div>
<p>Pull-wire for pull-wire switches</p> <ul style="list-style-type: none"> - Pull-wire yellow (polypropylene) - 1, 2, 3 or 4 m long - With rubber ball and Duplex wire clamp - Ordering unit: 1 piece 	<div data-bbox="571 790 703 931" data-label="Image"> </div> <div data-bbox="863 770 1458 880" data-label="Text"> <p>Pull-wire with ball pull-wire switches 1 m 04.73.7106 Pull-wire with ball pull-wire switches 2 m 04.73.7107 Pull-wire with ball pull-wire switches 3 m 04.73.7108 Pull-wire with ball pull-wire switches 4 m 04.73.7109</p> </div>



Ex magnetic sensors

Cylindrical design

// Series Ex RC 12

from page 272

// Series Ex RC 13,5

from page 274

// Series Ex RC M14

from page 276

// Series Ex RC 15

from page 278

// Series Ex RC M20

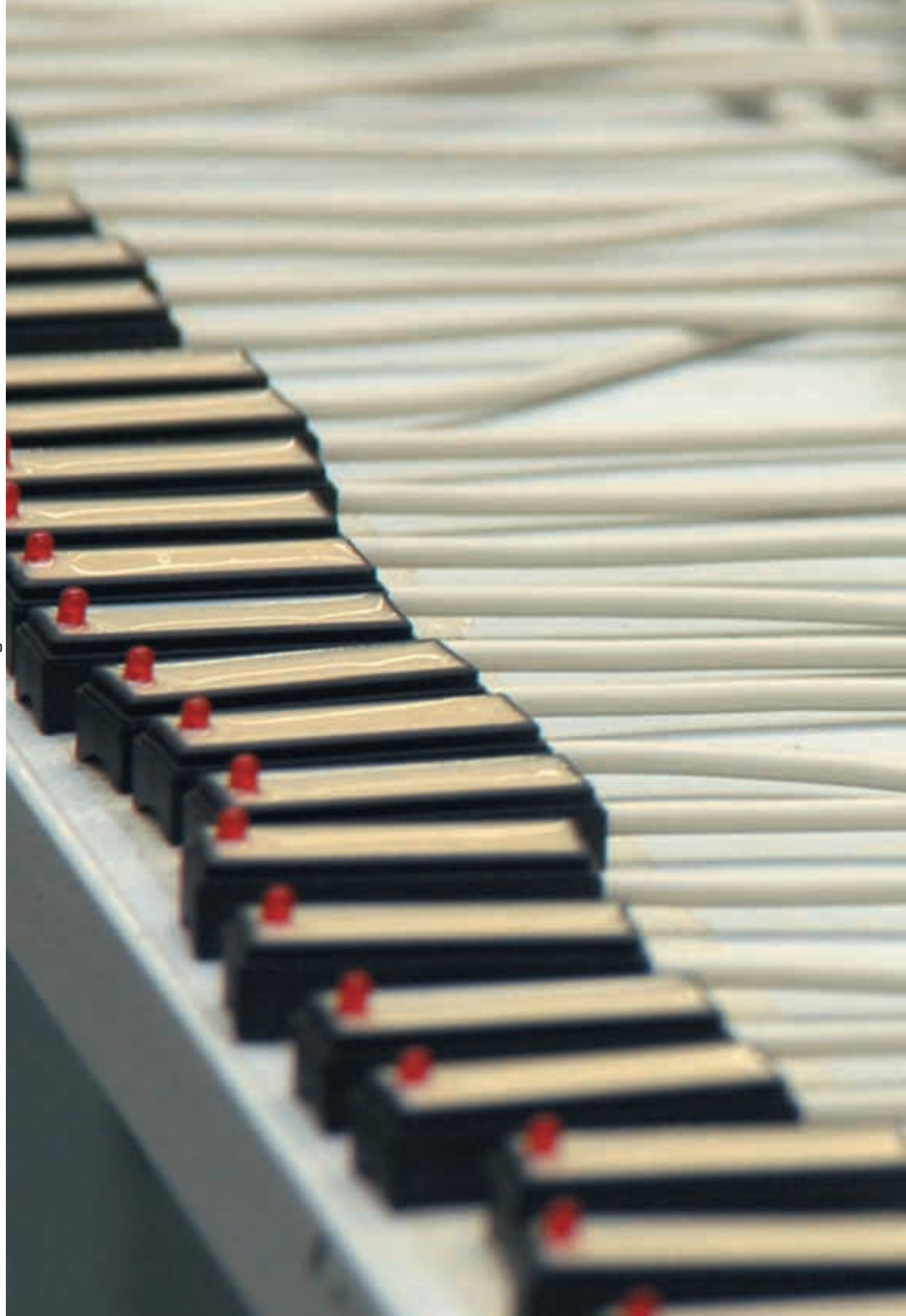
from page 280

Rectangular design

// Series Ex RC 2580

from page 286





Ex magnetic sensors

Range of application

Ex magnetic sensors are preferable where extreme dirt occurs or strict hygienic requirements must be met. This is because they are easy to clean. The high degree of protection allows for outside applications.

Even in the presence of aggressive materials, e.g. in galvanisation technology, safe switching is ensured through encapsulation of the contacts. A further advantage is the possibility of concealed mounting behind non-magnetic materials. Workplace surfaces can be designed without dirt-catching edges, functional spacings or covers.

For applications where a precise approach of the magnet to the sensor is not possible and highly fluctuating actuating distances occur Ex magnetic sensors are also suitable.

Design and operating principle

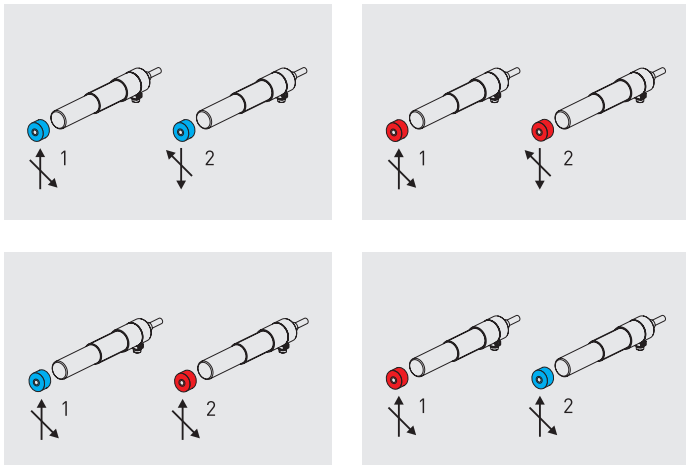
The Ex magnetic sensors are actuated by an M series permanent magnet, described at the end of this chapter, without any mechanical contact. The devices can be selected with NO, change-over or bistable contacts. All magnetic sensors described in this chapter are supplied with pre-wired cables.

The mounting site for magnetic sensors must be free of magnetic fields.

