

Automation

Safety, position switches, command devices



// SYSTEMATIC CONTROL SWITCHGEAR

Catalogue



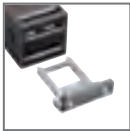
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Solenoid interlocks

Thermoplastic enclosure
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Solenoid interlocks

Range of application

The solenoid 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 solenoid 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 solenoid interlocks achieve SIL 3 according to EN 62061 and PL e according to EN ISO 13849-1.

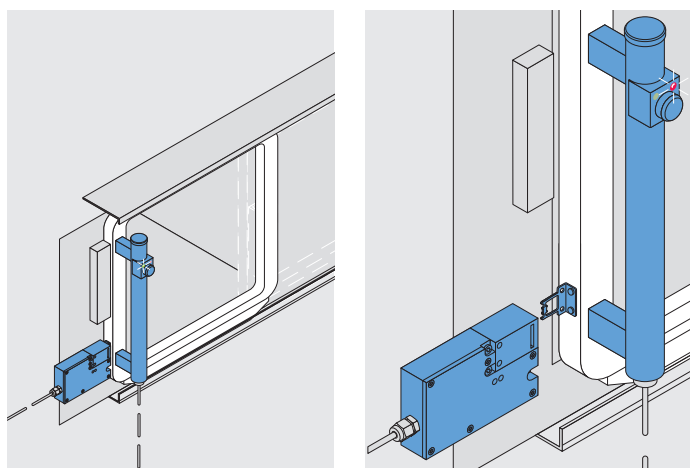
Design and operating principle

On the solenoid 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 solenoid interlocks operate on the principle of »actuated without power supply«, whereby the actuator is held in the interlock by spring pressure. When power is supplied to the solenoid, the interlock is released. The guarding device can then be opened. The solenoid interlocks with the power-to-lock principle work in the opposite way.

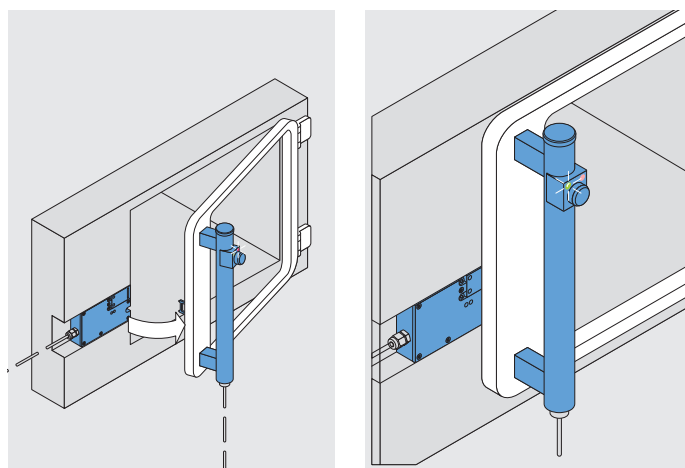
The solenoid interlocks shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC.

Application

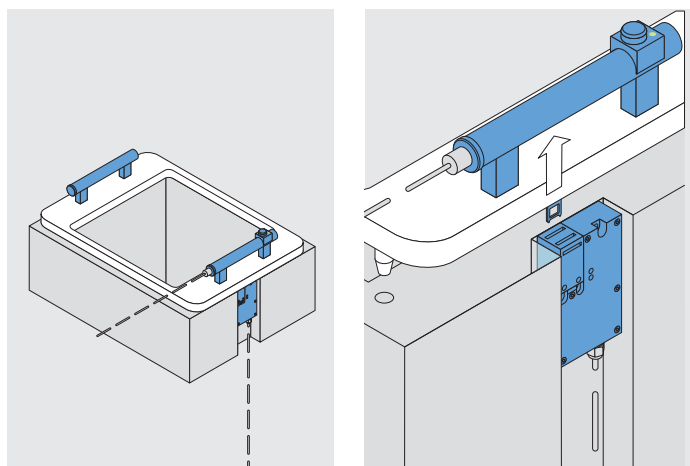
on sliding guards



on hinged guards



on removable guards



Solenoid interlocks

// Series STM 295

Features/Options

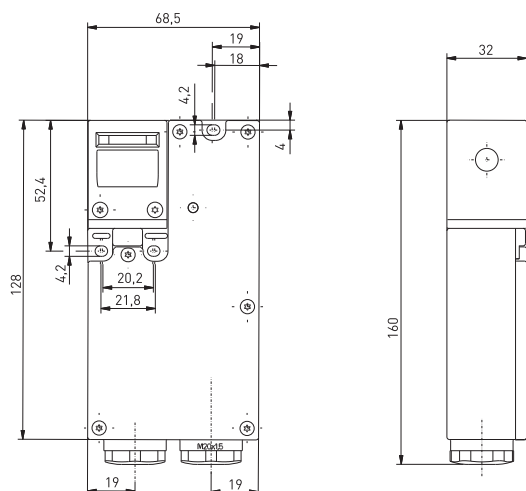
- Thermoplastic enclosure
- Double insulated ☐
- Two switch inserts in one enclosure
- Spring-to-lock or power-to-lock principle
- Holding force 1000 N
- Wiring compartment

