

Emergency pull-wire, Pull-wire, Belt-alignment, Slack-wire switches



SAFE SWITCHGEAR FOR COMPLEX AND  
CRITICAL APPLICATIONS

// Control technology / Catalogue









#### 4 The Company

### PRODUCTS



#### 8 Emergency pull-wire switches

- 12 Selection table Emergency pull-wire switches
- 15 One-side actuation
- 15 Series ZS 70
- 16 Series ZS 71
- 18 Series ZS 73
- 20 Series ZS 75
- 22 Series ZS 441
- 24 Series ZS 80
- 26 Two-side actuation
- 26 Series ZS 73 S
- 28 Series ZS 75 S
- 30 Series ZS 90 S
- 32 Mounting notes
- 34 Spring pre-stress and travel limitation



#### 36 Belt-alignment switches

- 40 Series ES 61 SR
- 42 Series ZS 73 SR
- 44 Series ZS 75 SR
- 46 Series ZS 90 SR



#### 48 Pull-wire switches

- 52 Selection table pull-wire switches
- 54 Series ES/EM 95 Z
- 56 Series ES 51 Z
- 58 Series ES/EM 41 Z
- 60 Series ES/EM 61 Z
- 62 Series ZS 70
- 63 Series ZS 71



#### 64 Slack-wire switches

- 69 Series ES/EM 41 DB

#### 70 Appendix

- 70 Accessories for emergency pull-wire and pull-wire switches
- 79 Explanation of symbols



STEUTE SCHALTGERÄTE IN LÖHNE  
SAFE SWITCHGEAR FOR COMPLEX AND CRITICAL APPLICATIONS







Löhne in Westphalia, Germany. Embedded between the »Wiehen-  
gebirge« and the »Teutoburger Wald«. This is the location of steute  
Schaltgeräte GmbH & Co. KG. Here switchgear is designed and pro-  
duced for explosion protection, medical technology and control tech-  
nology. Historians know our region as the area where the Battle of  
Varus took place in the year 9 AD. About 1700 years later the Treaty of  
Westphalia marked the end of the 30 Years War. Gourmets love West-  
phalian sausage, walkers the beautiful landscape. Briefly: it's a good  
place to live. It's also a good place to work.

The industrial culture of Westphalia is mostly characterised by  
SME companies; the region is also the home of many hidden cham-  
pions and world-market leaders, specialist machine and systems ma-  
nufacturers, as well as electronic and connecting technology.

This means we have many important suppliers, customers and  
partners practically »on our doorstep«. And even so, our employees  
travel a great deal all over the world. This is because renowned com-  
panies in all industrial markets use switchgear by steute when the  
focus is on high quality and availability. And when they appreciate  
cooperating with suppliers who can adapt flexibly to their requests.







## STEUTE LIVES AND BREATHES A HIGH QUALITY STANDARD IN ALL AREAS



Today, the company offers a homogenous product range, drawing on its wide know-how and characterised by a high degree of technological synergy.

180 employees attentively develop and manufacture electrical and electronic components for high-standard and explosive safety applications. These applications comply with established international directives, laws, standards and regulations. In this context, key significance is attributed to a close cooperation with technical certification institutions.

With its high standards and specific orientation, steute »lives and breathes« three QM systems:

- DIN EN ISO 9001: 2000
- DIN EN ISO 13485: 2003
- Certificate of Quality Assurance acknowledgement in accordance with the Directive 94/9/EC (ATEX)

On the following pages please find our wide range of emergency pull-wire, pull-wire, belt-alignment and slack-wire switches including accessories, each of which can be modified in accordance with customer specifications. Talk to us. Let us help you find what you are looking for.

Your steute team.







## Emergency pull-wire switches

### One-side actuation

// [Series ZS 70](#)

from page 15

// [Series ZS 71](#)

from page 16

// [Series ZS 73](#)

from page 18

// [Series ZS 75](#)

from page 20

// [Series ZS 441](#)

from page 22

// [Series ZS 80](#)

from page 24

### Two-side actuation

// [Series ZS 73 S](#)

from page 26

// [Series ZS 75 S](#)

from page 28

// [Series ZS 90 S](#)

from page 30

// [Mounting notes](#)

from page 32

// [Pre-stress and travel limitation](#)

from page 34







# Emergency pull-wire switches

## Application

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.

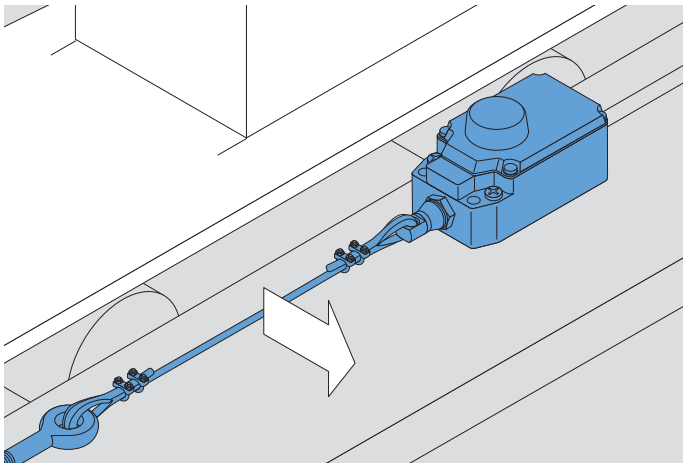
Emergency pull-wire switches without mechanical latching VD or VS do not conform to the EN 418 and IEC 609745-5-5. It is possible to meet the requirements of these two standards by suitable measurement of the circuitry and control technology.

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.

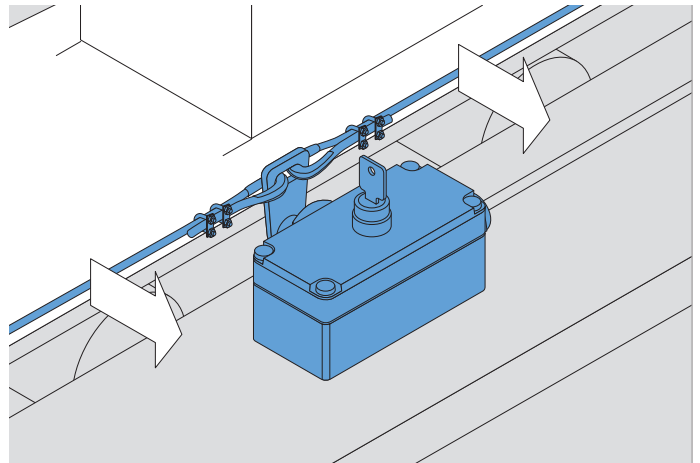
All emergency pull-wire switches bear the CE mark according to the Machinery Directive 98/37/EC.

## Application

### one-side actuation



### two-side actuation






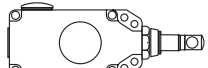
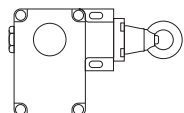
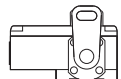
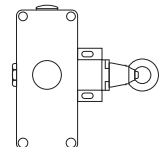
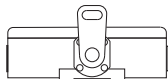
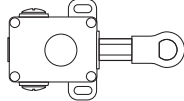
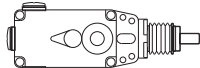
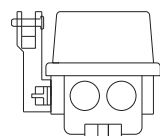
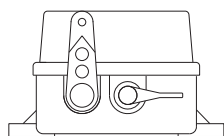


## Selection table

### Emergency pull-wire switches

// Series

// Maximum pull-wire length

		→	↔	
				
ZS 70, on page 15 - Thermoplastic enclosure - One-side actuation - 2 contacts		8 m	-	
ZS 71, on page 16 - Metal enclosure - One-side actuation - 2 contacts		20 m	-	
ZS 73, on page 18 and 26 - Metal enclosure - One-side actuation: ZS 73 - two-side actuation: ZS 73 S - 2 contacts		50 m	2 x 50 m	
ZS 75, on page 20 and 28 - Metal enclosure - One-side actuation: ZS 75 - Two-side actuation: ZS 75 S - 4 contacts		50 m	2 x 50 m	
ZS 441, on page 22 - Metal enclosure - One-side actuation - 2 contacts		25 m	-	
ZS 80, on page 24 - Metal enclosure - One-side actuation - 4 contacts		75 m	-	
ZS 90 S, on page 30 - Thermoplastic enclosure - Two-side actuation - 4 contacts		-	2 x 50 m	







PRODUCTION PROCESS ASSEMBLY

MOUNTING OF THE PULL-WIRE UNIT AT EMERGENCY PULL-WIRE SWITCHES

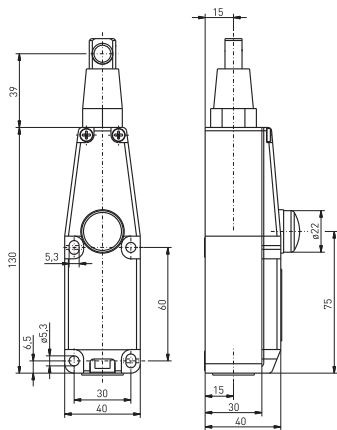






Emergency pull-wire switches, one-side actuation  
// Series ZS 70

- Features/Options
- Thermoplastic enclosure
  - 2 contacts
  - Mounting details to DIN EN 50 041
  - Small design
  - Wire length up to 8 m
  - Push button release
  - Wire pull and breakage detection

// ZS 70


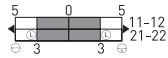


Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Cover	glassfibre reinforced, shock-proof thermoplastic, ultramid
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NC contacts
Switching system	snap action, positive break NC contacts $\ominus$
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	1 x M20 x 1.5
B <sub>10d</sub> (10 % load)	ZS 70: 2 million; ZS 70 VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 70: > 1 million operations ZS 70 VD: > 100 000 operations
Max. wire length	8 m
Features	wire pull and breakage detection
Approvals	 

15

Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 70 10/1S</b> 
2 NC contacts	<b>ZS 70 20</b> 

Ordering details

ZS 70 10/1S VD
VD push button release (blank without manual latching)
1 NC/1 NO contact (20)
Series
Emergency pull-wire switch

At 2.5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces are indicated at the end of this chapter.



# Emergency pull-wire switches, one-side actuation

## // Series ZS 71

### Features/Options

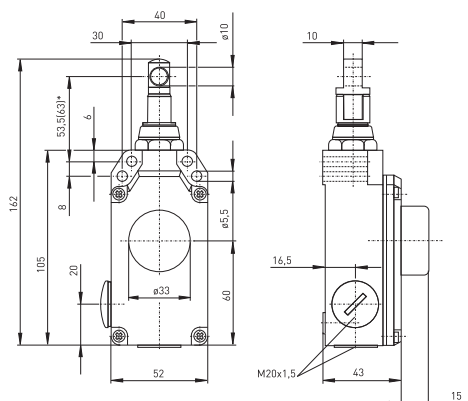
- Metal enclosure
- 2 contacts
- Small design
- Wire length up to 20 m
- 2 various spring force variants (actuating forces):  
55 N for max. 5 m, 200 N for 5-20 m
- Release by push button or key possible
- Wire pull and breakage detection
- Ex version available
- AS-Interface Safety at Work version available

// ZS 71



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Degree of protection	ZS 71 VD, ZS 71 WVD and ZS 71 NA: IP 65; ZS 71 VS and ZS 71 WVS: IP 54 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NC contacts
Switching system	snap action, positive break NC contacts ⊕
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M20 x 1.5
B <sub>10d</sub> (10 % load)	ZS 71: 2 million; ZS 71 VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 71: > 1 million operations ZS 71 VD/VS: > 100 000 operations
Indicator lamp	as option
Max. wire length	20 m
Features	wire pull and breakage detection
Approvals	



\* 63 mm for version with 200 N pre-stress force

### Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 71 10/1S</b> 
2 NC contacts	<b>ZS 71 20</b> 

### Ordering details

ZS 71 10/1S WVD-A/55 N-G
Indicator lamp (app.)
55 N pre-stress force (200 N)
A position indicator (NA emergency-stop button)
VD push button release (VS key release, blank without mechanical latching)
W watertight collar
1 NC/1 NO contact (20)
Series
Emergency pull-wire switch

At 3 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces are indicated at the end of this chapter.



# Emergency pull-wire switches, one-side actuation

## // Series ZS 71, variants

### Features/Options

- Position indicator A not available for variant ZS 71 NA
- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry
- Collar W to protect against the entry of foreign bodies

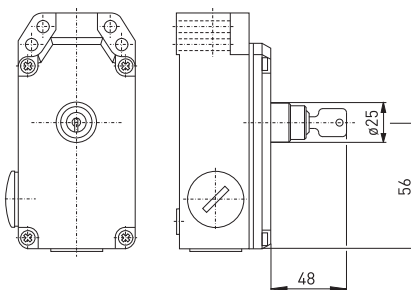
### Features/Options

- Version with emergency-stop push button for direct and fast actuation at the switch
- Emergency pull-wire switches are also available without mechanical latching but not the variant with emergency-stop push button

### // Watertight collar W



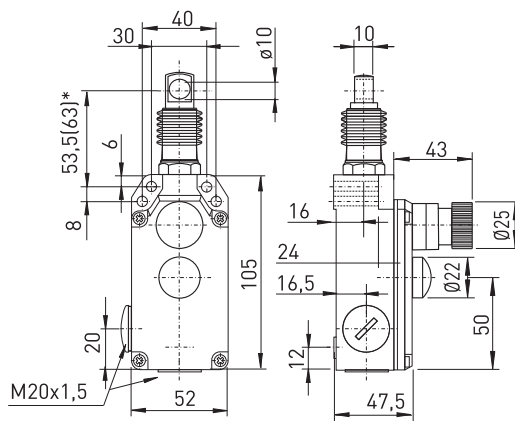
### // Key release VS



### // ZS 71 NA



### // ZS 71 NA



### // ZS 71 AS-Interface Safety at Work



### // Position indicator A









// Series ZS 73, variants

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request
- Collar W to protect against the entry of foreign bodies
- ZS 73 NIRO: pull-wire unit and screws made of stainless steel 1.4305, hard-coated enclosure with enamel finish

- With 2 cable entries available on request
- Emergency pull-wire switches are also available without mechanical latching

[illegible]

Technical drawing of the M16x1,5 connector showing front and side views with dimensions:

- Front View (Left):**
  - Overall height: 105
  - Top flange width: 15
  - Top flange thickness: 25
  - Top flange hole diameter: 30
  - Body diameter: 48
  - Body length: 6,5
  - Bottom flange thickness: 28
  - Bottom flange width: 56
  - Thread specification: M16x1,5
- Side View (Right):**
  - Overall width: 166
  - Top flange hole diameter: 33 (ø33)
  - Top flange thickness: 5
  - Top flange hole offset: 73
  - Body diameter: 15
  - Body length: 70
  - Bottom flange thickness: 15
  - Bottom flange width: 98
  - Thread specification: M16x1,5



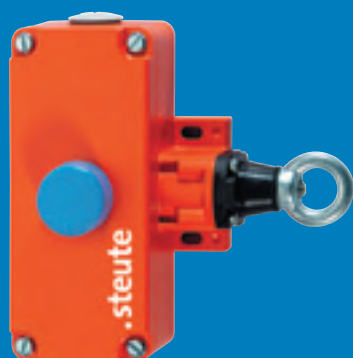
# Emergency pull-wire switches, one-side actuation

## // Series ZS 75

### Features/Options

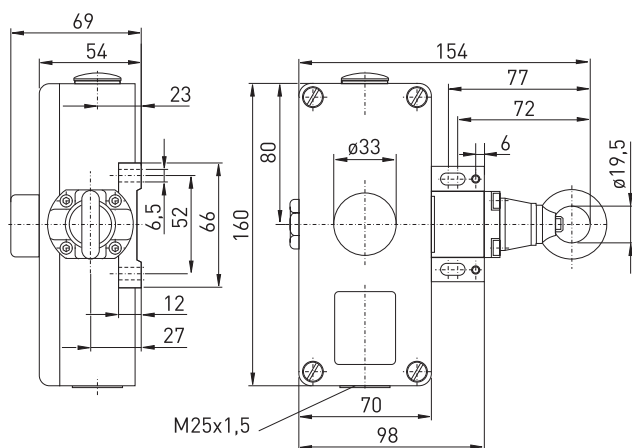
- Metal enclosure
- 2 or 4 contacts
- Wire length up to 50 m
- 4 various spring force variants (actuating forces), adjustable  
actuating force: 295-390 N for 30-50 m, 195-275 N for 20-30 m, 120-180 N for 10-20 m, 80-100 N for max. 10 m
- Release by push button or key possible
- Wire pull and breakage detection
- Ex version available
- AS-Interface Safety at Work version available

// ZS 75



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	aluminium die-cast, enamel finish
Degree of protection	ZS 75 WVD: IP 65; ZS 75 VD, ZS 75 VS and ZS 75 WVS: IP 54 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NO/2 NC or 4 NC contacts
Switching system	snap action, positive break NC contacts ⊕
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M25 x 1.5
B <sub>10d</sub> (10 % load)	ZS 75: 2 million; ZS 75 VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 75: > 1 million operations ZS 75 VD/VS: > 100 000 operations
Indicator lamp	as option
Max. wire length	50 m
Features	wire pull and breakage detection
Approvals	CE, UL, cULus



### Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 75 1Ö/1S</b> 
2 NC/2 NO contacts	<b>ZS 75 2Ö/2S</b> 
4 NC contacts	<b>ZS 75 4Ö</b> 

### Ordering details

ZS 75 1Ö/1S WVD/80-100 N-G
Indicator lamp, accessories (app.)
80-100 N pre-stress force (120-180 N, 195-275 N, 295-390 N)
VD push button release (VS key release, blank without mechanical latching)
W watertight collar
1 NC/1 NO contact (2Ö/2S, 4Ö)
Series
Emergency pull-wire switch

At 5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces are indicated at the end of this chapter.