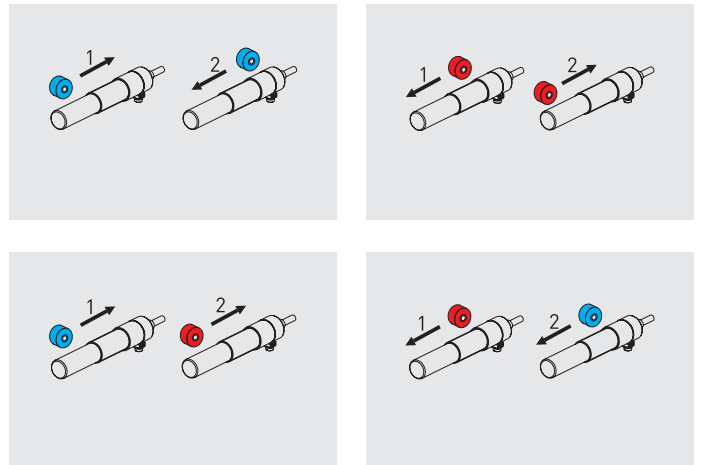
The magnetic sensors described in this chapter bear the CE mark according to the Low Voltage Directive 06/95/EC and to ATEX 94/9/EC. The Ex magnetic sensors per equipment category 3G/D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Operating principle

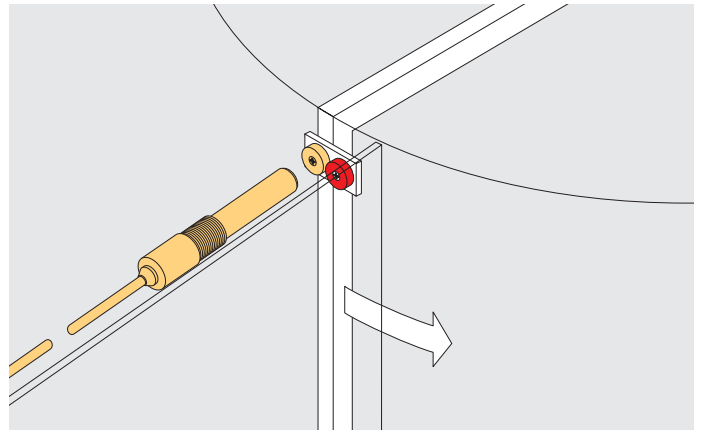
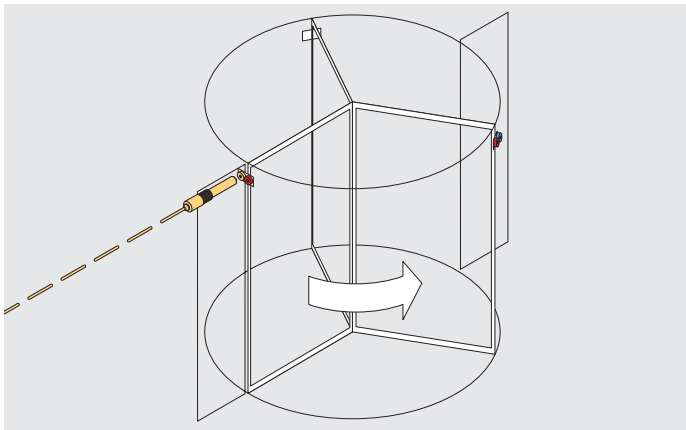
Magnetic sensors change-over contact, actuation from front



Magnetic sensors change-over contact, actuation from side



Magnetic sensors on a revolving door



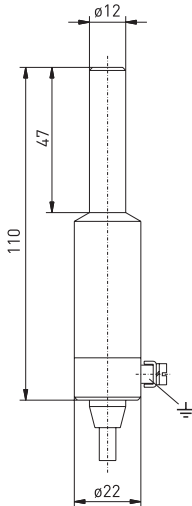
Ex magnetic sensors, cylindrical design

// Series Ex RC 12

Features/Options

- Ex zone 1 and 21
- Brass enclosure, nickered
- Long life
- 1 Reed contact
- Actuation from front
- Switching distance up to 25 mm depending on the actuating magnet
- With pre-wired cable
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC 12



Technical data

Standards	EN 60947-5-2; IEC/EN 60079-0; IEC/EN 60079-18; IEC 61241-0, -1
Enclosure	brass, nickered
Actuator	series M permanent magnet
Protection class	IP 67 according to EN 60529
Contact material	silver
Switching system	reed contacts
Contact types	NC contact, NO contact or change-over contact
Connection	cable, H05VV-F or Laptherm 145, length 2, 5, or 10 m
Cable section	1S, 1Ö: 3 x 0.75 mm ² , 1W: 4 x 0.75 mm ²
Switching voltage	250 V
Switching current	1,5 A
Switching capacity	1Ö, 1W: max. 50 VA/W, 1S: max. 100 VA/W
Utilisation category	AC-15, DC-13
Bounce duration	0.3 ... 0.6 ms
Ambient temperature	H05VV-F: -20 °C ... +70 °C, on request: -40 °C ... +70 °C
Mechanical life	> 1 million operations
Electrical life	10 ⁶ ... 10 ⁷ operations
Resistance to vibrations	1S: 50 ... 100 g, 1Ö, 1W: 10 ... 50 g
Ex marking	⊕ II 2G Ex mb IIC T6 Gb, II 2D Ex mb IIIC T80°C Db IP67 IECEx Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 058 X, IECEx BVS 07.0007 X



Contact variants: switch travel/contacts

	actuation from front
1 NC contact	Ex RC 12 1Ö BU — BN
1 NO contact	Ex RC 12 1S BU — BN
1 change-over	Ex RC 12 1W BN — BK BU

Type code

Ex RC 12 1W-3G/D

Equipment Categ. 3G/D,
Ex Zone 2 and 22
1 change-over (1Ö, 1S)
Enclosure diameter 12 mm
Magnetic sensor
Ex certified component

Features/Options

- Version for low temperatures up to -40 °C with Lappterm 145 cable available

Actuating distances

Actuating direction	from front	from front	from front
Switch travel			
Contacts	1 NC contact	1 NO contact	1 change-over contact
Actuating direction	N or S	N or S	N or S
Actuating magnet	Switching distance [mm] on off	Switching distance [mm] on off	Switching distance [mm] on off
M 50 U	4 7	- -	4 7
M 100	10 13	3 11	10 13
M 100 U	10 13	3 11	10 13
M 200	13 16	7 17	13 16
M 200 U	13 16	7 17	13 16
M 300	17 20	10 24	17 20
M 300 U	17 20	10 24	17 20
M 400 U	33 37	28 43	33 37
M 700	30 35	25 40	30 35

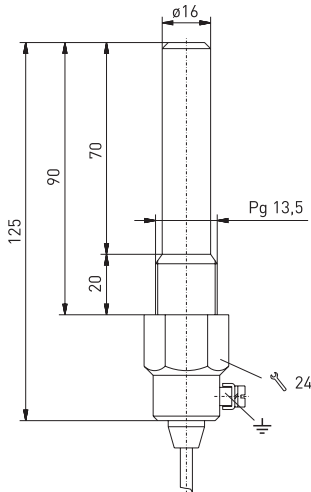
Ex magnetic sensors, cylindrical design

// Series Ex RC 13,5

Features/Options

- Ex zone 1 and 21
- Brass enclosure, nickered
- Long life
- 1 Reed contact
- Actuation from front
- Switching distance up to 30 mm depending on the actuating magnet
- With pre-wired cable
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC 13,5



Technical data

Standards	EN 60947-5-2; IEC/EN 60079-0; IEC/EN 60079-18; IEC 61241-0, -1
Enclosure	brass, nickered
Actuator	series M permanent magnet
Protection class	IP 67 according to EN 60529
Contact material	silver
Switching system	reed contacts
Contact types	NC contact, NO contact or change-over contact
Connection	cable, H05VV-F or Laptherm 145, length 2, 5, or 10 m
Cable section	1S, 1Ö: 3 x 0.75 mm ² , 1W: 4 x 0.75 mm ²
Switching voltage	250 V
Switching current	1.5 A
Switching capacity	1Ö, 1W: max. 50 VA/W, 1S: max. 100 VA/W
Utilisation category	AC-15, DC-13
Bounce duration	0.3 ... 0.6 ms
Ambient temperature	H05VV-F: -20 °C ... +70 °C, on request: -40 °C ... +70 °C
Mechanical life	> 1 million operations
Electrical life	10 ⁶ ... 10 ⁷ operations
Resistance to vibrations	1S: 50 ... 100 g, 1Ö, 1W: 10 ... 50 g
Ex marking	⊕ II 2G Ex mb IIC T6 Gb, II 2D Ex mb IIIC T80°C Db IP67 IECEx Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 058 X, IECEx BVS 07.0007 X



Contact variants: switch travel/contacts

	actuation from front
1 NC contact	Ex RC 13,5 1Ö BU — BN
1 NO contact	Ex RC 13,5 1S BU — BN
1 change-over	Ex RC 13,5 1W BN — BK BU