// STM 295



Technical data

Standards	EN ISO 13849-1; EN 60947-5-1; EN 1088
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Actuator	stainless steel 1.4301
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊖
Switching elements	2 NC / 2 NO contacts with positive break, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entries	2 x M20 x 1.5 for cable diameter 5 ... 9 mm
B_{10d} (10 % load)	1 million
T_M	max. 20 years
U_{imp}	4 kV
U_i	250 V
I_{the}	4 A
I_e/U_e	4 A/250 VAC; 0.25 A/230 VDC
Utilisation category	AC-15; DC-13
Max. fuse rating	6 A gG/gN fuse
U_s	24 VDC
Magnet	100 % ED
Unlocking	100 % ED
Power consumption	max. 47 W (0.25 s)
Ambient temperature	-20 °C ... +55 °C
Mechanical life	> 500 000 operations
Holding force F	max. 1000 N
Approvals	



Contact variants: switch travel/contacts

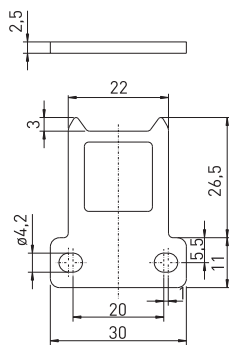
	Spring-to-lock principle	Power-to-lock principle
2 NC/2 NO contacts Material Number	STM 295 2Ö/2S-R 1183004	STM 295 2Ö/2S-A 1183003

Type code

STM 295 2Ö/2S-R

R Spring-to-lock principle [A Power-to-lock principle]
Contact type 2 NC/2 NO contact
Series
Solenoid interlock

// Straight actuator STM 295-B1



Features/Options

- Actuating radius on hinged guards
 $a = 350 \text{ mm}$ and $b = 700 \text{ mm}$
- Axial misalignment $x = 11 \text{ mm}$

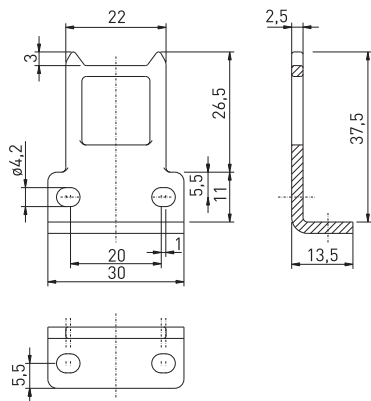
Note

The actuators are not included with the switches.

Actuator
 STM 295-B1

Material Number
 1183481

// Angled actuator STM 295-B5



Features/Options

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

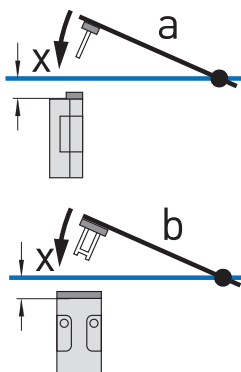
Note

The actuators are not included with the switches.

Actuator
 STM 295-B5

Material Number
 1183470

// Actuating radii



Features/Options

- The axis of the hinge should be $x \text{ mm}$ 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 referring to the surface of the enclosure and not to the inserted actuator!

Note

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





Safety switches with separate actuator

Thermoplastic enclosure

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Metal enclosure

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Safety switches with separate actuator

Range of application

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 an appropriate safety control module, all safety switches shown in this chapter achieve SIL 3 according to EN 62061 and PL e according to EN ISO 13849-1.

Design and operating principle

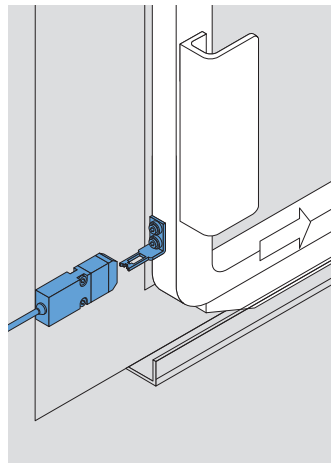
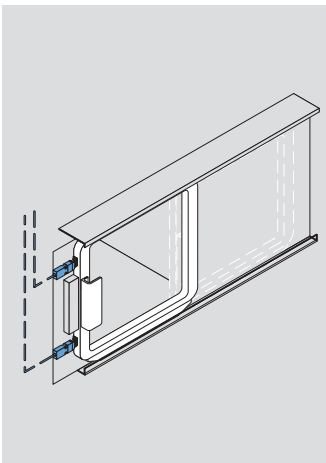
On the safety switches with a separate actuator, the switching element is not physically connected to the actuator, but functionally brought together or separated by switching. When the guard device is opened, the actuator is separated from the base unit. In this process, NC contacts are positively opened and NO contacts closed. A wide range of coded actuators is available, also suitable for small radii.