# Emergency pull-wire switches, one-side actuation

## // Series ZS 75, variants

### Features/Options

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request
- Collar W to protect against the entry of foreign bodies

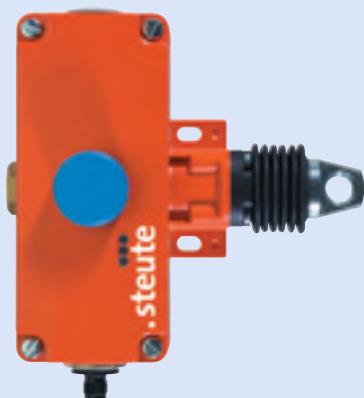
### Features/Options

- Emergency pull-wire switches are also available without mechanical latching

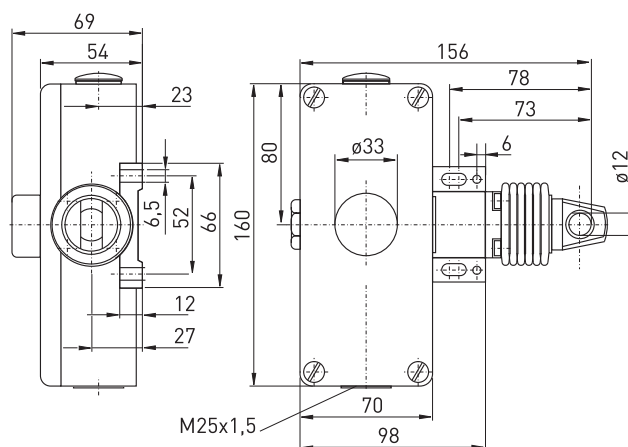
### // Watertight collar W



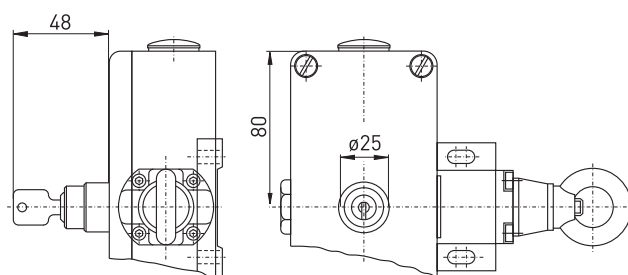
### // ZS 75 AS-Interface Safety at Work



### // Watertight collar W



### // Key release VS





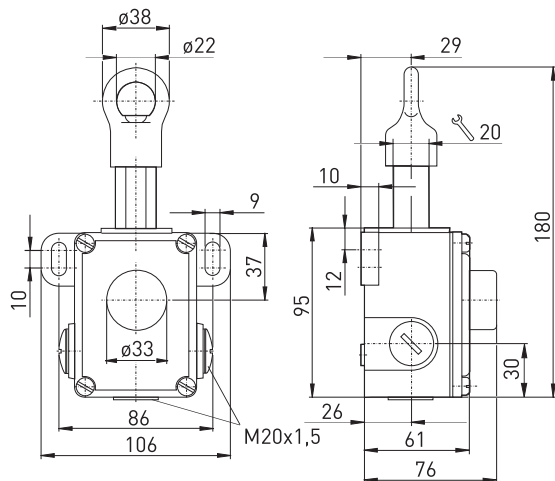
# Emergency pull-wire switches, one-side actuation

## // Series ZS 441

### Features/Options

- Metal enclosure
- 2 contacts
- Wire length up to 25 m
- 3 various spring force variants (actuating forces):  
220 N for 15-25 m, 150 N for 5-15 m, 60 N for max. 5 m
- Release by push button or key possible
- Wire pull and breakage detection

### // ZS 441



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	aluminium die-cast, enamel finish
Degree of protection	ZS 441 VD: IP 65; ZS 441 VS: IP 54 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NC contacts
Switching system	snap action, positive break NC contacts ⊖
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	3 x M20 x 1.5
B <sub>10d</sub> (10 % load)	ZS 441: 2 million; ZS 441 VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 441: > 1 million operations ZS 441 VD/VS: > 100 000 operations
Indicator lamp	as option
Max. wire length	25 m
Features	wire pull and breakage detection
Approvals	cULus

### Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 441 10/1S</b> 
2 NC contacts	<b>ZS 441 20</b> 

### Ordering details

ZS 441 10/1S VD/60 N-G
Indicator lamp, accessories (appendix)
60 N pre-stress force (150 N, 220 N)
VD push button release (VS key release, blank without mechanical latching))
1 NC/1 NO contact (20)
Series
Emergency pull-wire switch

At 5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces are indicated at the end of this chapter.



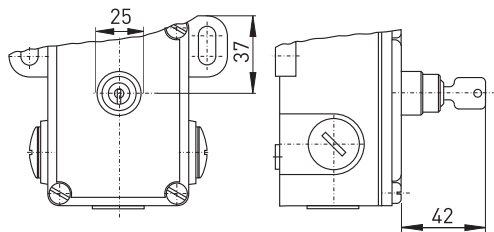
## Emergency pull-wire switches, one-side actuation

### // Series ZS 441, variants

#### Features/Options

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request
- Emergency pull-wire switches are also available without mechanical latching

#### // Key release VS





# Emergency pull-wire switches, one-side actuation

## // Series ZS 80

### Features/Options

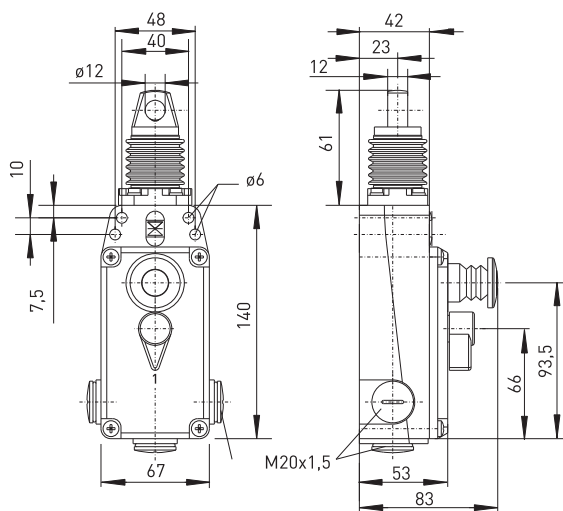
- Metal enclosure
- 4 contacts
- Position indicator and integrated emergency-stop push button
- Wire length up to 75 m
- Pretensioning force 100 N
- Lever for release and position indication
- Watertight collar
- Wire pull and breakage detection
- Indicator lamp available for various voltages see chapter accessories in the appendix

// ZS 80



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	glass-fibre reinforced, shock-proof thermoplastic, ultramid
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching elements	2 NC/2 NO, 3 NC/1 NO or 4 NC contacts with double break
Switching system	slow action, positive break NC contacts ⊖
Connection	2 x 4-pole terminal block
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	3 x M20 x 1.5
B <sub>10d</sub> (10 % load)	200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	2.5 kV
U <sub>i</sub>	250 V
I <sub>the</sub>	2 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	2 A/250 VAC
Max. fuse rating	2 A gL/gG D-fuse
Ambient temperature	-20 °C ... +70 °C
Mech. life	> 100 000 operations
Indicator lamp	as option
Max. wire length	75 m
Features	wire pull and breakage detection
Approvals	CE, UL, ENEC



### Contact variants: switch travel/contacts

	Snap action
2 NC/2 NO contact	<b>ZS 80 2Ö/2S</b> 
3 NC/1 NO contacts	<b>ZS 80 3Ö/1S</b> 
4 NC contacts	<b>ZS 80 4Ö</b> 

### Ordering details

**ZS 80 2Ö/2S WVD-G**

Indicator lamp, position: left cable entry, various voltages possible, see accessories (appendix)  
 VD lever release  
 W watertight collar  
 2 NC/2 NO contacts (3Ö/1S, 4Ö)  
 Series  
 Emergency pull-wire switch

At 5 m distance intermediate wire supports are required. One wire thimble is provided. Details related to pre-stress and actuating forces are indicated at the end of this chapter.



QUALITY MANAGEMENT  
SHOCK TEST OF AN EMERGENCY PULL-WIRE SWITCH





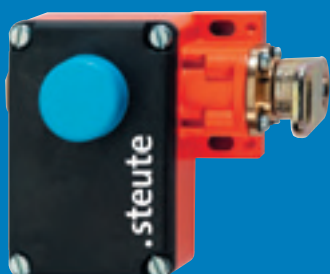
# Emergency pull-wire switches, two-side actuation

## // Series ZS 73 S

### Features/Options

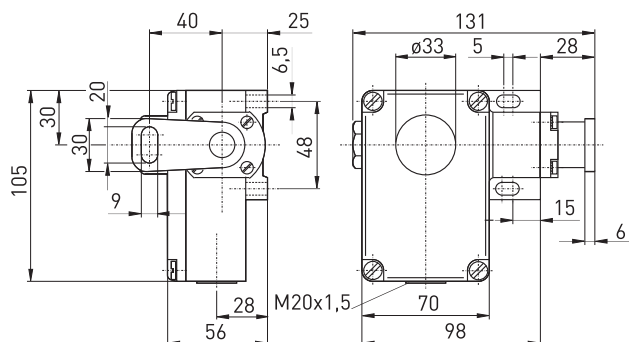
- Metal enclosure
- 2 contacts
- Wire length up to 2 x 50 m
- Release by push button or key possible
- Wire pull and breakage detection
- Ex version available

### // ZS 73 S



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, 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
Degree of protection	ZS 73 S VD: IP 65; ZS 73 S VS: IP 54 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NC contacts
Switching system	snap action, positive break NC contacts ⊖
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	1 x M20 x 1.5
B <sub>10d</sub> (10 % load)	ZS 73 S: 2 million; ZS 73 S VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 73 S: > 1 million operations ZS 73 S VD/VS: > 100 000 operations
Indicator lamp	as option
Max. wire length	2 x 50 m
Features	wire pull and breakage detection
Approvals	Ⓢ



### Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 73 S 10/1S</b> 
2 NC contacts	<b>ZS 73 S 20</b> 

### Ordering details

ZS 73 S 10/1S VD-NIRO-G	
Indicator lamp, accessories (appendix)	
NIRO pull-wire unit	
VD push button release (VS key release, blank without manual latching))	
1 NC/1 NO contact (20)	
S two-side actuation	
Series	
Emergency pull-wire switch	

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 RZ156I must be installed see chapter accessories in the appendix.



# Emergency pull-wire switches, two-side actuation

## // Series ZS 73 S, variants

### Features/Options

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request
- ZS 73 NIRO: pull-wire lever and screws made of stainless steel 1.4305, hard-coated enclosure with enamel finish

### Features/Options

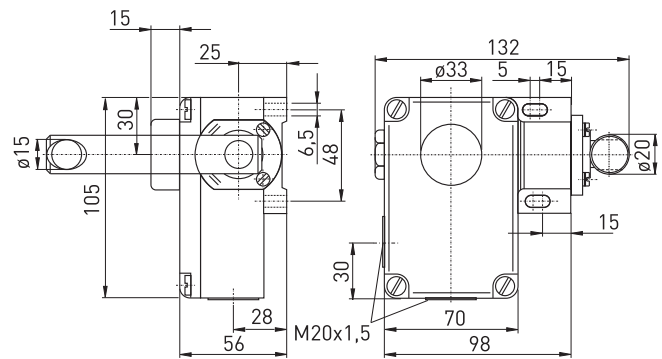
- With 2 cable entries available on request

### // ZS 73 S NIRO

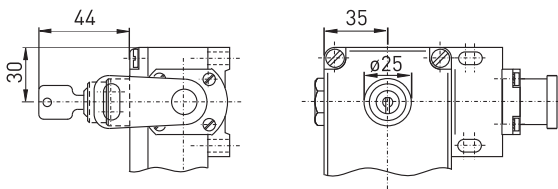


### // Key release VS

### // ZS 73 S NIRO



27





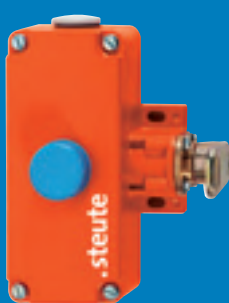
# Emergency pull-wire switches, two-side actuation

## // Series ZS 75 S

### Features/Options

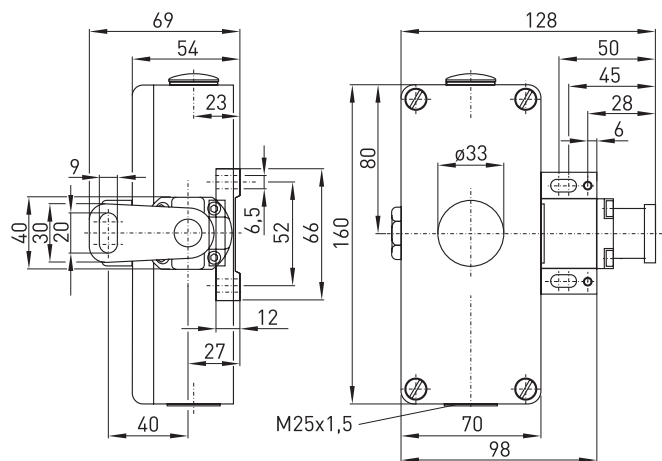
- Metal enclosure
- 2 or 4 contacts
- Wire length up to 2 x 50 m
- Release by push button or key possible
- Wire pull and breakage detection
- Ex version available

### // ZS 75 S



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	aluminium die-cast, enamel finish
Degree of protection	ZS 75 S VD: IP 65; ZS 75 S VS: IP 54 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NO/2 NC or 4 NC contacts
Switching system	snap action, positive break NC contacts ⊖
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M25 x 1.5
B <sub>10d</sub> (10 % load)	ZS 75 S: 2 million; ZS 75 S VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 75 S: > 1 million operations ZS 75 S VD/VS: > 100 000 operations
Indicator lamp	as option
Max. wire length	2 x 50 m
Features	wire pull and breakage detection
Approvals	Ⓢ



### Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 75 S 1Ö/1S</b> 
2 NC/2 NO contacts	<b>ZS 75 S 2Ö/2S</b> 
4 NC contacts	<b>ZS 75 S 4Ö</b> 

### Ordering details

<b>ZS 75 S 2Ö/2S VD-G</b>	
	Indicator lamp, accessories (appendix)
	VD push button release (VS key release, blank without manual latching)
	2 NC/2 NO contacts (1Ö/1S, 4Ö)
	S two-side actuation
	Series
	Emergency pull-wire switch

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 RZ1561 must be installed see chapter accessories in the appendix.