Type code

Ex RC 13,5 1W-3G/D

Equipment Categ. 3G/D,
Ex Zone 2 and 22
1 change-over (1S, 1Ö)
Enclosure diameter 16 mm, mounting
thread Pg 13.5
Magnetic sensor
Ex certified component

Features/Options

- Version for low temperatures up to -40 °C with Lapptherm 145 cable available

Actuating distances

Actuating direction	from front	from front	from front
Switch travel			
Contacts	1 NC contact	1 NO contact	1 change-over contact
Actuating direction	N or S	N or S	N or S
Actuating magnet	Switching distance [mm] on off	Switching distance [mm] on off	Switching distance [mm] on off
M 50 U	4 7	- -	4 7
M 100	10 13	3 11	10 13
M 100 U	10 13	3 11	10 13
M 200	13 16	7 17	13 16
M 200 U	13 16	7 17	13 16
M 300	17 20	10 24	17 20
M 300 U	17 20	10 24	17 20
M 400 U	33 37	28 43	33 37
M 700	30 35	25 40	30 35

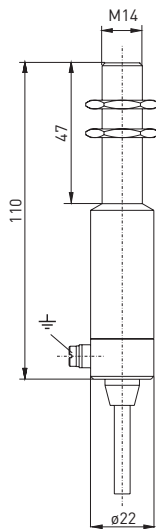
Ex magnetic sensors, cylindrical design

// Series Ex RC M14




Features/Options

- Ex zone 1 and 21
- Brass enclosure, nicked
- Including 2 mounting nuts
- Long life
- 1 Reed contact
- Actuation from front
- Switching distance up to 30 mm depending on the actuating magnet
- With pre-wired cable
- Special version only for gas Ex zone 2 and dust Ex zone 22 available



// EX RC M14



Technical data

Standards	EN 60947-5-2; IEC/EN 60079-0; IEC/EN 60079-18; IEC 61241-0, -1
Enclosure	brass, nicked
Actuator	series M permanent magnet
Protection class	IP 67 according to EN 60529
Contact material	silver
Switching system	reed contacts
Contact types	NO contact or change-over contact
Connection	cable, Ölflex 540 P, halogen-free, length 2, 5, or 10 m
Cable section	1S: 3 x 0.75 mm ² , 1W: 4 x 0.75 mm ²
Switching voltage	250 V
Switching current	0.5 A
Switching capacity	1W: max. 30 VA/W, 1S: max. 100 VA/W
Utilisation category	AC-15, DC-13
Bounce duration	0.3 ... 0.6 ms
Ambient temperature	-20 °C ... +70 °C
Mechanical life	> 1 million operations
Electrical life	10 ⁶ ... 10 ⁹ operations
Resistance to vibrations	1S: 50 ... 100 g, 1Ö, 1W: 10 ... 50 g
Ex marking	⊕ II 2G Ex mb IIC T6 Gb, II 2D Ex mb IIIC T80°C Db IP67 IECEX Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 058 X, IECEx BVS 07.0007 X   

Contact variants: switch travel/contacts

	actuation from front
1 NO contact	Ex RC M14 1S BU  BN
1 change-over	Ex RC M14 1W BN  BK BU

Type code

Ex RC M14 1W-3G/D

Equipment Categ. 3G/D,
Ex Zone 2 and 22
1 change-over (1S, 1Ö)
Enclosure diameter M14 x 1
Magnetic sensor
Ex certified component

Features/Options

- Version for low temperatures up to -40 °C with Lapptherm 145 cable available

Actuating distances

Actuating direction	from front	from front	from front
Switch travel			
Contacts	1 NC contact	1 NO contact	1 change-over contact
Actuating direction	N or S	N or S	N or S
Actuating magnet	Switching distance [mm] on off	Switching distance [mm] on off	Switching distance [mm] on off
M 50 U	4 7	- -	4 7
M 100	10 13	3 11	10 13
M 100 U	10 13	3 11	10 13
M 200	13 16	7 17	13 16
M 200 U	13 16	7 17	13 16
M 300	17 20	10 24	17 20
M 300 U	17 20	10 24	17 20
M 400 U	33 37	28 43	33 37
M 700	30 35	25 40	30 35

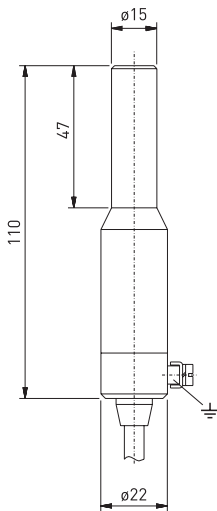
Ex magnetic sensors, cylindrical design

// Series Ex RC 15

Features/Options

- Ex zone 1 and 21
- Brass enclosure, nickered
- Long life
- 1 Reed contact
- Actuation from front
- Switching distance up to 30 mm depending on the actuating magnet
- With pre-wired cable
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC 15



Technical data

Standards	EN 60947-5-2; IEC/EN 60079-0; IEC/EN 60079-18; IEC 61241-0, -1
Enclosure	brass, nickered
Actuator	series M permanent magnet
Protection class	IP 67 according to EN 60529
Contact material	silver
Switching system	reed contacts
Contact types	NC contact, NO contact or change-over contact
Connection	cable, H05VV-F or Laptherm 145, length 2, 5, or 10 m
Cable section	1S, 1Ö: 3 x 0.75 mm ² , 1W: 4 x 0.75 mm ²
Switching voltage	250 V
Switching current	1.5 A
Switching capacity	1Ö, 1W: max. 50 VA/W, 1S: max. 100 VA/W
Utilisation category	AC-15, DC-13
Bounce duration	0.3 ... 0.6 ms
Ambient temperature	H05VV-F: -20 °C ... +70 °C, on request: -40 °C ... +70 °C
Mechanical life	> 1 million operations
Electrical life	10 ⁶ ... 10 ⁷ operations
Resistance to vibrations	1S: 50 ... 100 g, 1W: 10 ... 50 g
Ex marking	⊕ II 2G Ex mb IIC T6 Gb, II 2D Ex mb IIIC T80°C Db IP67 IECEx Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 058 X, IECEx BVS 07.0007 X



Contact variants: switch travel/contacts

	actuation from front
1 NC contact	Ex RC 15 1Ö BU — BN
1 NO contact	Ex RC 15 1S BU — BN
1 change-over	Ex RC 15 1W BN — BK BU

Type code

Ex RC 15 1W-3G/D

Equipment Categ. 3G/D,
Ex Zone 2 and 22
1 change-over (1S, 1Ö)
Enclosure diameter 15 mm
Magnetic sensor
Ex certified component

Features/Options

- Version for low temperatures up to -40 °C with Lappterm 145 cable available

Actuating distances

Actuating direction	from front	from front	from front
Switch travel			
Contacts	1 NC contact	1 NO contact	1 change-over contact
Actuating direction	N or S	N or S	N or S
Actuating magnet	Switching distance [mm] on off	Switching distance [mm] on off	Switching distance [mm] on off
M 50 U	4 7	- -	4 7
M 100	10 13	3 11	10 13
M 100 U	10 13	3 11	10 13
M 200	13 16	7 17	13 16
M 200 U	13 16	7 17	13 16
M 300	17 20	10 24	17 20
M 300 U	17 20	10 24	17 20
M 400 U	33 37	28 43	33 37
M 700	30 35	25 40	30 35

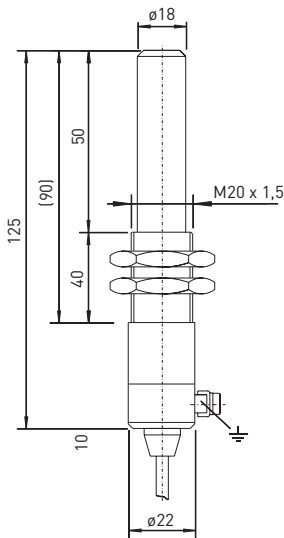
Ex magnetic sensors, cylindrical design

// Series Ex RC M20

Features/Options

- Ex zone 1 and 21
- Brass enclosure, nickel, available in stainless steel
- Including 2 mounting nuts
- 1 Reed contact
- Actuation from front, from side only with bistable contact
- Switching distance up to 30 mm depending on the actuating magnet
- With pre-wired cable
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC M20