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

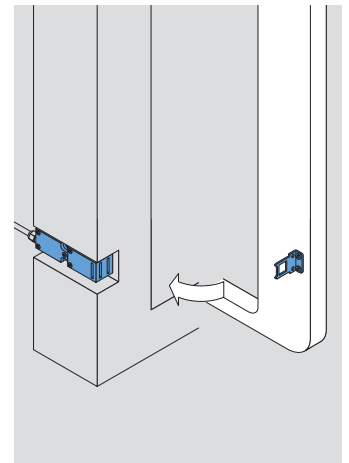
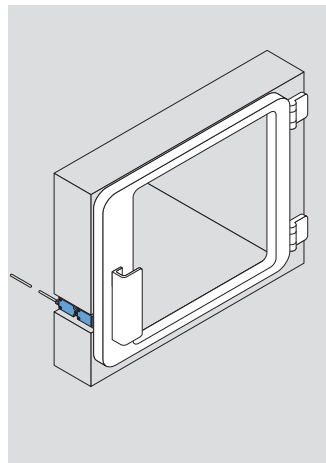
All safety switches shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC.

Application

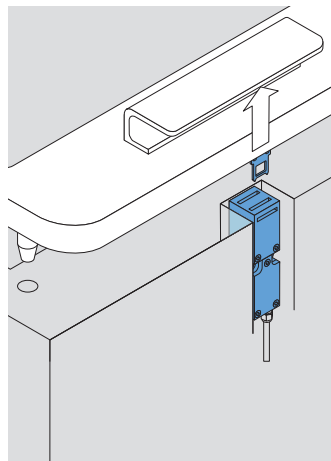
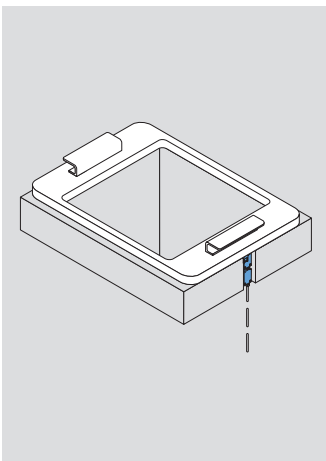
on sliding guards



on hinged guards



on removable guards



Safety switches with separate actuator

// Series ST 14

Features/Options

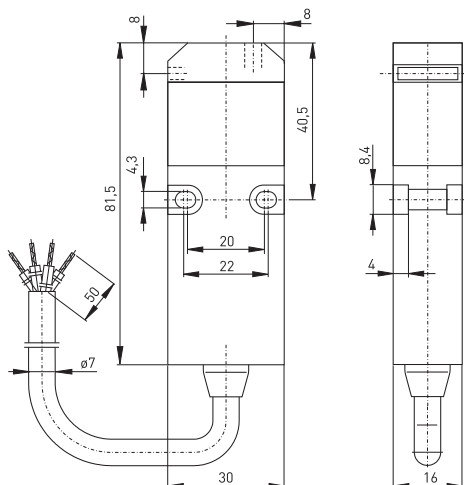
- Thermoplastic enclosure
- Double insulated ☐
- Slow action $\ominus$, change-over contact with double break
- Slow action with overlapping contacts available
- Version with cable entry on side available on request
- With pre-wired cable
- Ex version available (only with 2 contacts)
- With gold-plated contacts available on request
- Available on request with connector M12 x 1, 4-pole (2 contacts) or 6-pole (3 contacts)

// ST 14



Technical data

Standards	EN ISO 13849-1; EN 60947-5-1; BG-GS-ET-15; EN 1088
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Actuator	stainless steel 1. 4301
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts $\ominus$
Switching elements	change-over contact with double break Zb, 2 NC or 2 NC/1 NO contacts, galvanically separated contact bridges
Connection	cable 4 x AWG 20 UL 2464 (2 contacts) or 6 x AWG 20, UL 2464 (3 contacts)
Cable cross-section	4 x 0.56 mm ² , 6 x 0.56 mm ²
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; 4 A/24 VDC; 0.25 A/230 VDC; 3 contacts: 3 A/250 VAC; 2 A/24 VDC; 0,125 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	8 mm
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Approvals	
	3 contacts:



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ST 14 10̈/1S-2m 	1045455
2 NC contacts	ST 14 20̈-2m 	1053987
2 NC/1 NO contacts	ST 14 20̈/1S-2m 	1188892

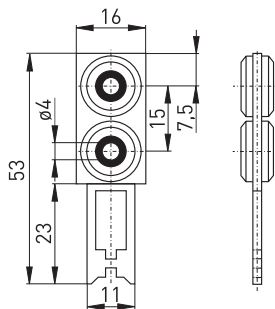
Type code

ST 14-S 10̈/1S-2m

Safety switches with separate actuator

// Series ST 14, actuators

// Straight actuator ST 14-B1



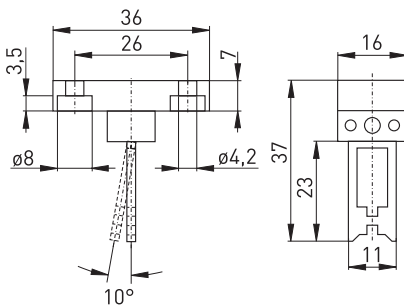
Features/Options

- Rubber mounting damps vibrations on guard devices
- Actuating radius on hinged guards a min. 900 mm and b min. 1500 mm with x = 30 mm axial misalignment
- Actuating radius on hinged guards a min. 250 mm and b min. 600 mm with x = 0 mm axial misalignment