# Emergency pull-wire switches, two-side actuation

## // Series ZS 75 S, variants

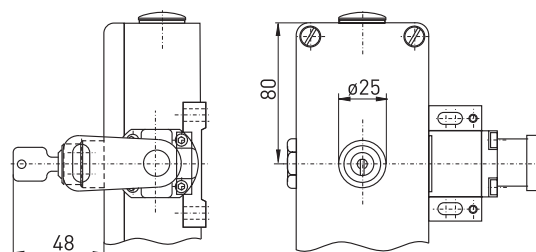
### Features/Options

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request

### // Pull-ring release VZ



### // Key release VS





# Emergency pull-wire switches, two-side actuation

## // Series ZS 90 S

### Features/Options

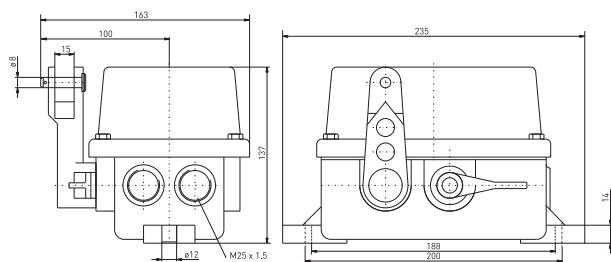
- Thermoplastic enclosure
- 4 contacts
- Wire length up to 2 x 50 m
- Release by lever possible
- Wire pull and breakage detection
- Ex version available

### // ZS 90 S



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418 EN ISO 13849-1
Enclosure	Duroplast
Cover	Duroplast
Protection class	IP 67 to IEC 60529
Contact material	silver
Switching elements	2 NO/2 NC or 4 NC contacts with double break
Schaltssystem	snap action, positive break NC contacts ⊖
Termination	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M25 x 1.5
B <sub>10d</sub> (10% Nennlast)	200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	10 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	1 A/230 VAC
Max. fuse rating	6 A gG D fuse
Ambient temperature	-40 °C ... +85 °C
Mech. life	> 100 000 operations
Max. wire length	2 x 50 m
Features	wire pull and breakage detection



### Contact variants: switch travel/contacts

	Snap action
2 NC/2 NO contacts	<b>ZS 90 S 2Ö/2S</b>  

### Ordering example

<b>ZS 90 S 2Ö/2S VD</b>	
VD lever release (blank without manual latching)	
2 NC/2 NO contacts	
S two-side actuation	
Series	
Emergency pull-wire switch	

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 in the appendix.



QUALITY MANAGEMENT  
LIFE TEST OF UNLOCKING MECHANISM





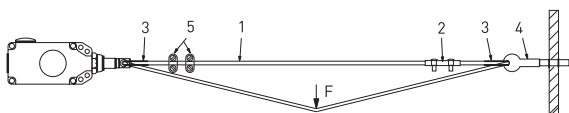
# Emergency pull-wire switches

## // Mounting notes

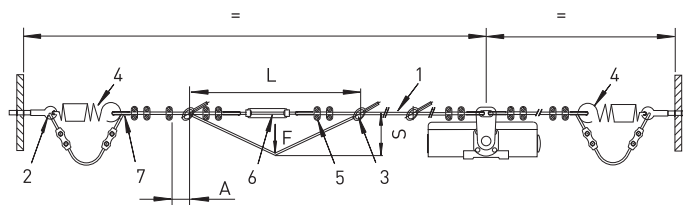
### Notes

- Always mount emergency pull-wire switch in middle position.
- Two tension springs type RZ156I must be installed see chapter accessories in the appendix

### // One-side actuation



### // Two-side actuation



- 1 = Pull-wire  
2 = DUPLEX wire clamp  
3 = Wire thimble  
4 = Eye bolt  
5 = Wire clamp

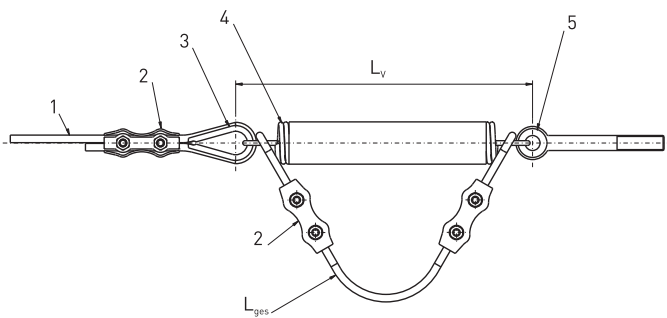
- 1 = Pull-wire  
2 = Eye bolt  
3 = Wire support  
4 = Tension spring  
5 = Wire clamp  
6 = Tensioner  
7 = Wire thimble  
A = Travel limit 70 mm  
L = Maximum wire length between wire supports  
S = Switching/actuating travel  
e.g. max. 400 mm at L = 4 m



#### Notes

- With two-side actuation a travel limitation must be installed, see drawing below, in order to prevent overstretching of the tension spring
- Before mounting the pull-wire, the red PVC sheath must be removed from the the pull-wire in the clamping range of the pull-wire!
- In order to guarantee safe operation, observe the enclosed mounting and wiring instructions.

### // Spring pretension / Travel limitation



- 1 = Pull-wire
- 2 = DUPLEX wire clamp
- 3 = Wire thimble
- 4 = Tension spring
- 5 = Eye bolt

$L_{ges}$  = Total length for limitation of spring 270 mm

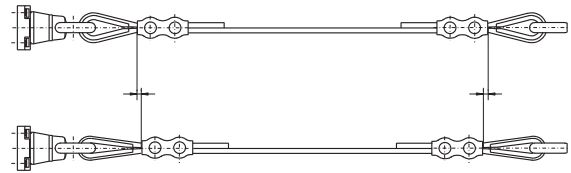
$L_v$  = Pre-stress 200 mm

Both values refer to tension spring RZ156I

#### 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 DUPLEX wire clamp, eye-bolt or tensioner.

### // Wire thimble deformation





# Emergency pull-wire switches

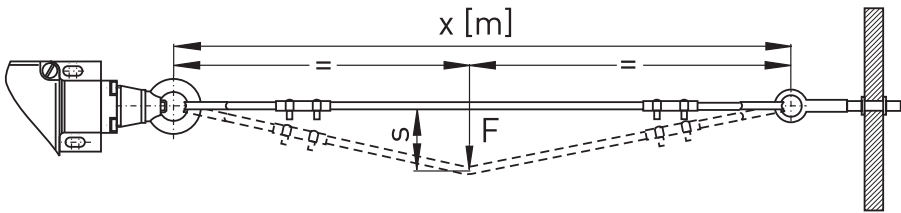
## // Pre-stress and actuating forces

- Notes
- The values are indicated for an ambient temperature of 20 °C.
  - 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.

Emergency pull-wire switch	Wire length betw. supports x [m]	Pre-stress force [N]	Actuating travel s [cm]	Actuating force F [N]	Recommended wire length [m]	Ordering index
ZS 70	2.5	50	7	10	<8	-
ZS 71	3	200 55	7 7	30 6	5-20 <5	/200N /55N
ZS 73	5	295-390 195-275 120-180 80-100	13 13 13 13	38-60 33-41 19-25 5-8	30-50 20-30 10-20 <10	/295-390N /195-275N /120-180N /80-100N
ZS 75	5	295-390 195-275 120-180 80-100	13 13 13 13	38-60 33-41 19-25 5-8	30-50 20-30 10-20 <10	/295-390N /195-275N /120-180N /80-100N
ZS 441	5	220 150 60	10 10 10	23 14 6	15-25 5-15 <5	/220N /150N /60N
ZS 80	5	100	22	32	75	-

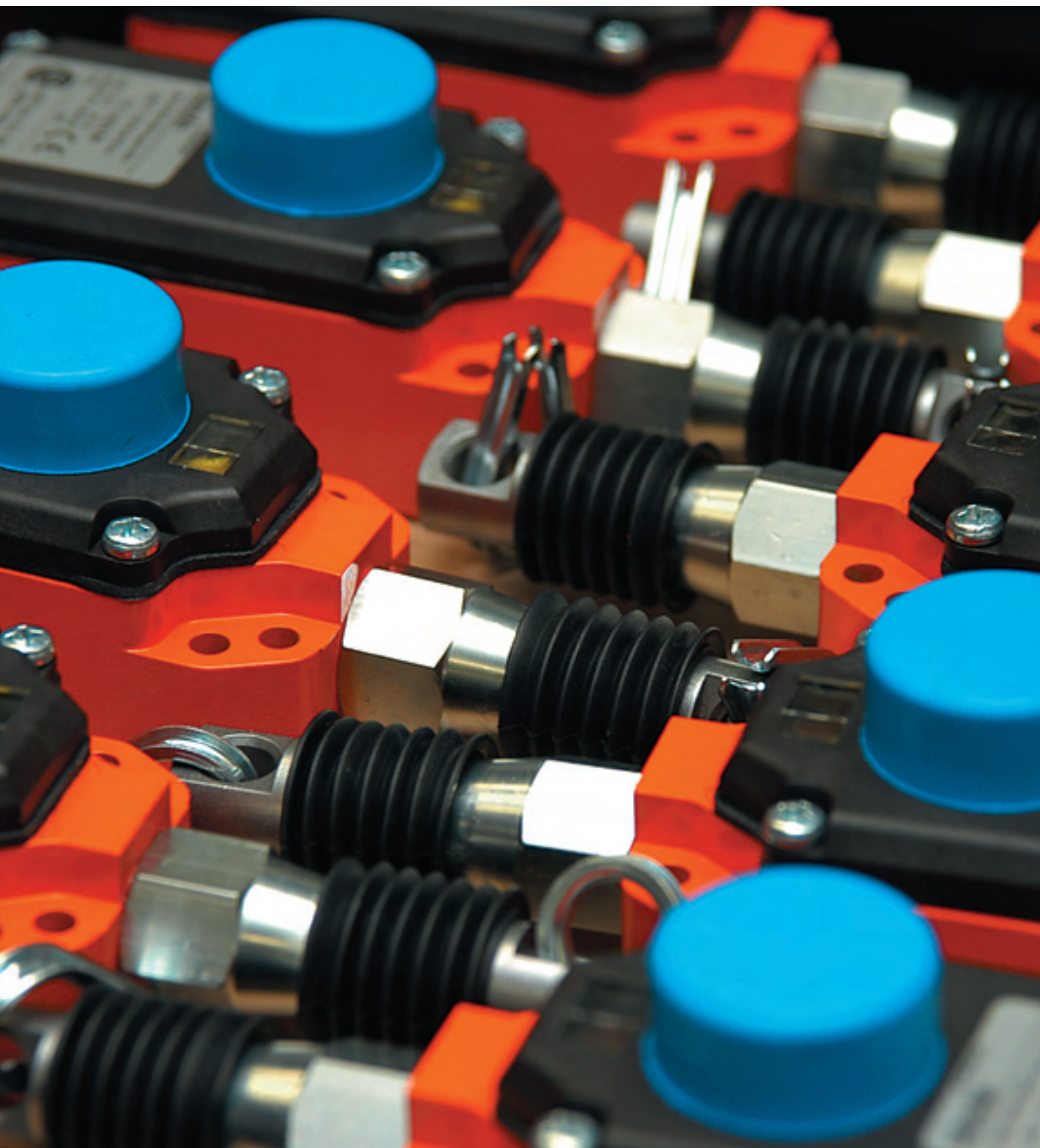
34

Actuating forces and travel between supports





PRODUCTION PROCESS ASSEMBLY  
EMERGENCY PULL-WIRE SWITCHES AFTER END CONTROL











## Belt-alignment switches

// Series ES 61 SR

from page 40

// Series ZS 73 SR

from page 42

// Series ZS 75 SR

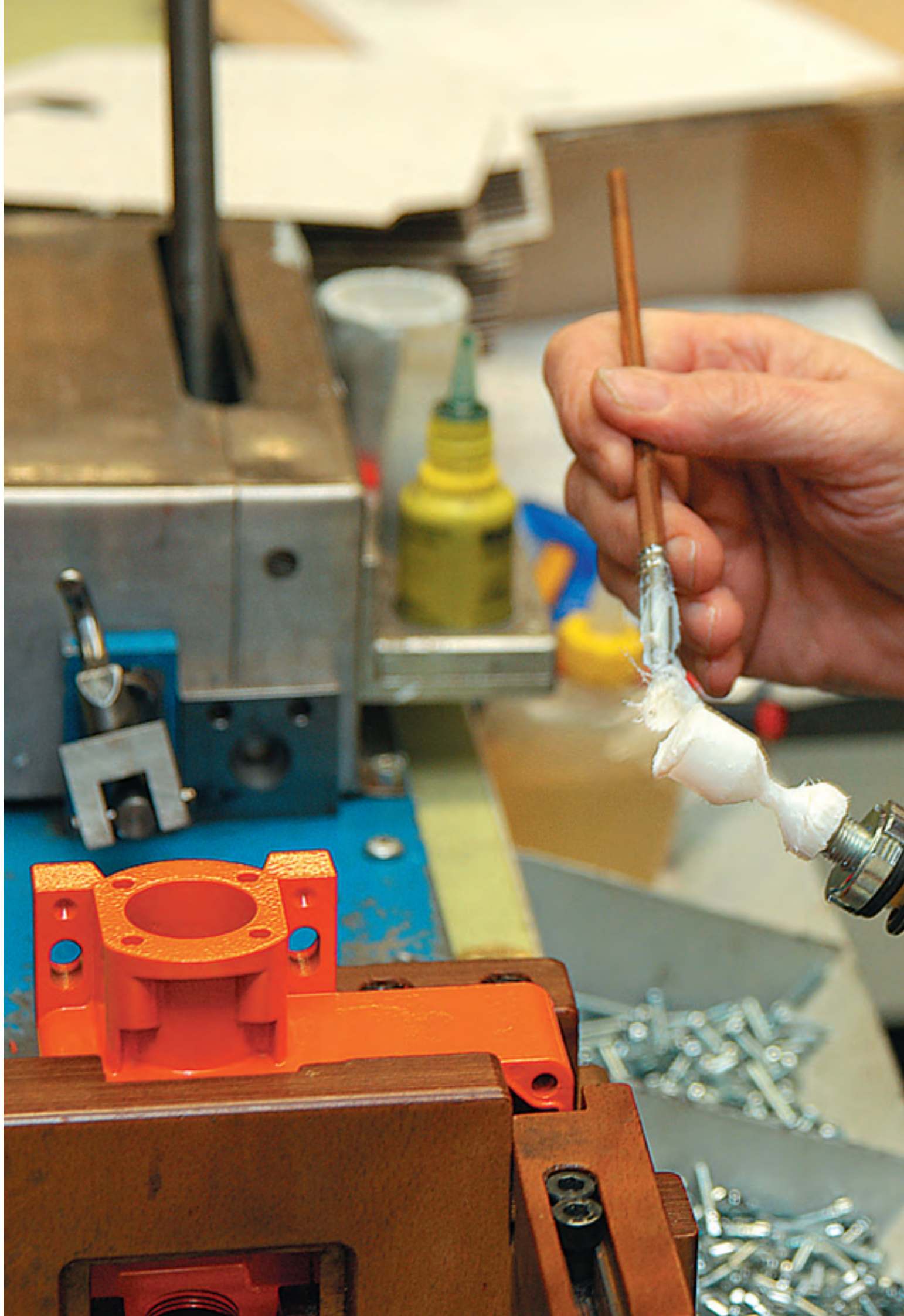
from page 44

// Series ZS 90 SR

from page 46

ZS 73 SR







# Belt-alignment switches

## Application

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.