Technical data

Standards	EN 60947-5-2; IEC/EN 60079-0; IEC/EN 60079-18; IEC 61241-0, -1
Enclosure	brass, nickel
Actuator	series M permanent magnet
Protection class	IP 67 according to EN 60529
Contact material	silver
Switching system	reed contacts
Switching elements	NO contact or change-over, bistable contact or bistable change-over contact
Connection	cable, H05VV-F or Lappterm 145, length 2, 5, or 10 m
Cable section	1S, 1Sr: 3 x 0.75 mm ² , 1W, 1Wr: 4 x 0.75 mm ²
Switching voltage	250 V
Switching current	1.5 A
Switching capacity	1W, 1Wr: max. 50 VA/W, 1S, 1Sr: max. 100 VA/W
Utilisation category	AC-15, DC-13
Bounce duration	0.3 ... 0.6 ms
Ambient temperature	H05VV-F: -20 °C ... +70 °C, on request: -40 °C ... +70 °C
Mechanical life	> 1 million operations
Electrical life	10 ⁶ ... 10 ⁷ operations
Resistance to vibrations	1S: 50 ... 100 g, 1Ö, 1W: 10 ... 50 g
Ex marking	⊕ II 2G Ex mb IIC T6 Gb, II 2D Ex mb IIIC T80°C Db IP67 IECEx Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 058 X, IECEx BVS 07.0007 X



Contact variants: switch travel/contacts

	actuation from front	actuation from side
1 NO contact	Ex RC M20 1S BU —→ BN	
1 bistable contact	Ex RC M20 1Sr BU —→ BN	Ex RC M20 1Sr BU —→ BN
1 change-over	Ex RC M20 1W BN —→ BK BU	
1 change-over bistable	Ex RC M20 1Wr BN —→ BK BU	Ex RC M20 1Wr BN —→ BK BU

Type code

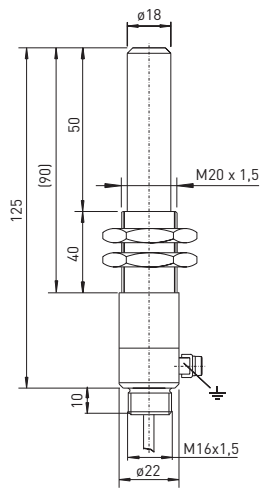
Ex RC M20 1W-B-3G/D

Equipment Categ. 3G/D,
Ex Zone 2 and 22
B Tapped bushing
M16 x 1.5
1 change-over (1S, 1Sr, 1Wr)
Enclosure diameter 18 mm,
mounting thread M20 x 1.5
Magnetic sensor
Ex certified component

Features/Options

- Ex RC M20-B, variant with tapped bushing M16 x 1.5
- Version for low temperatures up to -40 °C with Lapptherm 145 cable available

// Tapped bushing B



Ex magnetic sensors, cylindrical design

// Series Ex RC M20

Actuating distances

	from front		from front		from front	
	on	off	on	off	on	off
Actuating direction	from front		from front		from front	
Switch travel						
Contacts Actuating direction	1 change-over contact N or S		1 bistable contact N/S		1 change-over contact bistable N/S	
Actuating magnet	Switching distance [mm]		Switching distance [mm]		Switching distance [mm]	
M 50 U	4	7	12	6	-	-
M 100	10	13	22	12	20	40
M 100 U	10	13	22	12	20	40
M 200	13	16	30	30	25	50
M 200 U	13	16	30	30	25	50
M 300	17	20	37	23	30	60
M 300 U	17	20	37	23	30	60
M 400 U	33	37	63	43	50	90
M 700	30	35	60	40	50	75
Actuating direction	from side		from side			
Switch travel						
Contacts Actuating direction	1 bistable contact N or S		1 change-over contact bistable N or S			
Actuating magnet	Switching distance [mm]		Switching distance [mm]			
M 50 U			-	-		
M 100			15	20		
M 100 U			15	20		
M 200			20	25		
M 200 U			20	25		
M 300			25	30		
M 300 U			25	30		
M 400 U			30	35		
M 700			40	50		

Ex magnetic sensors, cylindrical design

// Actuating magnets

Features/Options

M 50 N U, M 100 N U, M 200 N U

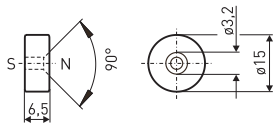
- Not encapsulated
- Barium ferrite
- Ambient temperature: -40 °C ... +80 °C

Features/Options

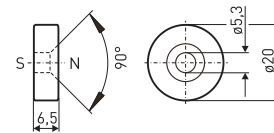
M 100 S, M 100 N, M 200 S

- Thermoplastic enclosure polyamide 6.6, blue S or red N
- Barium ferrite
- Ambient temperature: -40 °C ... +80 °C

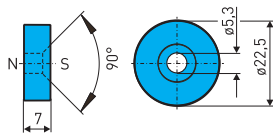
// Actuator M 50 N U



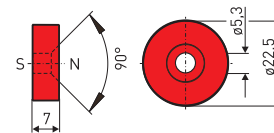
// Actuator M 100 N U



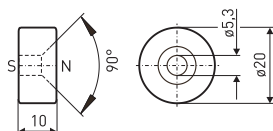
// Actuator M 100 S



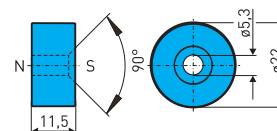
// Actuator M 100 N



// Actuator M 200 N U



// Actuator M 200 S



Ex magnetic sensors, cylindrical design

// Actuating magnets

Features/Options

M 300 N U, M 300 U B, M 400 N U

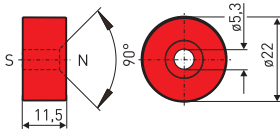
- Not encapsulated
- M 300 U: North pole with colour marking (red dot)
- Barium ferrite
- Ambient temperature: -40 °C ... +80 °C

Features/Options

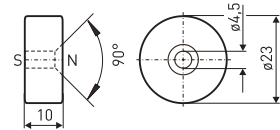
M 200 N, M 300 S, M 300 N

- Thermoplastic enclosure polyamide 6.6, blue S or red N
- Barium ferrite
- Ambient temperature: -40 °C ... +80 °C

// Actuator M 200 N

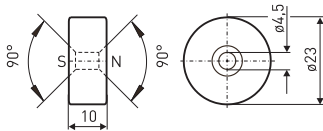


// Actuator M 300 N U

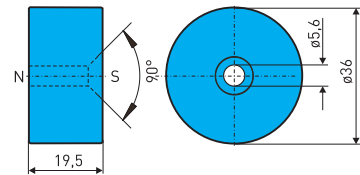


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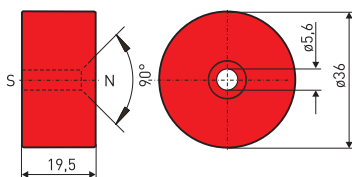
// Actuator M 300 U B



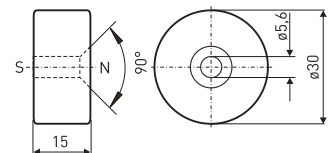
// Actuator M 300 S



// Actuator M 300 N



// Actuator M 400 N U



Features/Options

M 400 U B

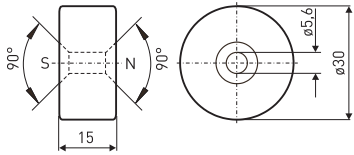
- Not encapsulated
- Barium ferrite
- Ambient temperature: -40 °C ... +80 °C