Actuator
ST 14-B1

Material Number
1040840

// Flexible actuator ST 14-B3



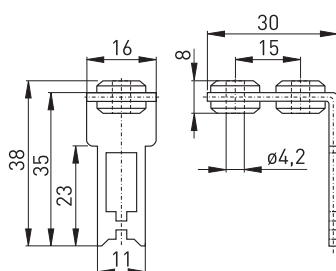
Features/Options

- Especially fit for hinged guards
- Actuating radius on hinged guards a min. 90 mm with x = 14 mm axial misalignment
- Actuating radius on hinged guards a min. 50 mm with x = 0 mm axial misalignment

Actuator
ST 14-B3

Material Number
1040842

// Angled actuator ST 14-B5



Features/Options

- Rubber mounting damps vibrations on guard devices
- Suitable for hinged guards
- Actuating radius on hinged guards a min. 500 mm and b min. 1000 mm with x = 15 mm axial misalignment
- Actuating radius on hinged guards a min. 250 mm and b min. 600 mm with x = 0 mm axial misalignment

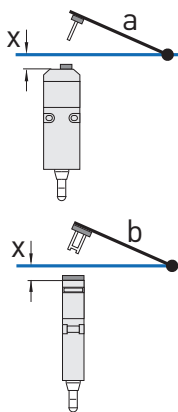
Actuator
ST 14-B5

Material Number
1040841

Safety switches with separate actuator

// Series ST 14, actuators

// Actuating radii



Features/Options

- 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 referring to the surface of the enclosure and not to the inserted actuator!

Note

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

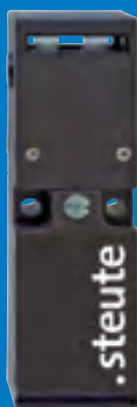
Safety switches with separate actuator

// Series ES 95 AZ

Features/Options

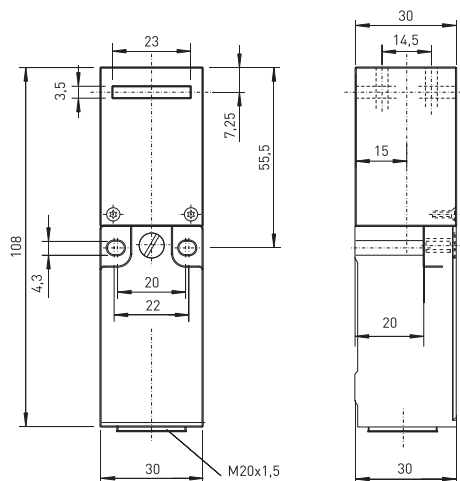
- Thermoplastic enclosure
- Double insulated □
- Mounting details to EN 50 047
- Slow action ⊖, change-over contact with double break
- Wiring compartment
- Actuator can be repositioned in factory by 4 x 90°
- Available on request with connector M12 x 1, 4-pole
- Ex version available
- Gold-plated contact possible on request
- Horizontally slotted mounting holes

// ES 95 AZ



Technical data

Standards	EN ISO 13849-1; EN 60947-5-1; EN 1088
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Actuator	stainless steel 1. 4301
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	1 x M20 x 1,5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	6 A
I _e /U _e	6 A/400 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Positive break travel	9 mm
Ambient temperature	-20 °C ... +80 °C
Mechanical life	> 1 million operations
Approvals	



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 95 AZ 1Ö/1S 	1177756
2 NC contacts	ES 95 AZ 2Ö 	1178649

Type code

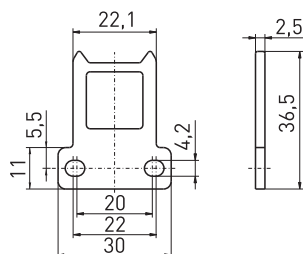
ES 95 AZ 1Ö/1S

Contact type 1NC/1NO (2Ö)
 Actuator AZ
 Series
 S Slow action

Safety switches with separate actuator

// Series ES 95 AZ, actuators

// Straight actuator 95 AZ-B1



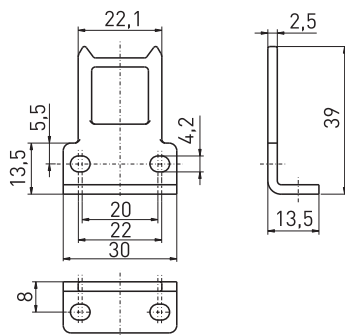
Features/Options

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

Actuator
AZ 95-B1

Material Number
1178645

// Angled actuator 95 AZ-B5



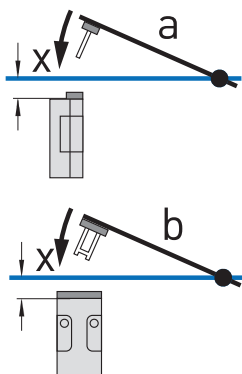
Features/Options

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

Actuator
AZ 95-B5

Material Number
1178646

// Actuating radii



Features/Options

- 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 referring to the surface of the enclosure and not to the inserted actuator!