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

## Design and mode of operation

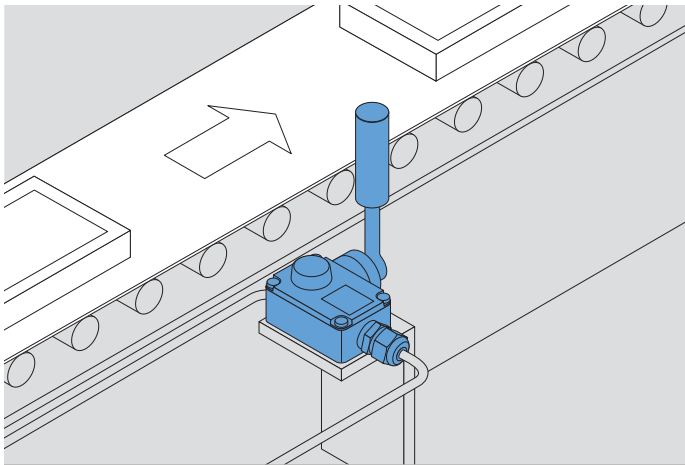
Belt-alignment switches are actuated when the conveyor belt becomes misaligned. Depending on the plant arrangements, this signal can either be used to switch the equipment off or to provide automatic correction of the belt alignment. Thus they should be installed at both sides of the conveyor belt close to the deflection and drive pulleys. In case of very long conveyor systems further belt-alignment switches must be installed. Those 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 Belt-alignment switches have positive break NC contacts and a mechanical latching. At actuation the NC contacts are opened and latched mechanically. The release can either be carried by push button or key. Thus an unintentional, automatic restart of the conveyor belt is prevented.

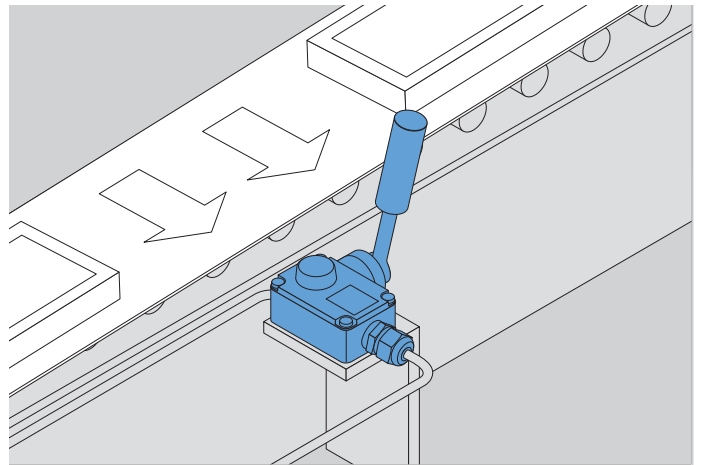
All belt-alignment switches bear the CE mark according to the Machinery Directive 98/37/EC.

## Application

### Monitoring an conveyor belt



### Belt-alignment switch in actuated state





# Belt-alignment switches

## // Series ES 61 SR

### Features/Options

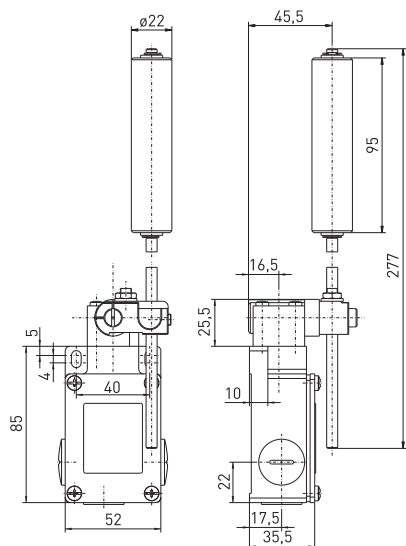
- Metal enclosure
- Slow action: 2 contacts

## // ES 61 SR



## Technical data

Standards	IEC/EN 60947-5-1, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	steel, enamel finish
Degree of protection	IP 65
Contact material	silver
Switching elements	change-over contact with double break with galvanically separated contact bridges
Switching system	slow action
Connection	M3.5 screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	3 x M20 x 1.5
B <sub>10d</sub> (10 % load)	1 million
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	10 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-20 °C ... +80 °C
Mech. life	> 1 million operations
Switching frequency	3600/h



### Contact variants: switch travel/contacts

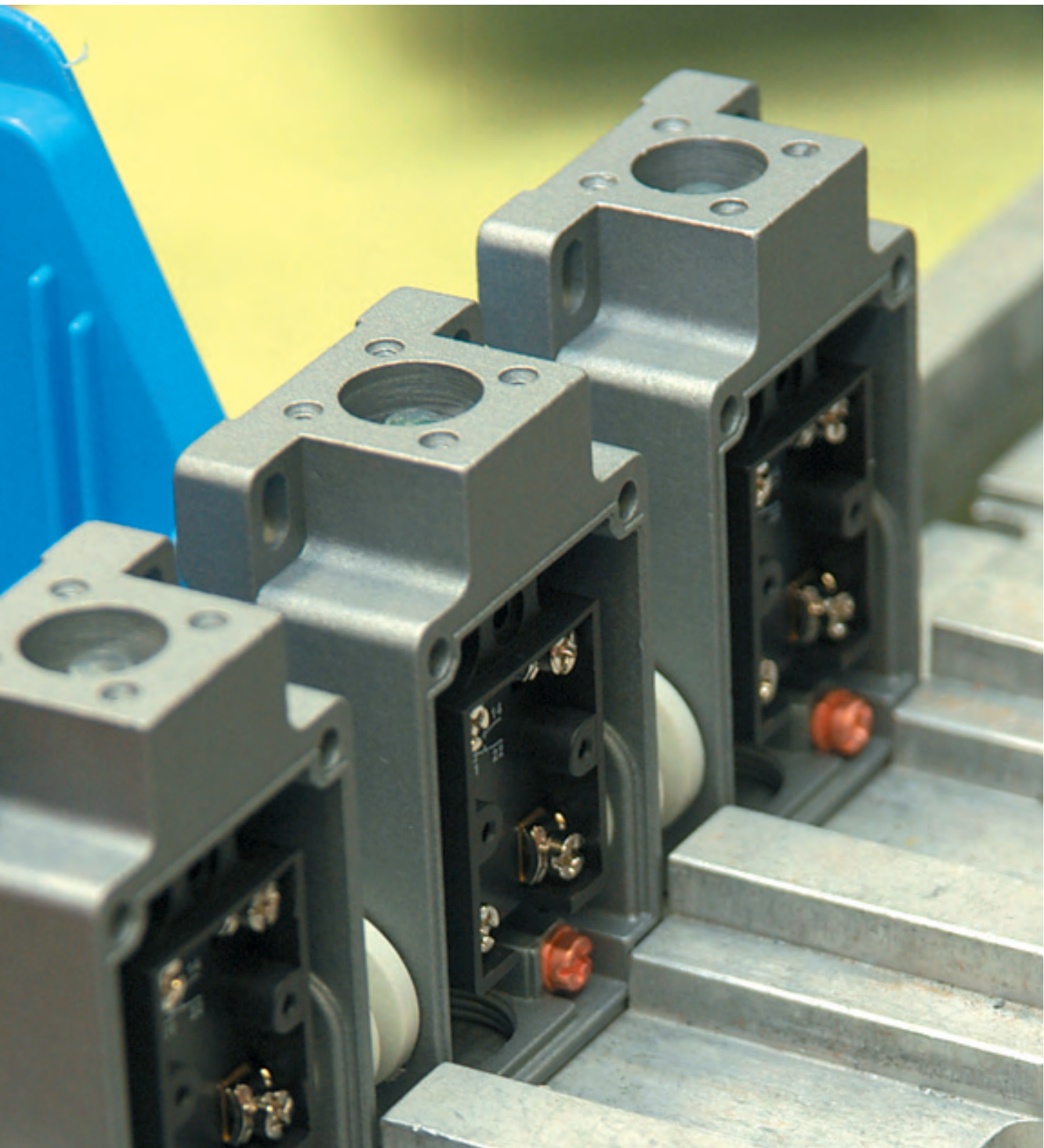
	Slow action
1 NC/1 NO contact	<b>ES 61 SR 10/1S</b> 
1 NC/1 NO contact with overlapping	<b>ES 61 SR UE</b> 

### Ordering details

#### ES 61 SR 10/1S

- 1 NC/1 NO contact, (UE 1 NC/1 NO contact with contact overlapping)
- SR Belt-alignment lever
- Series
- S Slow action (M snap action)







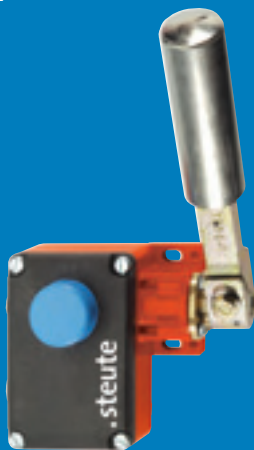
## Belt-alignment switches

### // Series ZS 73 SR

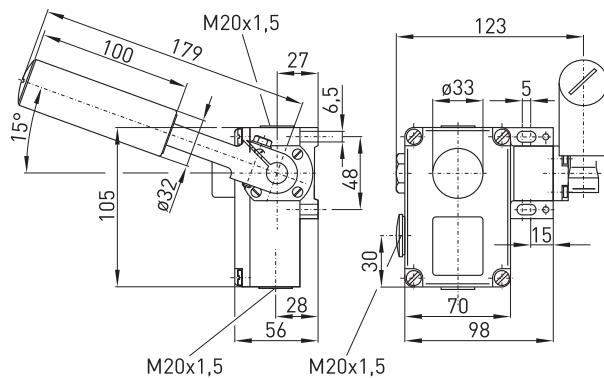
### Features/Options

- Metal enclosure
- 2 contacts
- Release by push button or key possible
- Belt-alignment roller made of stainless steel 1.4104
- Ex version available


// ZS 73 SR



42



## Technical data

<b>Standards</b>	IEC/EN 60947-5-1, EN ISO 13849-1
<b>Enclosure</b>	aluminium die-cast, enamel finish;
<b>Cover</b>	glass-fibre reinforced, shockproof thermoplastic, ultramid
<b>Degree of protection</b>	ZS 73 SR VD: IP 65; ZS 73 SR VS: IP 54 to IEC/EN 60529
<b>Contact material</b>	silver
<b>Switching elements</b>	change-over contact with double break or 2 NC contacts
<b>Switching system</b>	snap action, positive break NC contacts ⊖
<b>Connection</b>	screw terminals
<b>Cable section</b>	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
<b>Cable entry</b>	1 x M20 x 1.5
<b>B<sub>10d</sub> (10 % load)</b>	ZS 73 SR: 2 million; ZS 73 SR VD/VS: 200 000
<b>T<sub>M</sub></b>	10 years
<b>U<sub>imp</sub></b>	6 kV
<b>U<sub>i</sub></b>	400 V
<b>I<sub>the</sub></b>	6 A
<b>Utilisation category</b>	AC-15
<b>I<sub>e</sub>/U<sub>e</sub></b>	6 A/400 VAC
<b>Max. fuse rating</b>	6 A gL/gG D-fuse
<b>Ambient temperature</b>	-25 °C ... +70 °C
<b>Mech. life</b>	ZS 73 SR: > 1 million operations ZS 73 SR VD/VS: > 100 000 operations
<b>Indicator lamp</b>	as option
<b>Approvals</b>	

Contact variants: switch travel/contacts

	<b>Snap action</b>
1 NC/1 NO contact	<b>ZS 73 SR 10/1S</b> 
2 NC contacts	<b>ZS 73 SR 20</b> 

## Ordering details

Series	Indicator lamp, see accessories (appendix)	VD Push button release (VS key release, blank without manual latching)	1 NC/1 NO contact (20)	SR Belt-alignment lever	Belt-alignment switch
ZS					
73					
SR					
10/15					
VD-G					



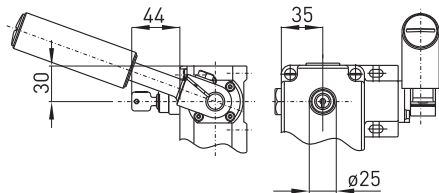
## Belt-alignment switches

### // Series ZS 73 SR, variants

#### Features/Options

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request
- With 2 cable entries available on request

#### // Key release VS





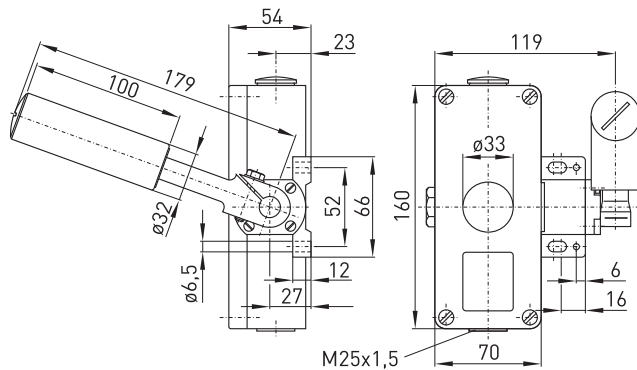
## Belt-alignment switches

### // Series ZS 75 SR



## Features/Options

- Metal enclosure
- 2 or 4 contacts
- Release by push button or key possible
- Belt-alignment roller made of stainless steel 1.4104
- Ex version available

// ZS 75 SR



## Technical data

Standards	IEC/EN 60947-5-1, EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Cover	aluminium die-cast, enamel finish
Degree of protection	ZS 75 SR VD: IP 65; ZS 75 SR VS: IP 54 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NO and 2 NC or 4 NC
Switching system	snap action, positive break NC contacts ⊖
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M25 x 1.5
B <sub>10d</sub> (10 % load)	ZS 75 SR: 2 million; ZS 75 SR VD/VS: 200 000
T <sub>M</sub>	10 years
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	ZS 75 SR: > 1 million operations ZS 75 SR VD/VS: > 100 000 operations
Indicator lamp	as option
Approvals	 



Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	<b>ZS 75 SR 10/15</b> 
2 NC/2 NO contacts	<b>ZS 75 SR 20/25</b> 
4 NC contacts	<b>ZS 75 SR 40</b> 

## Ordering details

**ZS 75 SR 20/2S VD-G**

The diagram shows the model name 'ZS 75 SR 20/2S VD-G' with vertical lines connecting each part to its description:

- ZS**: Indicator lamp, see accessories (appendix)
- 75**: VD Push button release (VS key release, blank without manual latching)
- SR**: 2 NC/2 NO contacts (1Ö/1S, 4Ö)
- 20/2S**: SR Belt-alignment lever
- VD**: Series
- G**: Belt-alignment switch