Features/Options

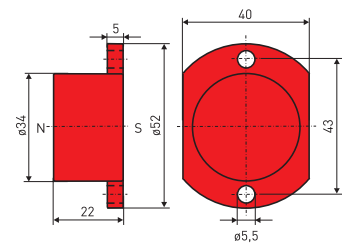
M 700 N

- Thermoplastic enclosure polyamide 6.6, red N
- Barium ferrite
- Ambient temperature: -40 °C ... +80 °C

// Actuating magnet M 400 U B



// Actuator M 700 N



Ex magnetic sensors, rectangular design

// Series Ex RC 2580

Features/Options

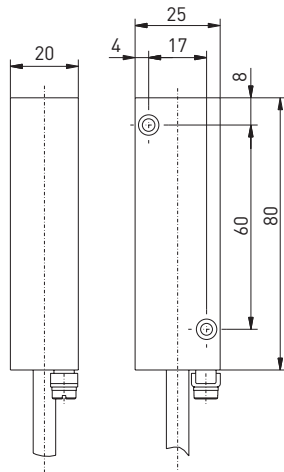
- Ex zone 1 and 21
- Stainless steel enclosure
- 1 Reed contact
- application down to -40 °C possible
- Actuation from side
- Switching distance up to 30 mm
- With pre-wired cable
- Special version only for gas Ex zone 2 and dust Ex zone 22 available

// EX RC 2580



Technical data

Standards	EN 60947-5-2; IEC/EN 60079-0; IEC/EN 60079-18; IEC 61241-0, -1
Enclosure	stainless steel 1.4571
Actuator	Ex M 2580, stainless steel 1.4571
Protection class	IP 67 according to EN 60529
Contact material	silver
Switching system	reed contacts
Switching elements	change-over contact
Connection	cable, Ölflex 540 P, halogen-free, length 2, 5, or 10 m
Cable section	4 x 0.75 mm ²
Switching voltage	250 V
Switching current	1.5 A
Switching capacity	max. 50 VA/W
Utilisation category	AC-15, DC-13
Bounce duration	0.3 ... 0.6 ms
Ambient temperature	-40 °C ... +70 °C
Mechanical life	> 1 million operations
Electrical life	10 ⁶ ... 10 ⁹ operations
Resistance to vibrations	10 ... 50 g
Ex marking	⊕ II 2G Ex mb IIC T6 Gb, II 2D Ex mb IIIC T80°C Db IP67 IECEX Ex mb II T6, Ex tD A21 IP67 T80°C
Approvals	DMT 01 ATEX E 058 X, IECEX BVS 07.0007 X



Contact variants: switch travel/contacts

	actuation from side
1 change-over	Ex RC 2580 1W

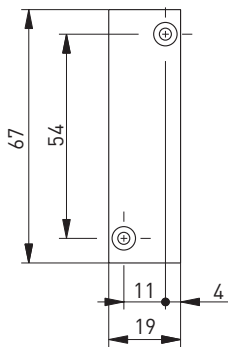
Type code

Ex	RC	2580	1W-B-3G/D	
				Equipment Categ. 3G/D, Ex Zone 2 and 22
				B Tapped bushing M16 x 1.5
				1 change-over contact
				Series
				Magnetic sensor
				Ex certified component

Features/Options

- Ex RC 2580-B, variant with tapped bushing M16 x 1.5
- Actuator Ex M 2580 must be ordered separately, not provided in delivery of sensor

// Actuating magnet Ex M 2580







Ex inductive sensors

// Series Ex IS M12
from page 292

// Series Ex IS M12-ST
from page 294

// Series Ex IS M18
from page 296

// Series Ex IS M18-ST
from page 298

// Series Ex IS M30
from page 300

// Series Ex IS M30-ST
from page 302

// Relay module Ex RM 1W 1
from page 304



Ex inductive sensors

Range of application

Ex inductive sensors are suitable for the positioning and controlling of machines and systems in many areas with explosive endangered industrial applications.

They are generally used as an alternative to mechanically operated limit switches in cases where unfavourable operating conditions, such as high or low actuating speeds, large switching frequencies, extreme dirt or dust production, high humidity, chemical atmospheres, highly fluctuating actuating distances, etc., occur. Even in the presence of aggressive materials, safe switching is ensured through encapsulation of the contacts.

Design and mode of operation

The Ex inductive sensors change their current consumption or their internal resistance with the approach of metal to the sensor surface. As output signals the changed current or the changed internal resistance are available.

The degree of protection IP 67 even permits safe application under rough ambient conditions. In addition, Ex inductive sensors are available with plug-in connectors for equipment category 3D, dust Ex zone 22.

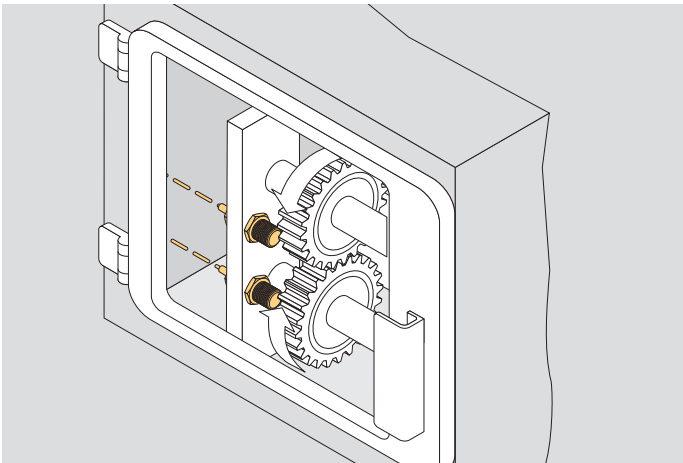
The Ex IS M12/M18/M30 range is offered as a complete system with a relay module. The relay module, which is suitable for cabinet mounting, supplies the required intrinsic power for the sensor and transmits the sensor signal. The function of the input circuit can be programmed as NO or NC contact.

The LEDs of the Ex RM 1W 1 relay module indicate the operational condition of the sensor, as well as possible malfunctions such as wire breakages and short-circuits.

All Ex inductive sensors shown in this chapter bear the CE mark according to the EMC Directive 2004/108/EC and according to ATEX 94/9/EC. The Ex safety switches for hinged guards per equipment category 3D bear the CE mark without the number of the notified body and have received a CE declaration of manufacturer conformity.

Anwendung

Ex inductive sensors for standstill monitoring



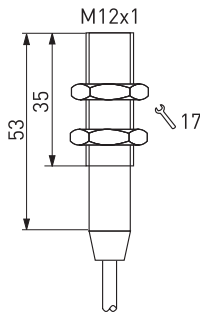
Ex inductive sensors

// Series Ex IS M12

Features/Options

- Ex zone 0 and 20
- Metal enclosure
- Variants for flush or non-flush mounting
- Long life, no mechanical wear
- Suitable for the food processing industry
- Insensitive to soiling
- Enclosure diameter M12 x 1

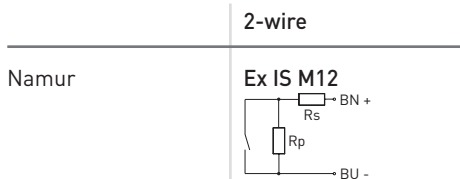
// EX IS M12 B



Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020; EN 50284; EN 50281-1-1
Enclosure	brass-nickel, PA
Nuts	2 pieces, brass-nickel
Switching system	namur per DIN EN 60947-5-6
Connection	cable, PVC, length 2 m
Cable section	2 x 0.5 mm ²
Protection class	IP 67 to IEC/EN 60529
Switching distance s_n	Ex IS M12 b: 2 mm, Ex IS M12 nb: 4 mm
Switching distance in %	steel St 37: 100 %, stainless steel: 70 %, brass: 50 %, copper: 45 %, aluminium: 40 %
Input power P_i	max. 50 mW
Input voltage U_i	max. 12.6 VDC
Input current I_i	max. 15.9 mA
Tightening torque for the nuts	M12 x 1: 10 Nm
Ambient temperature	-25 °C ... +75 °C
Ex marking	⊕ II 1G Ex ia IIC T6, II 1D IP67 T100°C
Approvals	TÜV 06 ATEX 553179