Note

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

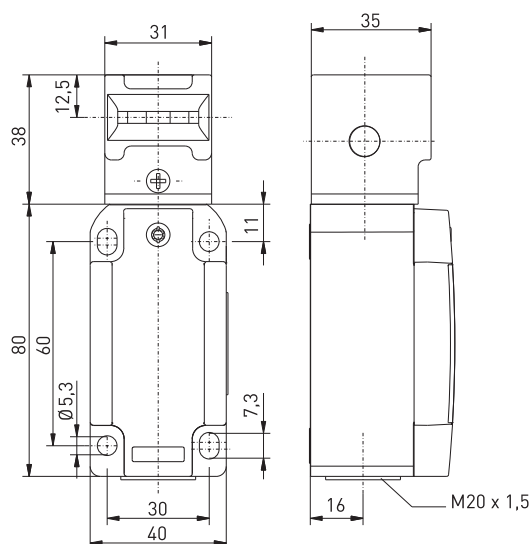
Safety switches with separate actuator

// Series ST 98

Features/Options

- Metal enclosure
- Mounting details to EN 50 041
- Slow action $\ominus$, change-over contact with double break
- Wiring compartment
- Actuator can be repositioned in factory by 4 x 90°
- Ex version available

// ST 98



Technical data

Standards	EN ISO 13849-1; EN 60947-5-1; EN 1088
Enclosure	zinc die-cast, enamel finish
Actuator	stainless steel 1. 4301
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts $\ominus$
Switching elements	change-over, 2 NC, 2 NC/1 NO or 1 NC/2 NO contacts with double break Zb, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	2 contacts: max. 2.5 mm ² , 3 contacts: max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	1 x M20 x 1,5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	2 contacts: 6 A, 3 contacts: 1.5 A
I _e /U _e	2 contacts: 6 A/250 VAC; 0.25 A/230 VDC 3 contacts: 1.5 A/230 VAC; 0.27 A/250 VDC
Utilisation category	AC-15; DC-13
Max. fuse rating	2 contacts: 6 A gG/gN fuse 3 contacts: 1.5 A gG/gN fuse
Positive break travel	8.3 mm
Ambient temperature	-20 °C ... +80 °C
Mechanical life	> 1 million operations

Contact variants: switch travel/contacts

	Slow action	Material Number
2 NC / 1 NO contact	ST 98-12 	1224002
1 NC / 1 NO contact	ST 98-11 	on request
2 NC contacts	ST 98-02 	on request