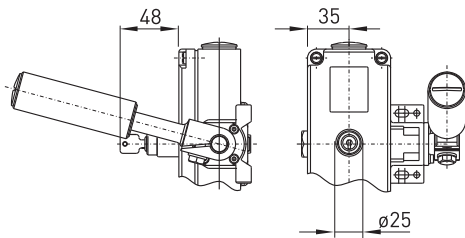
## Belt-alignment switches

### // Series ZS 75 SR, variants

#### Features/Options

- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Indicator lamp position in the left side cable entry, other positions possible on request

#### // Key release VS





## Belt-alignment switches

### // Series ZS 90 SR

#### Features/Options

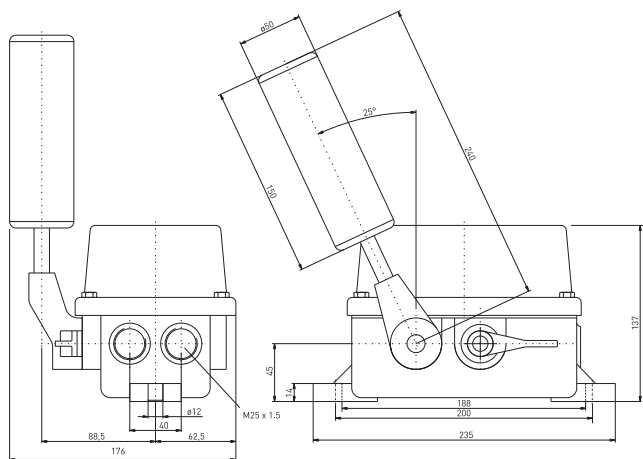
- Thermoplastic enclosure
- 2 NC and 2 NO contacts
- With contact staggering:
  - 1 NC and 1 NO contact switching at 15°,
  - 1 NC and 1 NO contact switching at 25°
- Release by lever possible
- Belt-alignment lever continuously adjustable
- Ex version available

### // ZS 90 SR



### Technical data

Standards	IEC/EN 60947-5-1, IEC/EN 60947-5-5, EN 418 EN ISO 13849-1
Enclosure	Duroplast
Cover	Duroplast
Degree of protection	IP 67 to IEC 60529
Contact material	silver
Switching elements	2 NO/2 NC contacts with double break
Switching system	snap action, positive break NC contacts ⊖
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M25 x 1.5
B <sub>10d</sub> (10 % load)	EEx ZS 90 SR VD: 200 000, EEx ZS 90 SR: 2 million
T <sub>M</sub>	10 years
U <sub>imp</sub>	4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	10 A
Gebrauchskategorie	AC-15
I <sub>e</sub> /U <sub>e</sub>	1 A/230 VAC
Max. fuse rating	6 A gG D fuse
Ambient temperature	-40 °C ... +85 °C
Mech. life	EEx ZS 90 SR VD: > 100 000 operations, EEx ZS 90 SR: > 1 million operations



#### Contact variants: switch travel/contacts

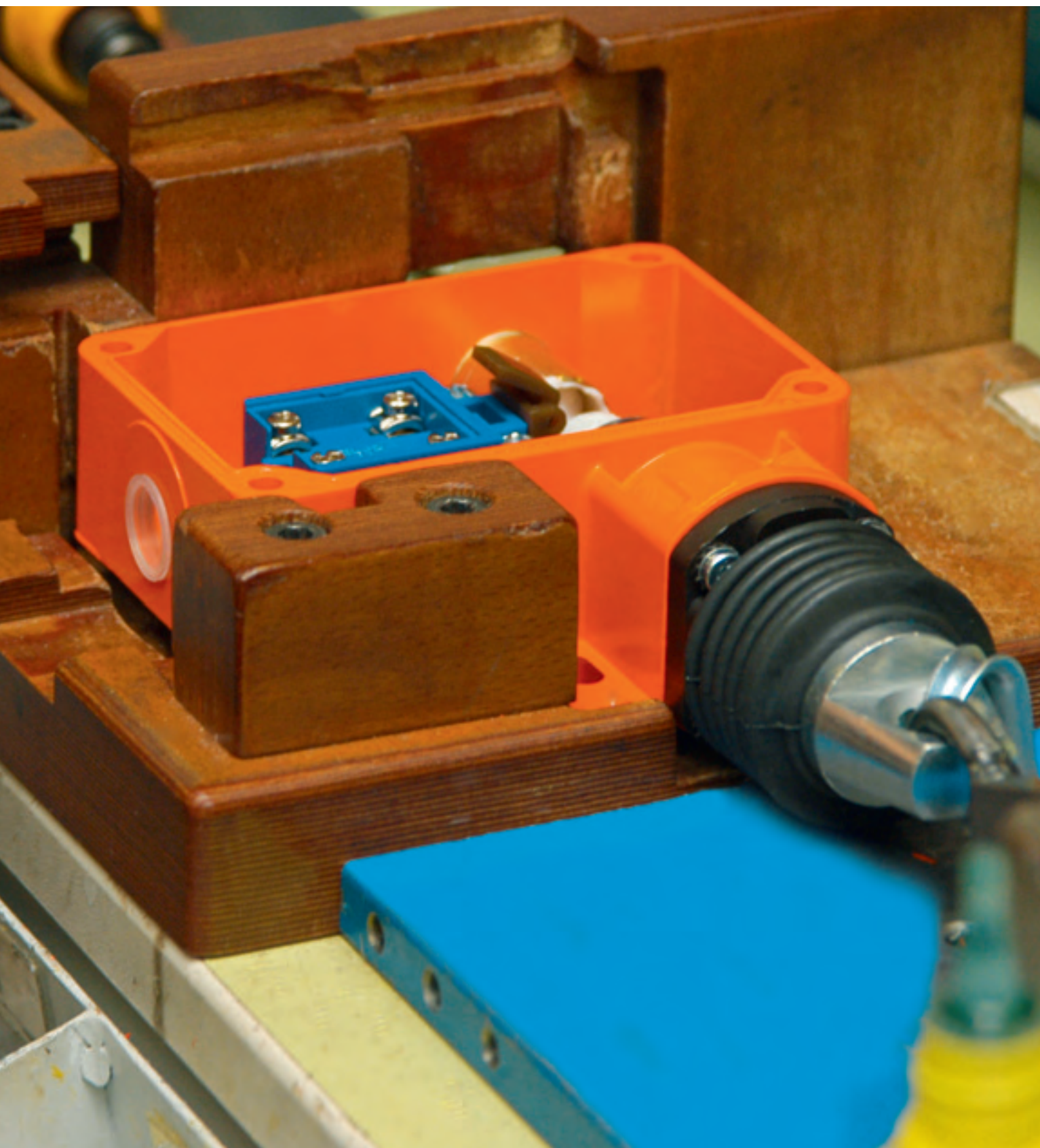
	Snap action
2 NC/2 NO contacts	<b>ZS 90 SR 1ÖS/1ÖS</b>  

#### Ordering example

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



PRODUCTION PROCESS ASSEMBLY  
ASSEMBLY OF PULL-WIRE SWITCH











## Pull-wire switches

// Series ES/EM 95 Z

from page 54

// Series ES 51 Z

from page 56

// Series ES/EM 41 Z

from page 58

// Series ES/EM 61 Z

from page 60

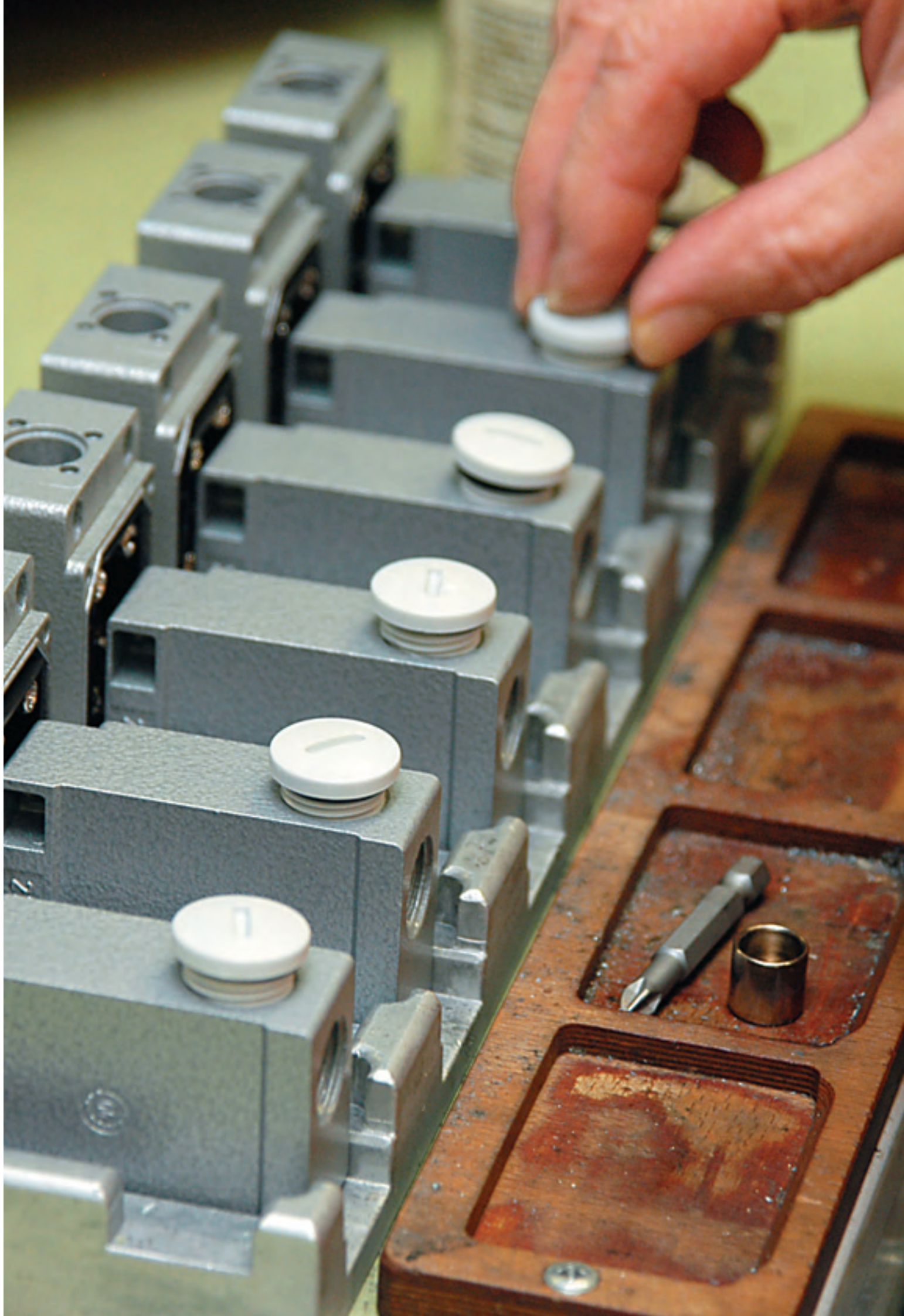
// Series ZS 70

from page 62

// Series ZS 71

from page 63







# Pull-wire switches

## Application

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

## Design and mode of operation

Pull-wire switches are actuated manually by pulling. There are variants with and without latching. The pull-wire switches without latching generate a switching impulse on actuation. With the devices with latching the switching impulse is maintained until repeated actuation.

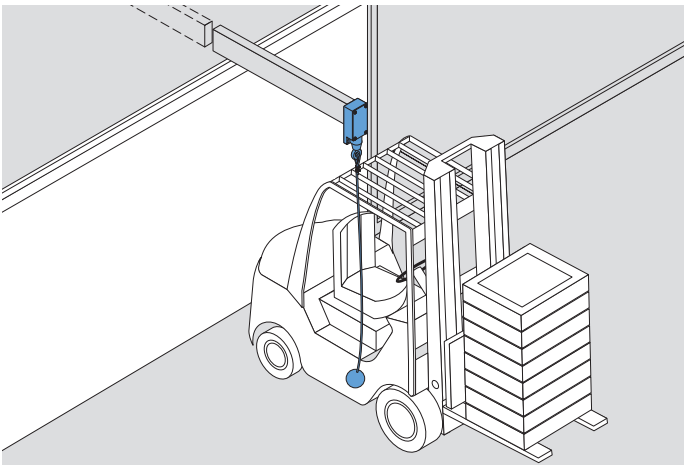
An important feature for the selection of pull-wire switches are the mounting possibilities, wall or ceiling mounting. For your support you find a selection table on the following page.

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

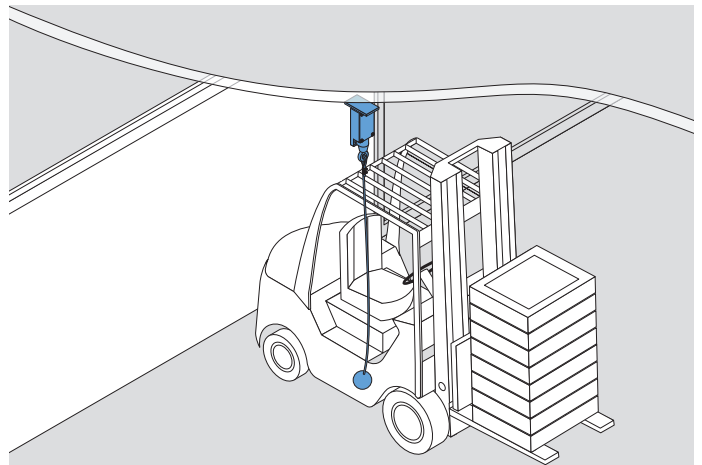
All pull-wire switches presented in this chapter bear the CE mark according to the Low Voltage Directive 73/23/EC.