Contact variants: switch travel/contacts



Type code

Ex IS M12 NB

NB Non-flush, (B flush)
Enclosure diameter M12
Series
Ex certified component

Ex inductive sensors

// Series Ex IS M12, variants

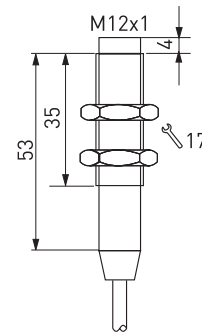
Features/Options

- Other cable lengths on request: 5 or 10 m

// EX IS M12 NB



// EX IS M12 NB



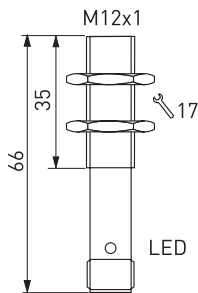
Ex inductive sensors

// Series Ex IS M12-ST

Features/Options

- Ex zone 22
- Metal enclosure
- Plug-in connector
- Variants for flush or non-flush mounting
- Long life, no mechanical wear
- Suitable for the food processing industry
- Insensitive to soiling
- Enclosure diameter M12 x 1

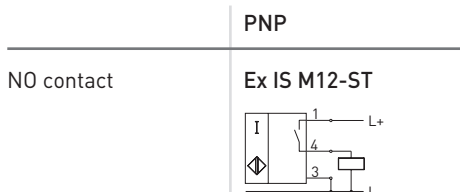
// EX IS M12 B-ST



Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020; EN 50284; EN 50281-1-1
Enclosure	brass-nickel, PA
Nuts	2 pieces, brass-nickel
Switching system	namur per DIN EN 60947-5-6
Connection	plug-in connector M12 x 1, 4-pole
Protection class	IP 67 to EN 60529
Switching distance s_n	Ex IS M12 b: 2 mm, Ex IS M12 nb: 4 mm
Switching distance in %	steel St 37: 100 %, stainless steel: 70 %, brass: 50 %, copper: 45 %, aluminium: 40 %
Switching voltage	10 ... 30 VDC
Switching current	200 mA
Overcurrent release	250 mA
Voltage drop	max. 2 V
Current consumption	7 mA
Switching frequency	500 Hz
Tightening torque for the nuts	M12 x 1: 10 Nm
Ambient temperature	-30 °C ... +75 °C
Ex marking	⊕ II 3D IP67 T80°C

Contact variants: switch travel/contacts



Type code

Ex IS M12 NB-ST-3D

- Ex certified component
- Series
- Enclosure diameter M12
- NB Non-flush, (B flush)
- ST Plug-in connector M12 X1
- Equipment Category, 3D, dust Ex zone 22

Ex inductive sensors

// Series Ex IS M12-ST, variants

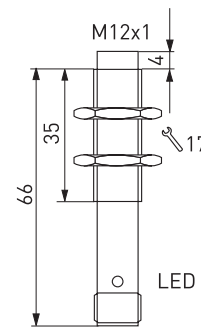
Features/Options

- 3D version with plug-in connector M12 x 1, 4-pole and integrated LED
- Lock for plug-in connector required, must be ordered separately, STESI-M12 order number 01.36.4057

// EX IS M12 NB-ST-3D



// EX IS M12 NB-ST-3D



Ex inductive sensors

// Series Ex IS M18

Features/Options

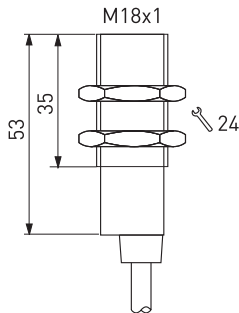
- Ex zone 0 and 20
- Metal enclosure
- Variants for flush or non-flush mounting
- Long life, no mechanical wear
- Suitable for the food processing industry
- Insensitive to soiling
- Enclosure diameter M18 x 1

// EX IS M18 B

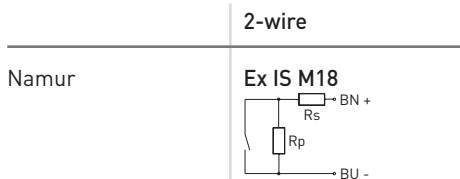


Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020; EN 50284; EN 50281-1-1
Enclosure	brass-nickel, PA
Nuts	2 pieces, brass-nickel
Switching system	namur per DIN EN 60947-5-6
Connection	cable, PVC, length 2 m
Cable section	2 x 0.5 mm ²
Protection class	IP 67 to EN 60529
Switching distance s_n	Ex IS M18 b: 5 mm, Ex IS M18 nb: 8 mm
Switching distance in %	steel St 37: 100 %, stainless steel: 70 %, brass: 50 %, copper: 45 %, aluminium: 40 %
Input power P_i	max. 50 mW
Input voltage U_i	max. 12.6 VDC
Input current I_i	max. 15.9 mA
Tightening torque for the nuts	M18 x 1: 36 Nm
Ambient temperature	-25 °C ... +75 °C
Ex marking	⊕ II 1G Ex ia IIC T6, II 1D IP67 T100°C
Approvals	TÜV 06 ATEX 553179



Contact variants: switch travel/contacts



Type code

Ex IS M18 NB

NB Non-flush, (B flush)
Enclosure diameter M18
Series
Ex certified component

Ex inductive sensors

// Series Ex IS M18, variants

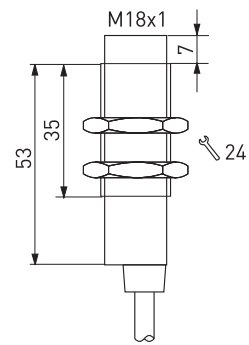
Features/Options

- Other cable lengths on request: 5 or 10 m

// EX IS M18 NB



// EX IS M18 NB



Ex inductive sensors

// Series Ex IS M18-ST

Features/Options

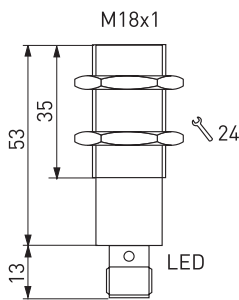
- Ex zone 22
- Metal enclosure
- Plug-in connector
- Variants for flush or non-flush mounting
- Long life, no mechanical wear
- Suitable for the food processing industry
- Insensitive to soiling
- Enclosure diameter M18 x 1

// EX IS M18 B-ST

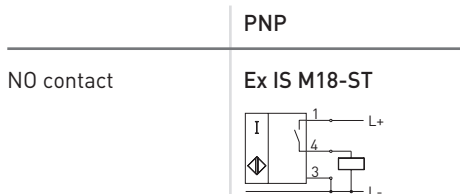


Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020; EN 50284; EN 50281-1-1
Enclosure	brass-nickel, PA
Nuts	2 pieces, brass-nickel
Switching system	namur per DIN EN 60947-5-6
Connection	plug-in connector M12 x 1, 4-pole
Protection class	IP 67 to EN 60529
Switching distance s_n	Ex IS M18 b: 5 mm, Ex IS M18 nb: 8 mm
Switching distance in %	steel St 37: 100 %, stainless steel: 70 %, brass: 50 %, copper: 45 %, aluminium: 40 %
Switching voltage	10 ... 30 VDC
Switching current	200 mA
Overcurrent release	250 mA
Voltage drop	max. 2 V
Current consumption	7 mA
Switching frequency	500 Hz
Tightening torque for the nuts	M18 x 1: 36 Nm
Ambient temperature	-30 °C ... +75 °C
Ex marking	Ⓔ II 3D IP67 T80°C



Contact variants: switch travel/contacts



Type code

Ex IS M18 NB-ST-3D

- Ex certified component
- Series
- Enclosure diameter M18
- NB Non-flush, (B flush)
- ST Plug-in connector M12 x 1
- Equipment Category, 3D, dust Ex zone 22