Type code

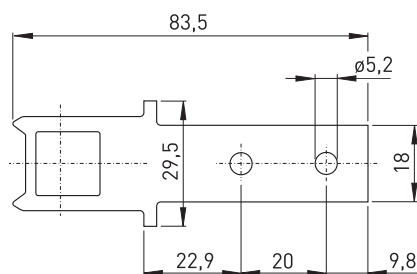
ST 98 -11

Contact type 1 NC/1 NO contact
[-02, -12, -21]
Series
Actuator ST

Safety switches with separate actuator

// Series ST 98, actuators

// Straight actuator AZ 335/355-B1



Features/Options

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

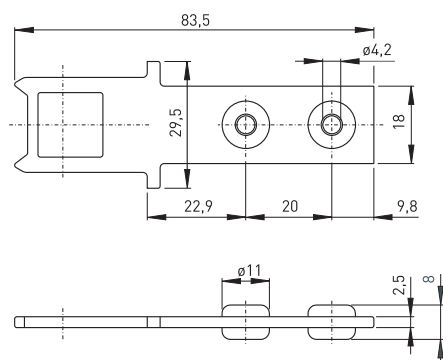
Actuator

AZ 335/355-B1

Material Number

1170536

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



Features/Options

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

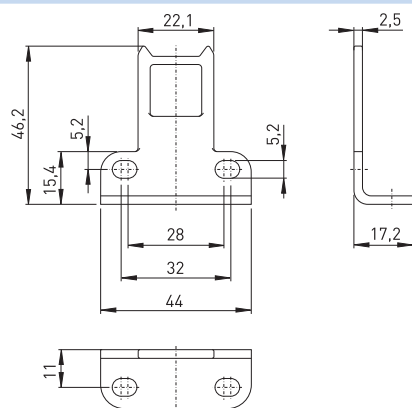
Actuator

AZ 335/355-B1-2245

Material Number

1170537

// Angled actuator AZ 335/355-B5



Features/Options

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

Actuator

AZ 335/355-B5

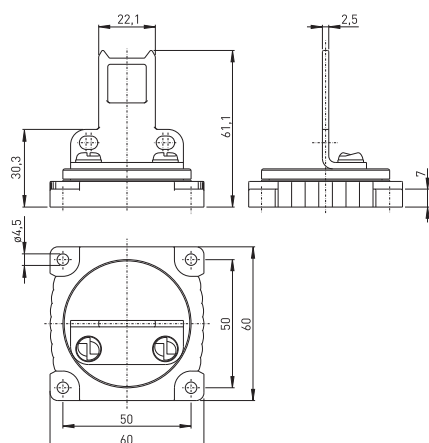
Material Number

1170538

Safety switches with separate actuator

// Series ST 98, actuators

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



Features/Options

- 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
- x = 30.3 mm

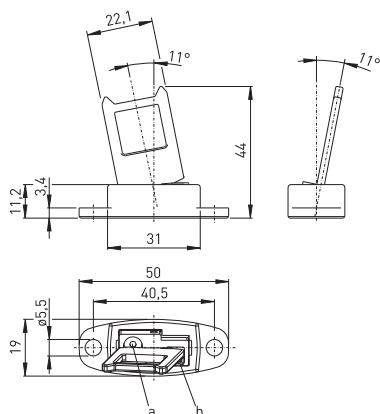
Actuator

AZ 335/355-B5-Flex

Material Number

1182126

// Flexible actuator AZ 335/355-B6



Merkmale/Optionen

- 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
- x = 13 mm

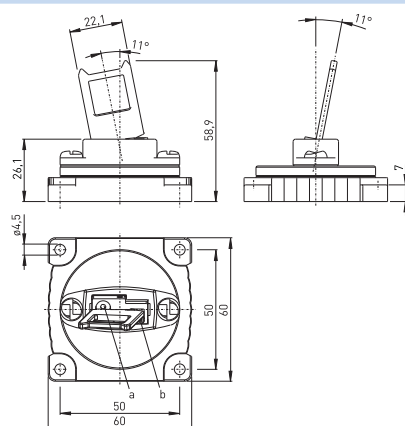
Actuator

AZ 335/355-B6

Material Number

1170540

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



Features/Options

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

Actuator

AZ 335/355-B6-Flex

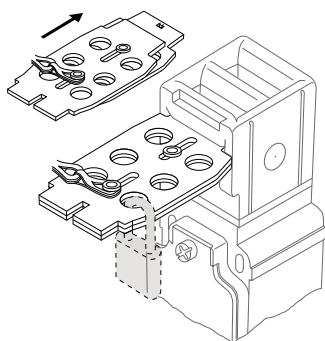
Material Number

1182698

Safety switches with separate actuator

// Series ST 98, actuators

// Lockout tag SZ 16/335



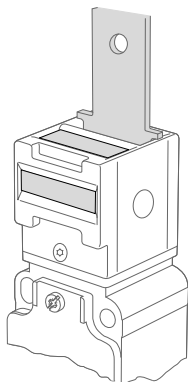
Features/Options

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

Actuator
SZ 16/335

Material Number
1170535

// Slot sealing plug AZ 335/355-1990



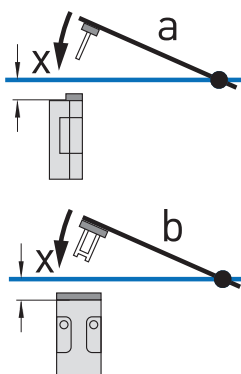
Features/Options

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

Actuator
AZ 335/355-1990

Material Number
1172965

// Actuating radii



Features/Options

- 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 referring to the surface of the enclosure and not to the inserted actuator!

Note

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

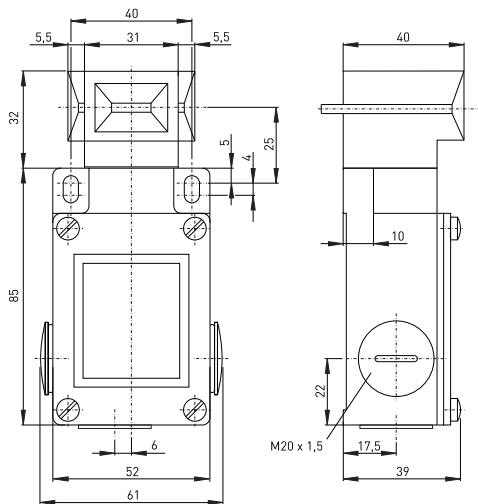
Safety switches with separate actuator
// Series ST 61

- Features/Options
- Metal enclosure
 - Double insulated □
 - Slow action ⊖, change-over contact with double break
 - 3 cable entries M20 x 1.5
 - Wiring compartment
 - Ex version available
 - With gold-plated contacts available on request
 - Long life
 - High level of contact reliability with low voltages and currents

// ST 61



26



Technical data

Standards	EN ISO 13849-1;EN 60947-5-1; EN 1088; BG-GS-ET-15
Enclosure	aluminium die cast, enamel finish
Actuator	stainless steel 1. 4301
Degree of protection	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 Zb or 2 NC contacts, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 2.5 mm ² (incl. conductor ferrules)
Cable entry	3 x M20 x 1.5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	6 kV
I _e /U _e	ST 61 1Ö/1S: 16 A/400 VAC ST 61 2Ö: 6 A/400 VAC
Mechanical life	> 1 million operations
Utilisation category	AC-15
Max. fuse rating	ST 61 1Ö/1S: 16 A gG/gN fuse ST 61 2Ö: 6 A gG/gN fuse
Positive break travel	10 mm
Ambient temperature	-20 °C ... +80 °C
Mechanical life	> 1 million operations
Approvals	