## Application

### Wall mounting as door opener



### Wall mounting





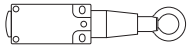
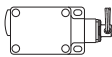
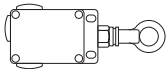
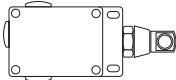

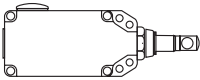


## Selection table

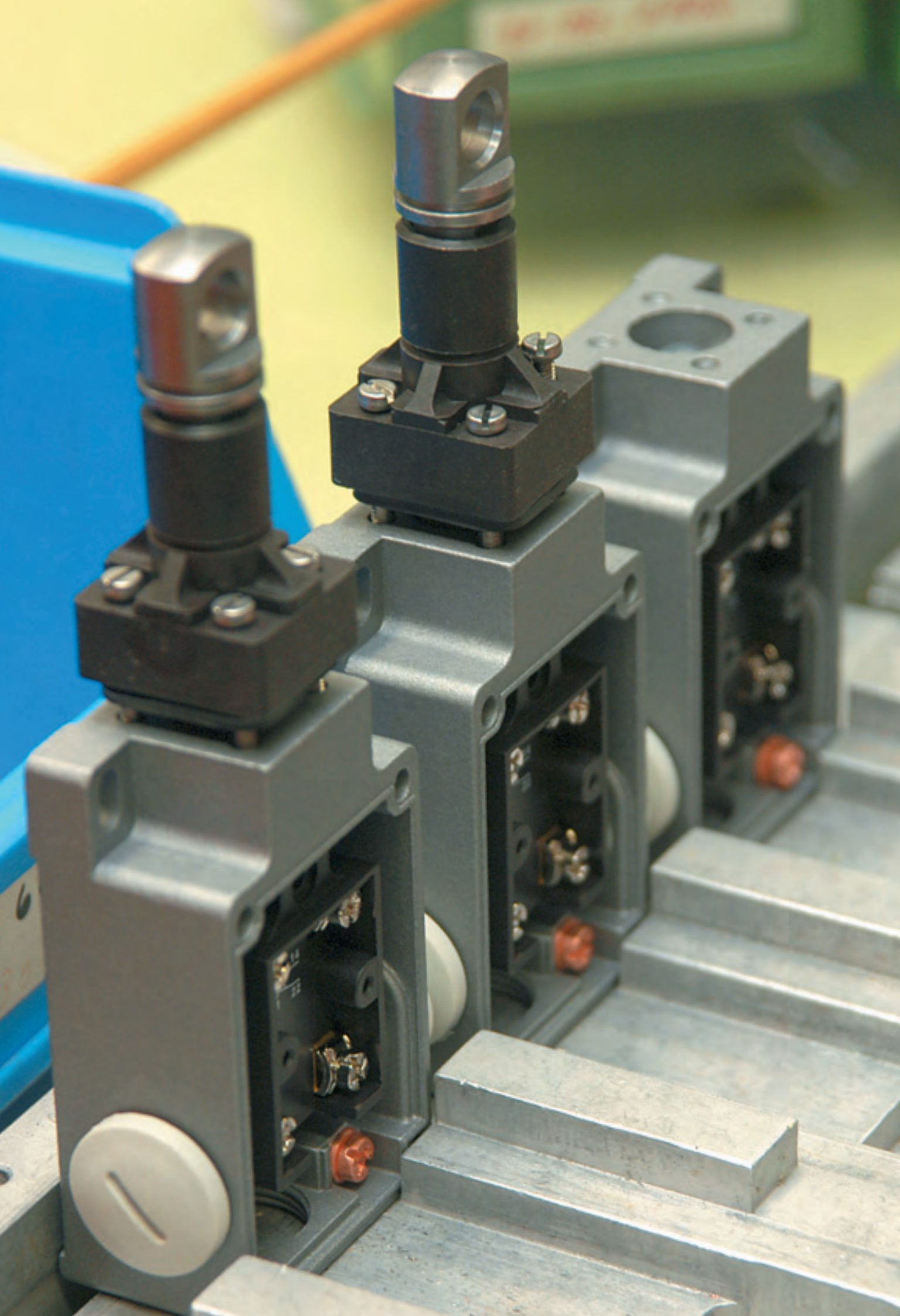
### Pull-wire switches

// Series

// Mounting possibilities

		↓	↓	
				
ES/EM 95 Z, on page 54 - Thermoplastic enclosure - Ceiling or wall mounting		X	X	
ES 51 Z, on page 56 - Metal enclosure - Wall mounting		X	—	
ES/EM 41 Z, on page 58 - Metal enclosure - Ceiling or wall mounting		X	X	
ES/EM 61 Z, on page 60 - Metal enclosure - Ceiling or wall mounting		X	X	
ZS 70, on page 62 - Thermoplastic enclosure - Wall mounting		X	—	
ZS 71, on page 63 - Metal enclosure - Wall mounting		X	—	



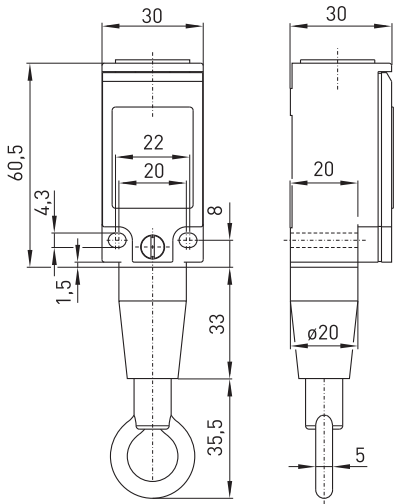




Pull-wire switches  
// Series ES 95 Z

- Features/Options
- Thermoplastic enclosure
  - Wall mounting
  - Slow action: 2 contacts
  - Horizontal slotted mountig holes
  - Double insulated □

// ES 95 Z



Technical data

Standards	IEC/EN 60947-5-1
Design	DIN EN 50 047
Enclosure	glass-fibre reinforced, shockproof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break, galvanically separated contact bridges
Switching system	slow action, positive break NC contacts ⊕ to IEC 60947-5-1
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	1 x M20 x 1.5
U <sub>i</sub> imp	4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15; DC-13
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC; 0,25 A/230 VDC
Max. fuse rating	6 A gL/gG D-fuse
Mech. life	> 1 million operations
Switching frequency	1800/h
Ambient temperature	- 20 °C ... + 80 °C
Contact opening	2 x 3.5 mm
Actuating force	20 N
Features	pull-wire function

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 95 Z 10/1S

Ordering details

ES 95 W Z 10/1S
1 NC/1 NO contact
Z Actuator towing eye
W Collar
Series
S Slow action



## Pull-wire switches

### // Series ES95 Z, variants

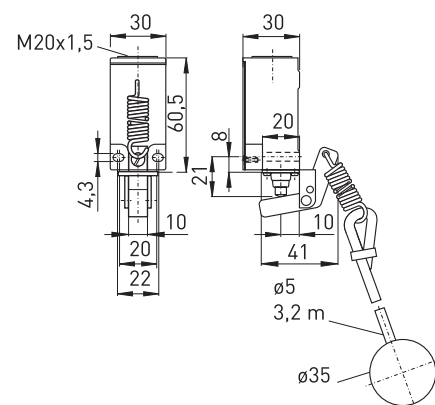
#### Features/Options

- Version for door/gate opening ES 95 WH/90° 1Ö/1S:  
including 3.2 m long nylon pull-wire and rubber ball,  
slow action 1 NC/1 NO contact

// ES 95 WH/90° 1Ö/1S



// ES 95 WH/90° 1Ö/1S





# Pull-wire switches

## // Series ES 51 Z

### Features/Options

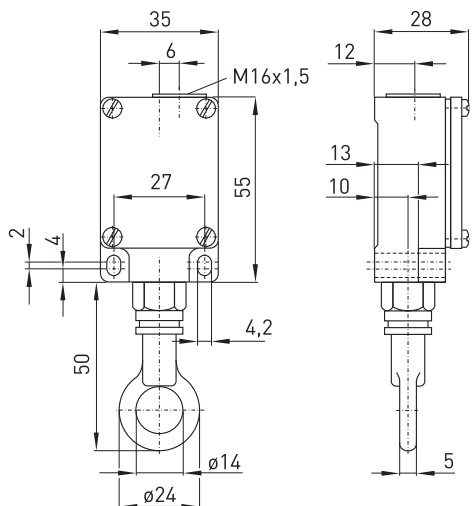
- Metal enclosure
- Wall mounting
- Slow action: 2 contacts
- Small design
- Various spring force variants (actuating forces)
- Pull-wire function

// ES 51 Z



### Technical data

Standards	IEC/EN 60947-5-1
Enclosure	aluminium die-cast, enamel finish
Cover	steel, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break with galvanically separated contact bridges
Switching system	slow action
Connection	M3 screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	1 x M16 x 1.5
U <sub>imp</sub>	4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	4 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	4 A/400 VAC
Max. fuse rating	4 A gL/gG D-fuse
Ambient temperature	-20 °C ... +80 °C
Mech. life	> 1 million operations
Switching frequency	3600/h
Actuating force	max. 40 N
Features	pull-wire function



### Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 Z 10/1S

### Ordering details

ES 51 W Z 10/1S

1 NC/1 NO contact  
 Z Actuator towing eye  
 W Collar  
 Series  
 S Slow action



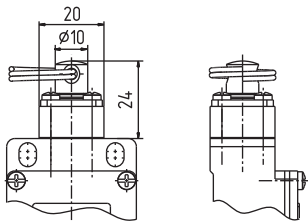
## Pull-wire switches

### // Series ES 51 Z, Varianten

#### Features/Options

- Collar W to protect against the entry of foreign bodies

#### // Collar W





# Pull-wire switches

## // Series ES/EM 41 Z

### Features/Options

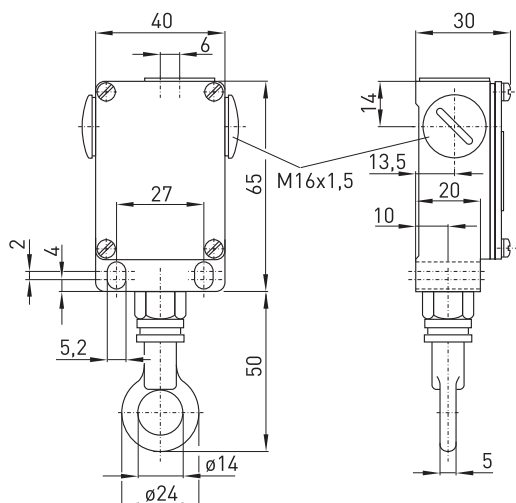
- Metal enclosure
- Wall or ceiling mounting
- Slow or snap action: 2 contacts
- Various spring force variants (actuating forces)
- Pull-wire function

// ES/EM 41 Z



### Technical data

Standards	IEC/EN 60947-5-1
Enclosure	aluminium die-cast, enamel finish
Cover	steel, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	change-over or 2 NO contacts with double break and galvanically separated contact bridges
Switching system	slow or snap action
Connection	M3.5 screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	3 x M16 x 1.5
U <sub>imp</sub>	4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	10 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-20 °C ... +80 °C
Mech. life	> 1 million operations
Switching frequency	3600/h
Actuating force	max. 45 N
Features	pull-wire function



### Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	<b>EM 41 Z 10/1S</b> 	<b>ES 41 Z 10/1S</b> 
2 NO contacts		<b>ES 41 Z 2S</b> 

### Ordering details

ES 41 W Z 10/1S DM

DM Ceiling mounting, including ceiling mounting plate  
 1 NC/1 NO contact, (2S 2 NO contacts)  
 Z Actuator towing eye  
 W Collar  
 Series  
 S Slow action (M snap action)



## Pull-wire switches

### // Series ES/EM 41 Z, Varianten

#### Features/Options

- Version for ceiling mounting with mounting plate
- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Collar W to protect against the entry of foreign bodies
- Available with thermoplastic cover

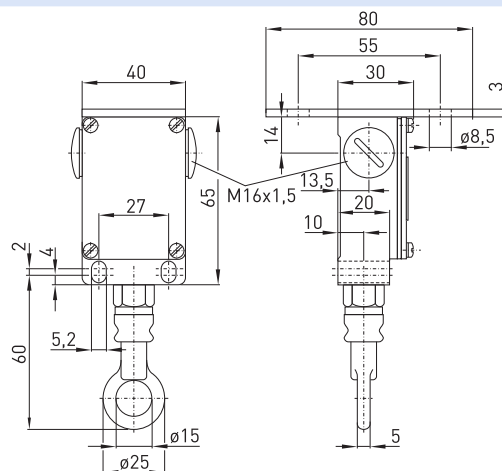
#### Features/Options

- Version for ceiling and wall mounting ES 41 WH/90° 10/1S
- Version for door/gate opening ES 41 WH/90° 10/1S: including 3.2 m long nylon pull-wire with rubber ball, including mounting screws and rawlplugs, metal enclosure with thermoplastic cover, slow action 1 NC/1 NO contact

#### // Ceiling mounting DM



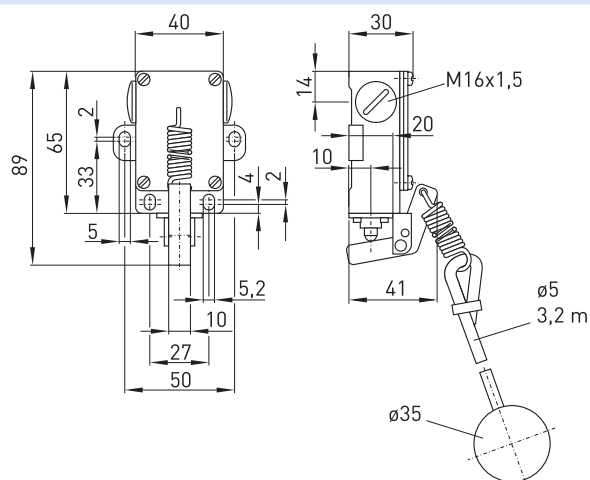
#### // Ceiling mounting DM



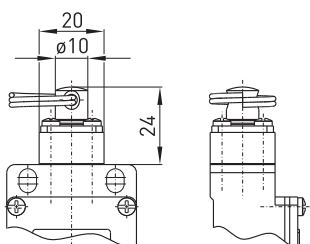
#### // ES 41 WH/90° 10/1S



#### // ES 41 WH/90° 10/1S



#### // Collar W





## Pull-wire switches

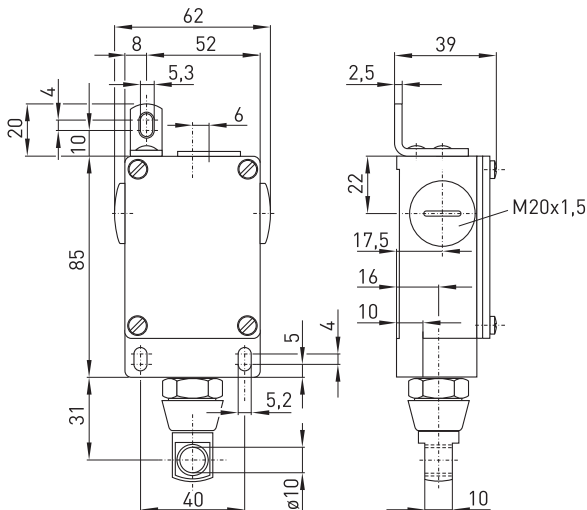
### // Series ES/EM 61 Z

- ### Features/Options
- Metal enclosure
  - Wall or ceiling mounting
  - Slow or snap action: 2 contacts
  - Various spring force variants (actuating forces)
  - Pull-wire function
  - Ex version available

// ES/EM 61 Z



60



## Technical data

Standards	IEC/EN 60947-5-1
Enclosure	aluminium die-cast, enamel finish
Cover	steel, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	change-over or 2 NO contacts with double break and galvanically separated contact bridges
Switching system	slow or snap action
Connection	M3.5 screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	3 x M16 x 1.5
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	10 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	ES 61: 16 A/400 VAC, EM 61: 6 A/400 VAC
Max. fuse rating	ES 61: 16 A gL/gG D-fuse EM 61: 6 A gL/gG D-fuse
Ambient temperature	-20 °C ... +80 °C
Mech. life	> 1 million operations
Switching frequency	3600/h
Actuating force	max. 50 N
Features	pull-wire function

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	<p><b>EM 61 Z 10/1S</b></p> <p>0 3 7 21-22 13-14 13-14 21-22 1</p>	<p><b>ES 61 Z 10/1S</b></p> <p>0 3.5 7 13-14 21-22 2</p>
2 NO contacts		<p><b>ES 61 Z 2S</b></p> <p>0 3.5 7 13-14 23-24</p>

## Ordering details

ES 61 W Z 10/1S DM

DM Ceiling mounting, including ceiling mounting plate

1 NC/1 NO contact, (2S 2 NO contacts)

Z Actuator towing eye

W Collar

Series

S Slow action (M snap action)



# Pull-wire switches

## // Series ES/EM 61 Z, Varianten

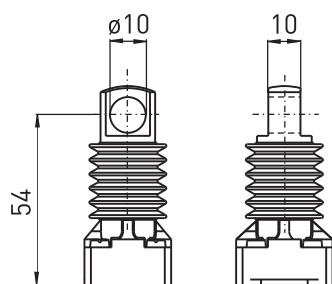
### Features/Options

- Version for wall mounting with mounting angle
- Version for ceiling mounting with mounting plate
- Indicator lamps for various voltages are indicated in chapter accessories in the appendix
- Collar W to protect against the entry of foreign bodies