Ex inductive sensors

// Series Ex IS M18-ST, variants

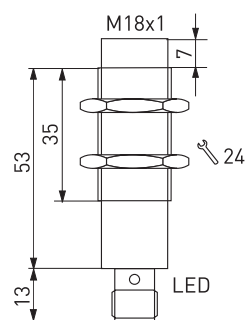
Features/Options

- 3D version with plug-in connector M12 x 1, 4-pole and integrated LED
- Lock for plug-in connector required, must be ordered separately, STESI-M12 order number 01.36.4057

// EX IS M18 NB-ST-3D



// EX IS M30 NB-ST-3D



Ex inductive sensors

// Series Ex IS M30

Features/Options

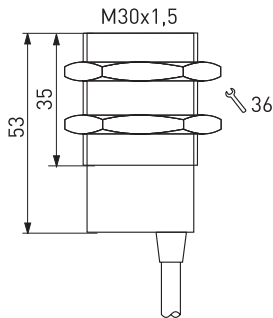
- Ex zone 0 and 20
- Metal enclosure
- Variants for flush or non-flush mounting
- Long life, no mechanical wear
- Suitable for the food processing industry
- Insensitive to soiling
- Enclosure diameter M30 x 1.5

// EX IS M30 B

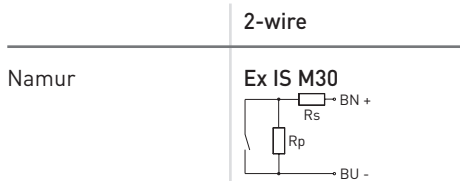


Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020; EN 50284; EN 50281-1-1
Enclosure	brass-nickel, PA
Nuts	2 pieces, brass-nickel
Switching system	namur per DIN EN 60947-5-6
Connection	cable, PVC, length 2 m
Cable section	2 x 0.5 mm ²
Protection class	IP 67 to EN 60529
Switching distance s_n	Ex IS M30 b: 10 mm, Ex IS M30 nb: 15 mm
Switching distance in %	steel St 37: 100 %, stainless steel: 70 %, brass: 50 %, copper: 45 %, aluminium: 40 %
Input power P_i	max. 50 mW
Input voltage U_i	max. 12.6 VDC
Input current I_i	max. 15.9 mA
Tightening torque for the nuts	M30 x 1,5: 100 Nm
Ambient temperature	-25 °C ... +75 °C
Ex marking	⊕ II 1G Ex ia IIC T6, II 1D IP67 T100 °C
Approvals	TÜV 06 ATEX 553179



Contact variants: switch travel/contacts



Type code

Ex IS M30 NB

NB Non-flush, (B flush)

Enclosure diameter M30

Series

Ex certified component

Ex inductive sensors

// Series Ex IS M30, variants

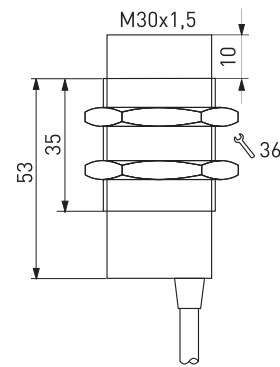
Features/Options

- Other cable lengths on request: 5 or 10 m

// EX IS M30 NB



// EX IS M30 NB



Ex inductive sensors

// Series Ex IS M30-ST

Features/Options

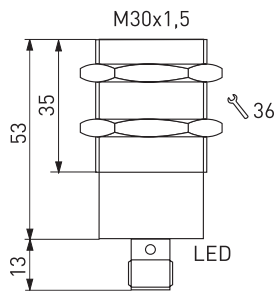
- Ex zone 22
- Metal enclosure
- Plug-in connector
- Variants for flush or non-flush mounting
- Long life, no mechanical wear
- Suitable for the food processing industry
- Insensitive to soiling
- Enclosure diameter M30 x 1.5

// EX IS M30 B-ST



Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020; EN 50284; EN 50281-1-1
Enclosure	brass-nickel, PA
Nuts	2 pieces, brass-nickel
Switching system	namur per DIN EN 60947-5-6
Connection	plug-in connector M12 x 1, 4-pole
Protection class	IP 67 to EN 60529
Switching distance s_n	Ex IS M30 b: 10 mm, Ex IS M30 nb: 15 mm
Switching distance in %	steel St 37: 100 %, stainless steel: 70 %, brass: 50 %, copper: 45 %, aluminium: 40 %
Switching voltage	10 ... 30 VDC
Switching current	200 mA
Overcurrent release	250 mA
Voltage drop	max. 2 V
Current consumption	7 mA
Switching frequency	500 Hz
Tightening torque for the nuts	M30 x 1,5: 100 Nm
Ambient temperature	-30 °C ... +75 °C
Ex marking	Ⓔ II 3D IP67 T80°C



Contact variants: switch travel/contacts

	PNP
NO contact	Ex IS M30-ST

Type code

Ex IS M30 NB-ST-3D	Equipment Category, 3D, dust Ex zone 22
	ST Plug-in connector M12 x 1
	NB Non-flush, (B flush)
	Enclosure diameter M30
	Series
	Ex certified component

Ex inductive sensors

// Series Ex IS M30-ST, variants

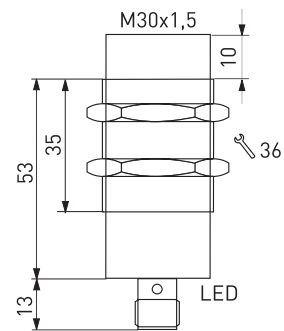
Features/Options

- 3D version with plug-in connector M12 x 1, 4-pole and integrated LED
- Lock for plug-in connector required, must be ordered separately, STESI-M12 order number 01.36.4057

// EX IS M30 NB-ST-3D



// EX IS M30 NB-ST-3D



Ex Relay module

// Series Ex RM 1W 1

Features/Options

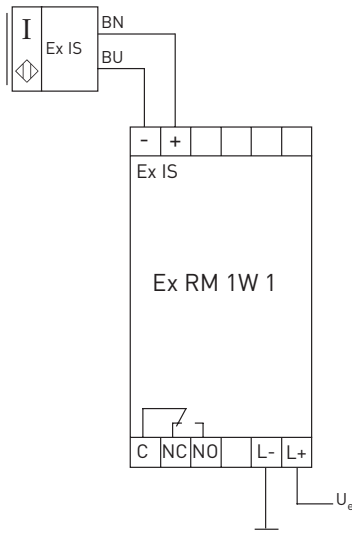
- Thermoplastic enclosure
- Output: Relay
- 40 mm housing width
- 24 VDC or 230 VAC operating voltage

// EX RM 1W 1



Technical data

Standards	EN 60947-5-2; EN 50014; EN 50020
Enclosure	thermoplastic, PA
Dimensions	40 x 70 x 110 mm (BxHxT)
Mounting	DIN rail mounting per DIN EN 50022
Connection	screw clamps
Protection class	IP 20 to IEC/EN 60529
Rated operating voltage U_e	24 VDC $\pm 15\%$, 230 VAC $+10/-15\%$
Power consumption	1.8 W, 1.5 VA
Output power P_o	max. 50 mW
Output voltage U_o	max. 12.6 VDC
Output current I_o	max. 15.9 mA
Output	relay: change-over contact
Switching voltage	250 VAC/24 VDC
Switching current	4 A, $\cos \varphi > 0.7$
Display	LEDs, red: wire-break and short-circuits, yellow: relay pulled, green: operating voltage
Ambient temperature	-20 °C ... +60 °C
Ex marking	Ⓜ II (1)GD [Ex ia] IIC
Approvals	TÜV 06 ATEX 553146



Type code

Ex RM 1W 1 24VDC

Rated operating voltage 24 VDC
(230 VAC)
1 input
Relay output: 1 change-over contact
Series
Ex certified component