Contact variants: switch travel/contacts

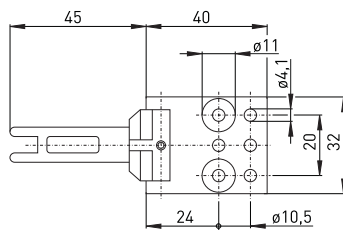
	Slow action	Material Number
1 NC / 1 NO contact	ST 61 1Ö/1S 	1047846
2 NC contacts	ST 61 2Ö 	1047979

Type code	ST 61 1Ö/1S
	Contact type 1 NC/1 NO (2Ö)
	Series
	Safety door switch

Safety switches with separate actuator

// Series ST 61, actuators

// Straight actuator ST 61-B1



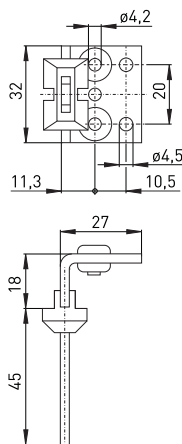
Features/Options

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

Actuator
ST 61-B1

Material Number
1032911

// Angled actuator ST 61-B5



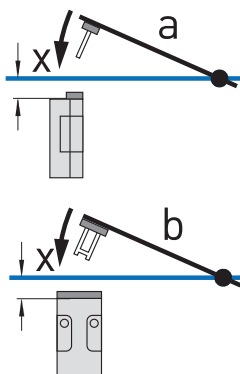
Features/Options

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

Actuator
ST 61-B5

Material Number
1032913

```
// Actuating radii
```



Features/Options

- 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 referring to the surface of the enclosure and not to the inserted actuator!

Note

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





Safety switches for hinged guard doors

Thermoplastic enclosure

// Series ES 95 T.C

from page 32

// Series ES 13 SB

from page 33

// Series ES 95 SB

from page 34

// Series ES 98 SB

from page 35

Safety switches for hinged guard doors

Range of application

These 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 setting up and maintenance.

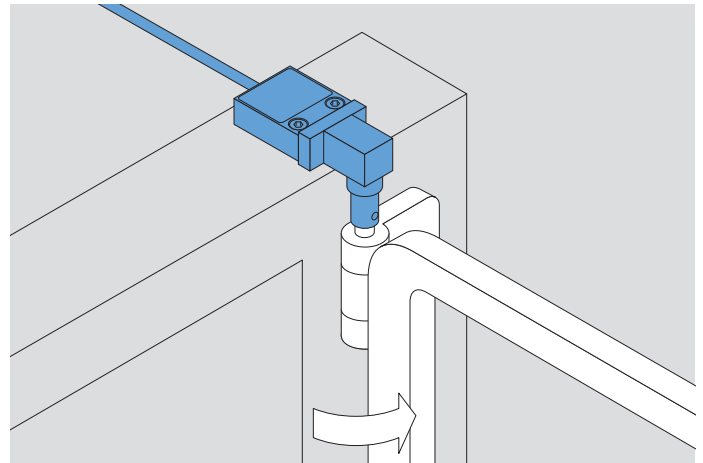
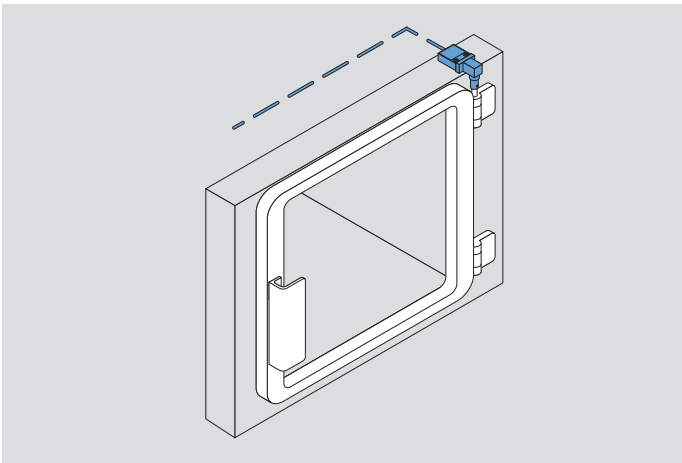
Design and operating principle

A general advantage of the 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 cost advantage for the user in avoiding the necessity of mounting a specially designed cam. These safety switches are provided with slow action.

All safety switches for hinged guard doors shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC.

Application

ES 13 SB on hinged safety guard



Safety switches for hinged guard doors

// Series ES 95 T.C

Features/Options

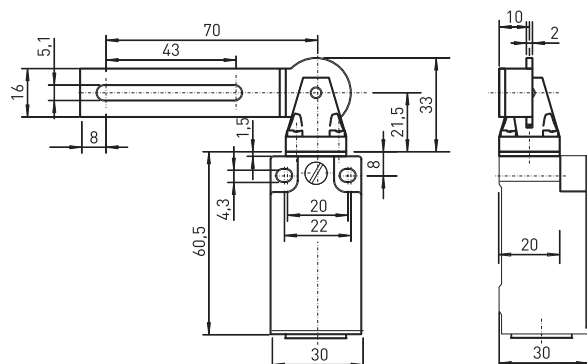
- Thermoplastic enclosure
- Double insulated □
- Slow action ⊖, change-over contact with double break
- Cable entry M20 x 1.5
- Wiring compartment
- Ex version available
- With gold-plated contacts available on request
- Mounting details to EN 50 047
- Horizontally slotted mounting holes
- Actuator heads can be repositioned by 4 x 90°