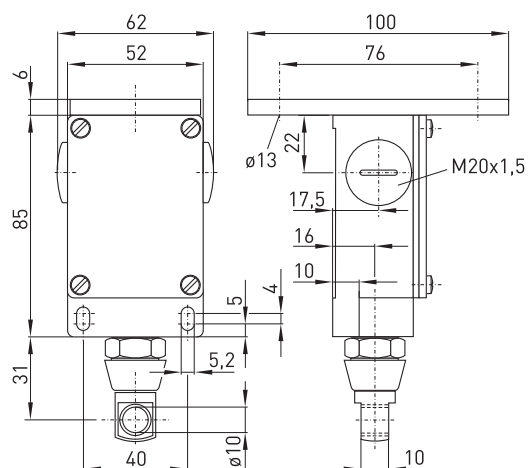
### // Ceiling mounting DM



### // Collar W



### // Ceiling mounting DM



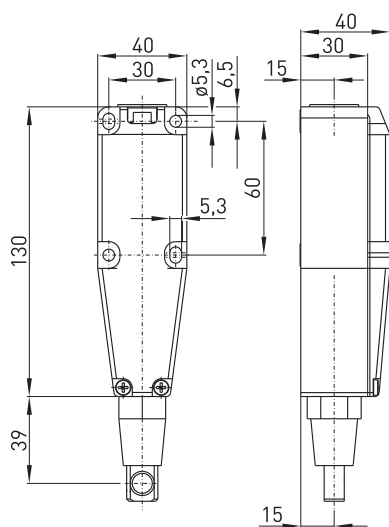


# Pull-wire switches

## // Series ZS 70

- Features/Options
- Thermoplastic enclosure
  - Wall mounting
  - Snap action: 2 contacts
  - Pull-wire function

// ZS 70



### Technical data

Standards	IEC/EN 60947-5-1
Design	mounting dimensions to DIN EN 50041
Enclosure	glass-fibre reinforced, shockproof thermoplastic, ultramid
Cover	glass-fibre reinforced, shockproof thermoplastic, ultramid
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break with galvanically separated contact bridges
Switching system	snap action, positive break NC contacts ⊖ to IEC 60947-5-1
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	1 x M20 x 1.5
U <sub>imp</sub>	6 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-10 °C ... +70 °C
Mech. life	> 1 million operations
Switching frequency	1800/h
Actuating force	max. 85 N
Features	pull-wire function

### Contact variants: switch travel/contacts

	Snap action
1 NC/1 NO contact	ZS 70 Z 10/1S 0 3 5 13-14 21-22

### Ordering details

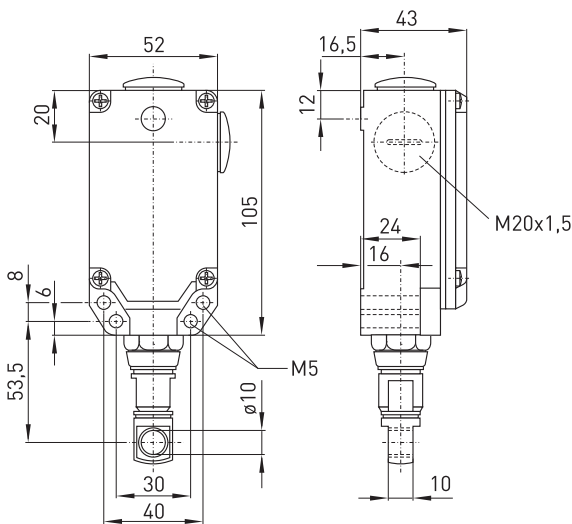
ZS 70 Z 10/1S

1 NC/1 NO contact  
Z Actuator towing eye  
Series  
Pull-wire switch




Pull-wire switches  
// Series ZS 71

// ZS 71


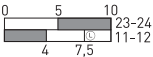


- Features/Options
- Metal enclosure
  - Wall mounting
  - Slow or snap action: 2 contacts
  - Pull-wire function with or without latching
    - snap action: without latching
    - slow action: with latching
  - Collar W to protect against the entry of foreign bodies
  - Indicator lamps for various voltages are indicated in chapter accessories in the appendix

Technical data

Standards	IEC/EN 60947-5-1
Enclosure	aluminium die-cast, enamel finish
Cover	thermoplastic, ultramid
Protection class	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break mit with galvanically separated contact bridges
Switching system	slow or snap action, positive break NC contacts ⊖ to IEC 60947-5-1
Connection	screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	2 x M20 x 1.5
U <sub>imp</sub>	ZS 71 Z: 6 kV, ZS 71 Z RE: 4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	ZS 71 Z: 6 A ZS 71 Z RE: 4 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	ZS 71 Z: 6 A/400 VAC, ZS 71 Z RE: 4 A/400 VAC
Max. fuse rating	ZS 71 Z: 6 A gL/gG D-fuse ZS 71 Z RE: 4 A gL/gG D-fuse
Ambient temperature	-25 °C ... +70 °C
Mech. life	> 1 million operations
Indicator lamp	as option
Switching frequency	1800/h
Actuating force	ZS 71 Z: max. 80 N, ZS 71 Z RE: max. 80 N
Features	pull-wire function with or without latching
Approvals	

Contact variants: switch travel/contacts

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

Ordering details

ZS 71 W Z 10/1S RE-G

Indicator lamp, position left side cable entry, see accessories (appendix)

RE latching

1 NC/1 NO contact

Z Actuator towing eye

W Collar

Series

Pull-wire switch







## Slack-wire switches

// Series ES 41 DB  
from page 69









# Slack-wire switches

## Application

Slack-wire switches are suitable for applications with handling equipment. There they are for example mounted at a wire in order to monitor the wire tension.

## Design and mode of operation

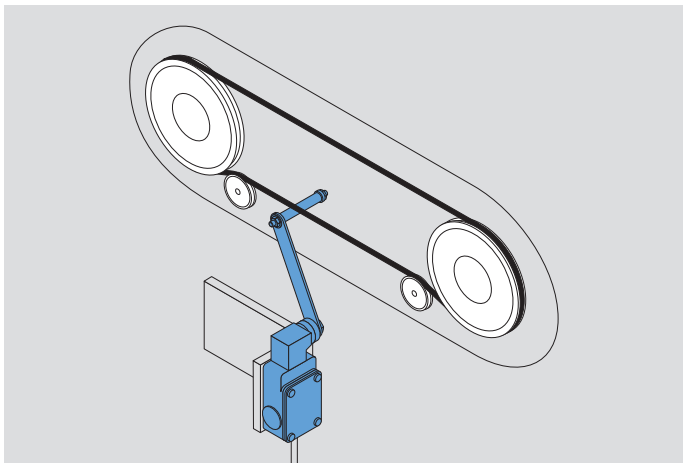
Slack-wire switches monitor the pull-wire tension. With correct tension present, the switch is actuated. In case of wire breakage or stretching of the wire the switch is released and thus switches the system off. In addition, this signal can depending on the construction of the system generate an optical or acoustic indicating or warning signal.

All slack-wire switches presented in this chapter bear the CE mark according to the Low Voltage Directive 73/23/EC.

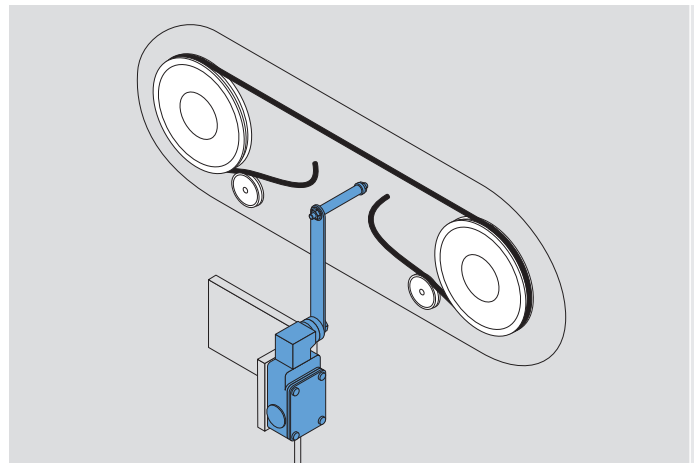
67

## Application

### Monitoring of wire tension

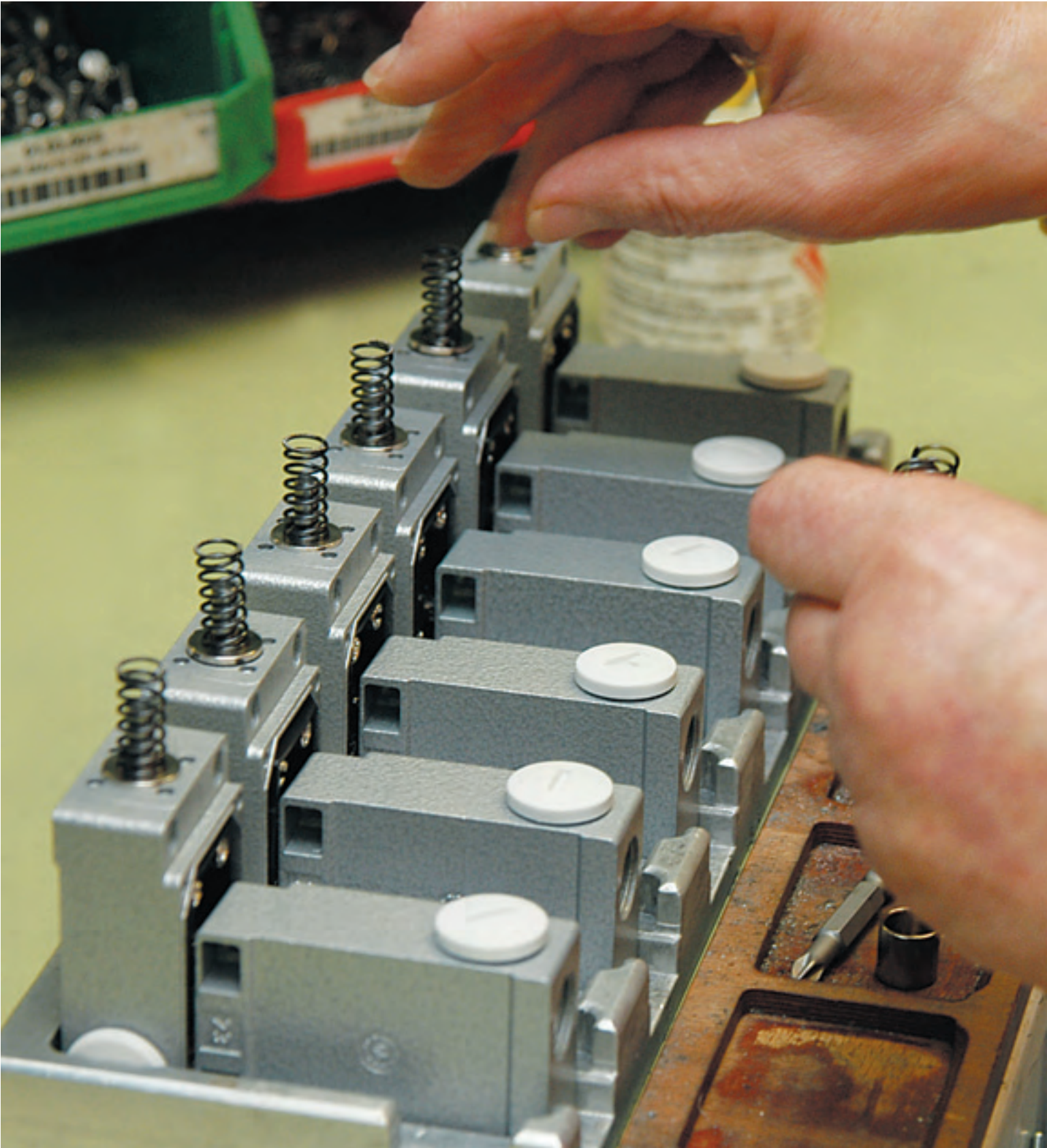


### Slack-wire switches in released state after wire breakage





PRODUCTION PROCESS ASSEMBLY  
MANUAL MOUNTING OF RETAINING SPRINGS ON SLACK-WIRE SWITCHES



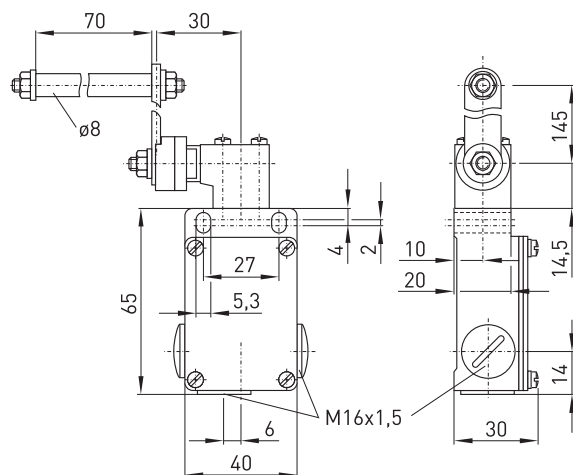
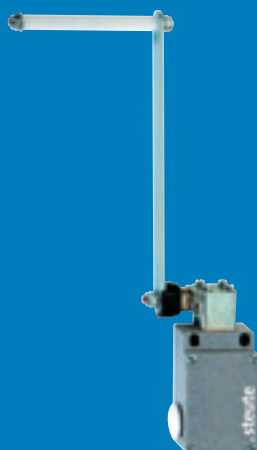


Slack-wire switches  
// Series ES 41 DB

## Features/Options

- Metal enclosure
- Slow or snap action: 2 contacts
- Available with thermoplastic cover
- Available with various actuating rollers

```
// ES 41 DB
```



## Technical data

Standards	IEC/EN 60947-5-1
Enclosure	aluminium die-cast, enamel finish
Cover	steel, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with double break or 2 NC contacts and galvanically separated contact bridges
Switching system	slow or snap action
Connection	M3.5 screw terminals
Cable section	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry	3 x M16 x 1.5
U <sub>imp</sub>	4 kV
U <sub>i</sub>	400 V
I <sub>the</sub>	6 A
Utilisation category	AC-15
I <sub>e</sub> /U <sub>e</sub>	6 A/400 VAC
Max. fuse rating	6 A gL/gG D-fuse
Ambient temperature	-20 °C ... +80 °C
Mech. life	> 1 million operations
Switching frequency	max. 1800/h

69

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	<b>EM 41 DB 10/1S</b> <p>Diagram showing contact positions and angles for EM 41 DB 10/1S. The switch has two contacts: a normally closed (NC) contact and a normally open (NO) contact. The NC contact is shown in the closed position (shaded) and the NO contact is shown in the open position (white). The angles are marked as 70°, 25°, 0°, 25°, 70° for the NC contact and 13-14, 21-22 for the NO contact. The switch is labeled 11° and 11°.</p>	<b>ES 41 DB 10/1S</b> <p>Diagram showing contact positions and angles for ES 41 DB 10/1S. The switch has two contacts: a normally closed (NC) contact and a normally open (NO) contact. The NC contact is shown in the closed position (shaded) and the NO contact is shown in the open position (white). The angles are marked as 70°, 30°, 0°, 30°, 70° for the NC contact and 23-24, 11-12 for the NO contact. The switch is labeled 20° and 20°.</p>
2 NC contacts		<b>ES 41 DB 20</b> <p>Diagram showing contact positions and angles for ES 41 DB 20. The switch has two normally closed (NC) contacts. Both contacts are shown in the closed position (shaded). The angles are marked as 70°, 20°, 0°, 20°, 70° for the NC contacts and 11-12, 21-22 for the NO contact. The switch is labeled 20° and 20°.</p>
1 NC/1 NO contact with overlapping		<b>ES 41 DB UE</b> <p>Diagram showing contact positions and angles for ES 41 DB UE. The switch has two contacts: a normally closed (NC) contact and a normally open (NO) contact. The NC contact is shown in the closed position (shaded) and the NO contact is shown in the open position (white). The angles are marked as 70°, 30°, 0°, 30°, 70° for the NC contact and 23-24, 15-16 for the NO contact. The switch is labeled 40° and 40°.</p>