PRODUCTION PROCESS
MOULDING OF SENSORS







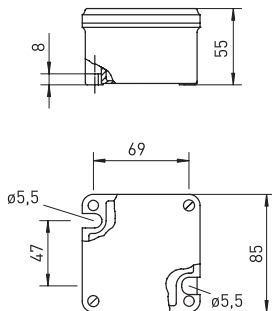
Ex junction and terminal boxes

// Series Ex AD
from page 308

Ex junction and terminal boxes

// Series Ex AD

// EX AD 85



308

Features/options

- Ex zone 1 and 21
- Polyester resin enclosure
- Different variants as junction or terminal boxes available
- Method of protection either increased safety »i« or intrinsic safety »i« possible
- PU foam gaskets
- 3 different enclosure sizes available

Technical Data

Standards	IEC/EN 60079-0, IEC/EN 60079-7, IEC/EN 60079-11, IEC 60079-18, IEC/EN 61241-0, IEC/EN 61241-1
Enclosure	glass fibre-reinforced polyester resin
Protection class	IP 66 to IEC 60529
Connection	hood-type or terminal blocks
Cable entry	max. 8 cable entries
Cable section	Ex AD 85 MK: max. 4 mm ² , Ex AD 115 MK: max. 6 mm ² Ex AD 145 MK: max. 10 mm ² (incl. conductor ferrules), single-wire
Cable entry	M20 x 1.5, M25 x 1.5 or M32 x 1.5
Temperature class	T6, T5, T4
U_e	Ex AD FK: with fuse max. 250 or 550 V; Ex AD 85 FK: max. 550 V without fuse Ex AD 115 FK, Ex AD 145 FK: max. 750 V without fuse; Ex AD MK: max. 1100 V without fuse, max. 550 V with fuse
I_e/U_e	Ex AD 85: 25 A/550 VAC, Ex AD 115: 32 A/750 VAC, Ex AD 145: 44 A/750 VAC
Ambient temperature	Ex e: T6: -40 °C ... +40 °C, T5: -40 °C ... +55 °C, T4: -40 °C ... +60 °C; Ex i: -40 °C...+ 75 °C, -50 °C with special cable glands
Ex marking	⊕ II 2G Ex em II T6, T5, T4; II 2D Ex tD A21 IP66 T80°C, T95°C, 130°C ⊕ II 2G Ex ia/ib IIA, IIB, IIC T6, T5 II 2D Ex tD A21 IP66 T80°C, T95°C, 130°C
Approval	PTB 10 ATEX 1019X, IECEx in 2012

Type code

Ex AD 85 e MK4 3xM20

Cable gland size (M25, M32)
 Number of cable glands, max. 6
 Number of terminals, max. 8 hood-type terminals (FK spring-force terminals max. 15)
 Method of protection (i)
 Series (115, 145)
 Junction/Terminal box
 Ex certified component

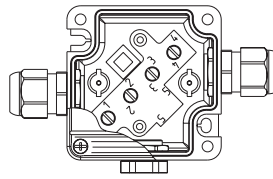
Ex junction and terminal boxes

// Series Ex AD, variants

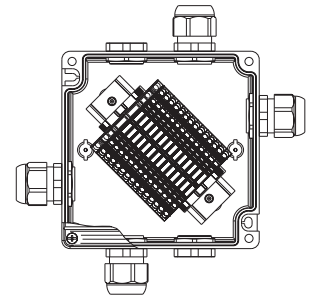
Features/Options

- All variants are available as junction or terminal box
- Method of protection e or i
- Junction box equipped with hood-type terminals
- Terminal box Ex AD FK equipped with max. 16 spring-force terminal blocks plus 2 PE/PA terminals

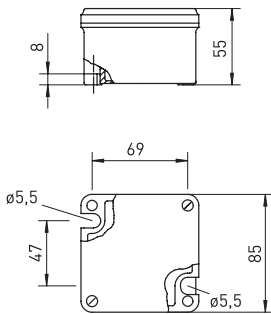
Ex junction boxes



Ex terminal boxes



// Ex AD 85



Features/Options

- Junction box Ex AD 85 MK equipped with 4 or 5 hood-type terminals and 3 or 4 x M20 x 1.5 cable entries
- Terminal box Ex AD 85 FK equipped with 5 spring-force terminal blocks 3 x M20 x 1.5 cable entries

Ex e version

- Ex AD 85 e MK4 3xM20
- Ex AD 85 e MK5 4xM20
- Ex AD 85 e FK5 3xM20

Order Number

- 6711100401
- 6711100502
- 6711200101

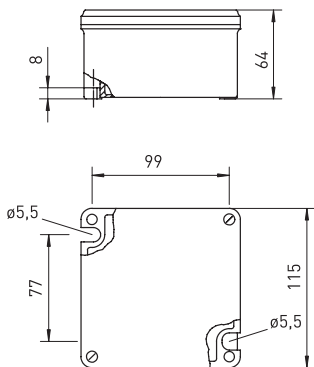
Ex i version

- Ex AD 85 i MK4 3xM20
- Ex AD 85 i MK4 4xM20
- Ex AD 85 i FK5 3xM20

Order Number

- 6721100401
- 6721100402
- 6721200201

// Ex AD 115



Features/Options

- Junction box Ex AD 115 MK equipped with 8 hood-type terminals and 6 x M20 x 1.5, 4 or 6 x M25 x 1.5 cable entries
- Terminal box Ex AD 115 FK equipped with 9 spring-force terminal blocks and 4 x M25 x 1.5 cable entries

Ex e version

- Ex AD 115 e MK8 6xM20
- Ex AD 115 e MK8 4xM25
- Ex AD 115 e MK8 6xM25
- Ex AD 115 e FK9 4xM25

Order Number

- 6712100807
- 6712100805
- 6712100808
- 6712200312

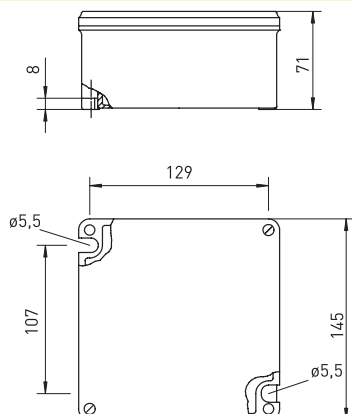
Ex i version

- Ex AD 115 i FK9 4xM25

Order Number

- 6722200412

// Ex AD 145



Features/Options

- Junction box Ex AD 145 MK equipped with 8 hood-type terminals and 8 x M25 x 1.5 or 6 x M32 x 1.5 cable entries
- Terminal box Ex AD 145 FK equipped with 15 spring-force terminal blocks and 6 x M25 x 1.5 cable entries

Ex e version

- Ex AD 145 e MK8 8xM25
- Ex AD 145 e MK8 6xM32
- Ex AD 145 e FK15 6xM25

Order Number

- 6713100808
- 6713100805
- 6713200511
















Ex i version

- Ex AD 145 i FK15 6xM25

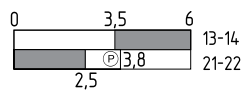
Order Number



- 6723200611

LEGEND

	Explosion protected to ATEX
	A/F
	Double insulated
	Positive break NC contact
	Positive break travel/angle
	Latching point
	Wire breakage detection
	Wire pull detection
	Actuated
	Not actuated
	Type examination-tested
IECEX	Ex approval to IEC standards
	Ex approval for Brazil
	Ex approval for Russia
	Ex approval for China
	Directive-compliance, see Declaration of Conformity
I_e	Rated operating current
I_{the}	Thermal test current
U_e	Rated operating voltage
U_i	Rated insulation voltage
U_{imp}	Rated impulse withstand voltage

Explanation of switch travel diagrams



 Contact opened
 Contact closed

X1-X2 NC contact
 X3-X4 NO contact
 X5-X6 Contact overlapping

Colour codes to DIN IEC 757

BK	black
BN	brown
BU	blue
GN	green
GY	grey
OG	orange
PK	pink
RD	red
TQ	turquoise
VI	violet
WH	white
YE	yellow

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