## Ordering details

## EM 41 DB 10/1S

1 NC/1 NO contact (2Ö 2 NC contacts, UE contact overlapping), other configurations possible

DB Slack-wire lever

Series

M Snap action (S slow action)



Appendix

// Accessories emergency pull-wire and pull-wire switches

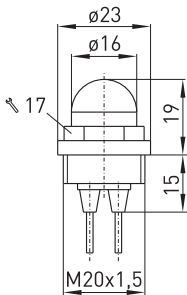
- Features/Options
- Lamp cap red
  - M20 x 1.5
  - 24 VDC or 230 VAC
  - Ordering unit: 1 piece

- Features/Options
- Lamp cap red
  - M20 x 1.5
  - 24 VDC, 115 VAC or 230 VAC
  - Ordering unit: 1 piece

// Indicator lamp glow lamp



// Indicator lamp glow lamp



Ordering details

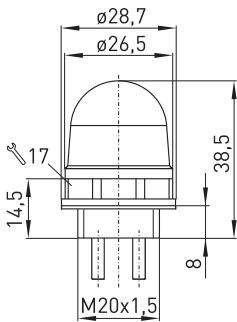
Indicator lamp glow lamp 24 VDC  
Indicator lamp glow lamp 230 VAC

01.41.5101  
01.41.5100

// Indicator lamp Multi-LED red



// Indicator lamp Multi-LED red



Ordering details

Indicator lamp Multi-LED RD 24 VDC  
Indicator lamp Multi-LED RD 115 VAC  
Indicator lamp Multi-LED RD 230 VAC

01.41.5105  
01.41.5103  
01.41.5116



#### Features/Options

- Lamp cap white
- M20 x 1.5
- 24 VDC, 115 VAC or 230 VAC
- Ordering unit: 1 piece

#### Features/Options

- To guide the pull-wire where the path is not a straight line
- For pull-wire with red PVC sheath  $\varnothing$  5 mm (steel core  $\varnothing$  3 mm)
- Ordering unit: 1 piece

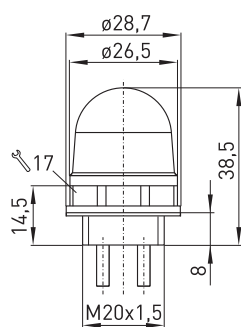
#### Notes

According to EN 418, pulleys may only be mounted such that the complete length of the pull-wire can be observed.

// Indicator lamp Multi-LED white



// Indicator lamp Multi-LED white



#### Ordering details

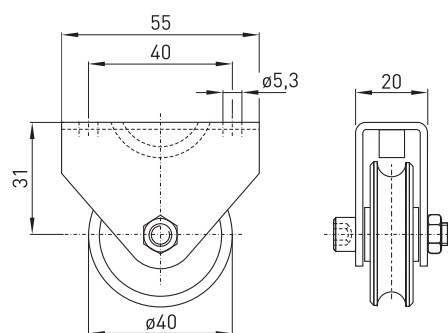
Indicator lamp Multi-LED WH 24 VDC  
Indicator lamp Multi-LED WH 115 VAC  
Indicator lamp Multi-LED WH 230 VAC

01.41.5106  
01.41.5104  
01.41.5115

// Pulley



// Pulley



#### Ordering details

Pulley

04.73.9102



Appendix





// Accessories emergency pull-wire and pull-wire switches

Features/Options

- Steel core Ø 3 mm with red PVC sheath
- Total diameter 5 mm
- Ordering unit: per metre
- Available with stainless steel core
- Complete pull-wire set consisting of:  
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

Features/Options

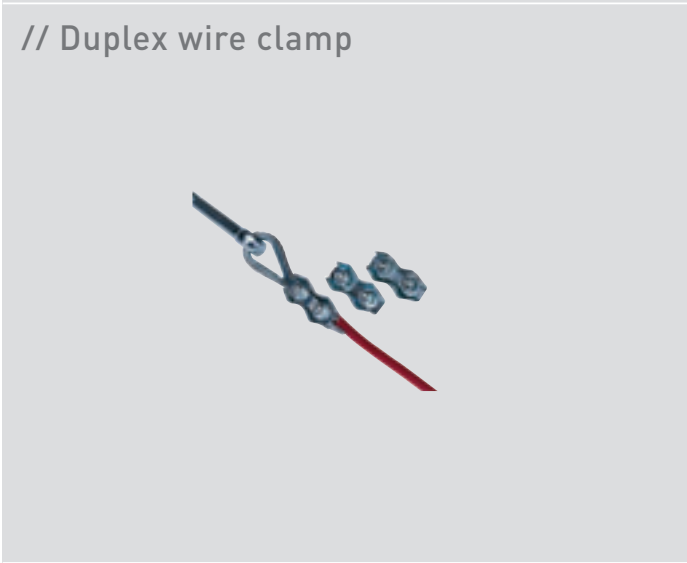
- Pull-wire yellow (polypropylene)
- Emergency pull-wire switches: with rubber ball and mounting clamp
- pull-wire switches: with rubber ball and Duplex wire clamp
- 1, 2, 3 or 4 m long
- Ordering unit: 1 piece

<div>// Pull-wire</div> <div>  </div>		<div>// Pull-wire for emergency pull-wire sw.</div> <div>  </div>	
<div>// Complete pull-wire set</div> <div>  </div>		<div>// Pull-wire for pull-wire switches</div> <div>  </div>	
<div>Ordering details</div> <div> <div> <div>Pull-wire Ø 5 mm per metre</div> <div>01.09.0011</div> </div> <div> <div>Pull-wire stainless steel Ø 5 mm per metre</div> <div>01.10.0059</div> </div> <div> <div>Complete pull-wire set, 5 m</div> <div>04.61.7101</div> </div> <div> <div>(other lengths on request)</div> <div></div> </div> </div>		<div>Ordering details</div> <div> <div> <div>Pull-wire with ball for pull-wire switches 1 m</div> <div>04.73.7106</div> </div> <div> <div>Pull-wire with ball for pull-wire switches 2 m</div> <div>04.73.7107</div> </div> <div> <div>Pull-wire with ball for pull-wire switches 3 m</div> <div>04.73.7108</div> </div> <div> <div>Pull-wire with ball for pull-wire switches 4 m</div> <div>04.73.7109</div> </div> <div> <div>Pull-wire with ball for emergency pull-wire switches 1 m</div> <div>04.73.7101</div> </div> <div> <div>Pull-wire with ball for emergency pull-wire switches 2 m</div> <div>04.73.7103</div> </div> <div> <div>Pull-wire with ball for emergency pull-wire switches 3 m</div> <div>04.73.7104</div> </div> <div> <div>Pull-wire with ball for emergency pull-wire switches 4 m</div> <div>04.73.7102</div> </div> </div>	



- Features/Options
- for pull-wire with steel core Ø 3 mm
  - Ordering unit: 1 piece
  - Wire clamp made of stainless steel available

- Features/Options
- For pull-wire with steel core Ø 3 mm
  - Ordering unit: 1 piece



Ordering details

- |                                 |            |
|---------------------------------|------------|
| Wire clamp 3 mm                 | 01.10.0003 |
| Wire clamp 3 mm stainless steel | 01.10.0061 |
| Duplex wire clamp               | 01.10.0004 |

Ordering details

- |                            |            |
|----------------------------|------------|
| Egg-shaped wire clamp 3 mm | 01.10.0063 |
|----------------------------|------------|



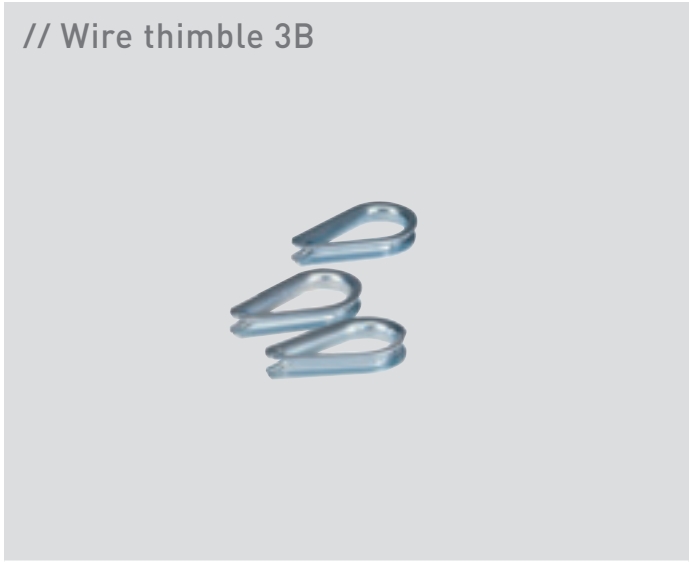
Appendix

// Accessories emergency pull-wire and pull-wire switches

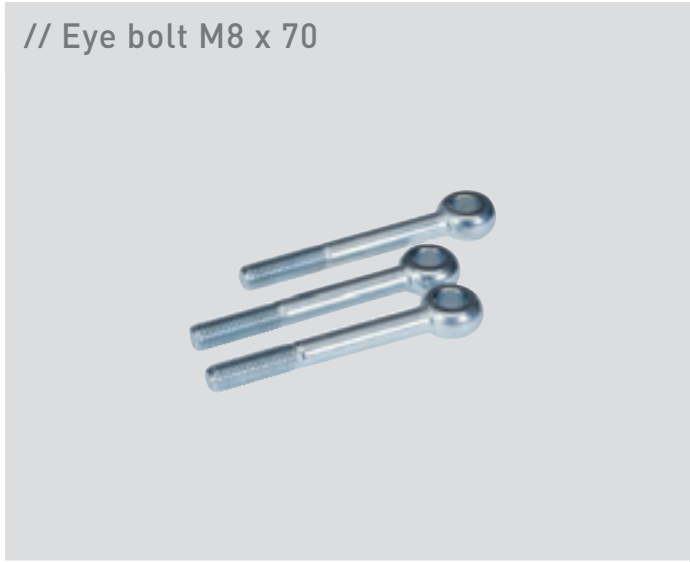
- Features/Options
- Per DIN 6899
  - For pull-wire with steel core Ø 3 mm, part number wire thimble 3B
  - Wire clamp made of stainless steel available
  - Ordering unit: 1 piece

- Features/Options
- Per DIN 444
  - Eye bolt M8 x 70 including nut: 70 mm length referring to eye centre, M8 x 1.5 thread, 25 mm thread length
  - M8 x 70 made of stainless steel available
  - Eye bolt BM10 x 40 including nut (without figure): 40 mm length referring to eye centre, M10 x 1.5 thread, 25 mm thread length
  - Ordering unit: 1 piece

// Wire thimble 3B



// Eye bolt M8 x 70



Ordering details	
Wire thimble 3B	01.10.0001
Wire thimble stainless steel	01.10.0084

Ordering details	
Eye bolt M8x70 with nut	04.00.7112
Eye bolt M8x70 stainless steel	01.03.0210
Eye bolt BM10x40 with nut	01.03.0208



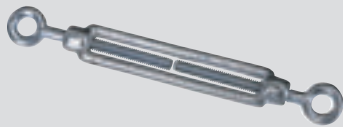
#### Features/Options

- For precise adjustment of pull-wire pre-stress
- Per DIN 1480
- Tensioner M6: adjustable von 145 mm bis 225 mm
- Tensioner M8 (without figure):  
made of stainless steel, adjustable from 160 mm to 255 mm
- Ordering unit: 1 piece

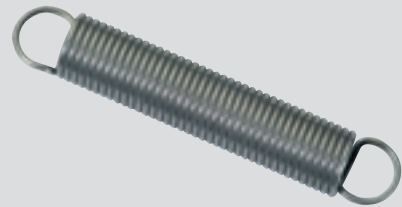
#### Features/Options

- Only suitable for two-side actuation, emergency pull-wire switches series ZS 73 S and ZS 75 S
- To maintain reaction force
- Length in unstretched state 130 mm
- Ordering unit: 1 piece

// Tensioner M6



// Tension spring RZ-156l



75

#### Ordering details

Tensioner M6	01.10.0010
Tensioner M8 stainless steel	01.10.0062

#### Ordering details

Tension spring RZ-156l	01.07.0070
------------------------	------------



## Accessories

### // Accessories emergency pull-wire and pull-wire switches

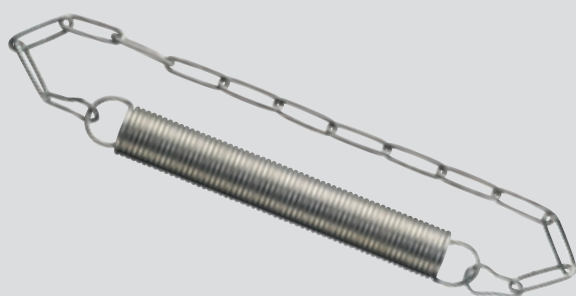
#### Features/Options

- Only suitable for two-side actuation, emergency pull-wire switches series ZS 90 S
- To maintain reaction force
- Length in unstretched state 156 mm
- Ordering unit: 1 piece

#### Features/Options

- Application at fluctuation of temperature
- Suitable for ZS 80 with 100 N spring force
- Length in unstretched state 42.8 mm
- Stainless steel 1.4310
- Ordering unit: 1 piece

// Tension spring RZ-130K



// Compensation spring RZ-142I



#### Ordering details

Tension spring RZ-130K

04.76.7101

#### Ordering details

Compensation spring RZ-142I

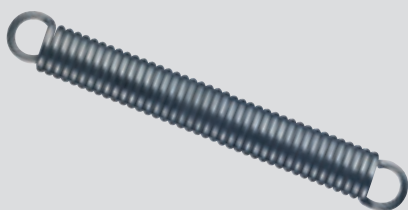
01.07.0111



#### Features/Options

- Application at fluctuation of temperature
- Suitable for ZS 71 with 200 N spring force
- Length in unstretched state 118 mm
- Stainless steel 1.4310
- Ordering unit: 1 piece

#### // Compensation spring RZ-162I



#### Ordering details

Compensation spring RZ-162I











01.07.0103



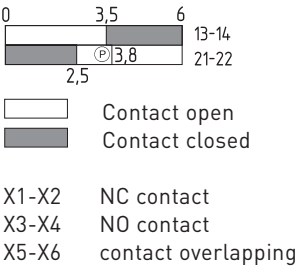




Explanation of symbols

	positive break NC contacts
	positive break travel/angle
	latching point
	wire breakage detection
	wire pull detection
	spanner size across flats
	CSA/UL approval, Canada
	TÜV prototype-tested
	BG prototype-tested
	conformity to standards, 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 travel diagrams





steute develops and manufactures safe switchgear for demanding and critical fields of application. Besides a comprehensive standard range of products for applications in Explosion Protection, Control Technology and Medical Equipment, we also and increasingly develop customised switchgear for extreme conditions in all three business fields.

Some examples: emergency pull-wire switches for the mining industry, self-sufficient radio position switches for industrial automation and control panels for laser surgery. Our head office is in Löhne, Westphalia, Germany; worldwide sales are conducted by subsidiaries and trading partners.

steute  
Schaltgeräte GmbH & Co. KG  
Brückenstraße 91  
32584 Löhne, Germany  
Phone + 49 (0) 57 31 7 45-0  
Telefax + 49 (0) 57 31 7 45-200  
E-mail [info@steute.com](mailto:info@steute.com)  
[www.steute.com](http://www.steute.com)