// ES 95 T.C



Technical data

Standards	EN 60947-5-1; EN 1088; BG-GS-ET-15; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊖
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-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	400 V
I _{the}	6 A
I _e /U _e	6 A/400 VAC; 0,25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Ambient temperature	-20 °C ... +80 °C
Mechanical life	> 1 million operations
Approvals	



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 95 T5C 1Ö/1S 	1179327
2 NC contacts	ES 95 T5C 2Ö 	1181614
1 NC / 1 NO contact with overlapping	ES 95 T5C UE 	on request

Type code

ES 95 T5C 1Ö/1S

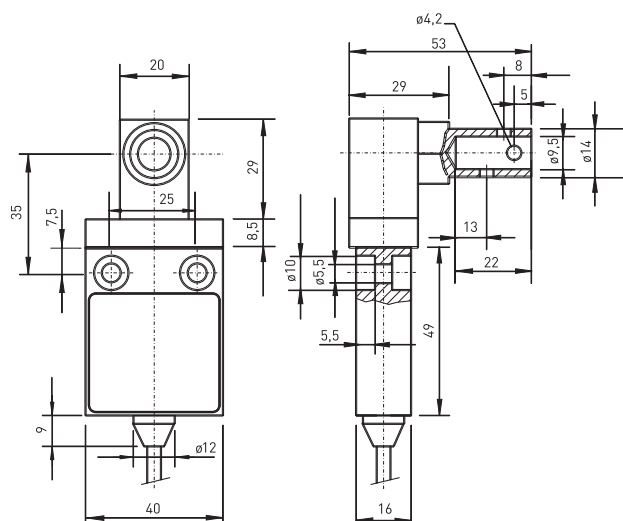
Safety switches for hinged guard doors

// Series ES 13 SB

Features/Options

- Thermoplastic enclosure
- Double insulated ☐
- Slow action $\ominus$, change-over contact with double break
- Slow action with overlapping contacts available
- Version with cable entry on side available on request
- With pre-wired cable
- Ex version available
- With gold-plated contacts available on request
- Max. 3 contacts
- Version with 3 contacts has cable entry on side

// ES 13 SB



Technical data

Standards	EN 60947-5-1; EN 1088; BG-GS-ET-15; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts $\ominus$
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	cable H05VV-F, length 2 or 5 m
Cable cross-section	4 x 0.75 mm ²
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; 4 A/24 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Approvals	 

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Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 13 SB 1Ö/1S-2m 180° 15° 0° 15° 180° BK-GY BN-BU 5° 5°	1179012
2 NC contacts	ES 13 SB 2Ö-2m 180° 15° 0° 15° 180° BK-GY BN-BU 5° 5°	on request

Type code

ES 13 SB-S 1Ö/1S-2m



Cable length 2 m (5 m)

Contact type 1NC/1NO

(2Ö, 2Ö/1S, 2S/1Ö)

Cable on side

Actuator SB

Series

S Slow action

Safety switches for hinged guard doors

// Series ES 95 SB

Features/Options

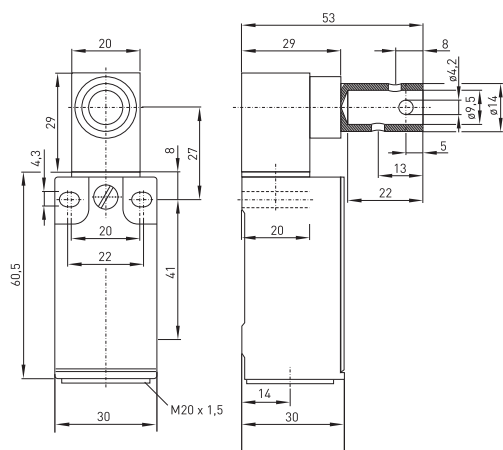
- Thermoplastic enclosure
- Double insulated ☐
- Slow action $\ominus$, change-over contact with double break
- Cable entry M20 x 1.5
- Wiring compartment
- Ex version available
- With gold-plated contacts available on request
- Mounting details to EN 50047
- Horizontally slotted mounting holes
- Actuator can be repositioned by 4 x 90°
- Shaft bore $\varnothing$ 9.5 mm or $\varnothing$ 10 mm available

// ES 95 SB



Technical data

Standards	EN 60947-5-1; EN 1088; BG-GS-ET-15; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts $\ominus$
Switching elements	change-over contact with double break Zb or 2 NC contacts, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-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	400 V
I _{the}	6 A
I _e /U _e	6 A/400 VAC; 0.25 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Ambient temperature	-20 °C ... +80 °C
Mechanical life	> 1 million operations
Approvals	



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 95 SB 10/1S-9,5mm 	1050057
2 NC contacts	ES 95 SB 20-9,5mm 	1050456
1 NC / 1 NO contact with overlapping	ES 95 SB UE-9,5mm 	1050299

Type code

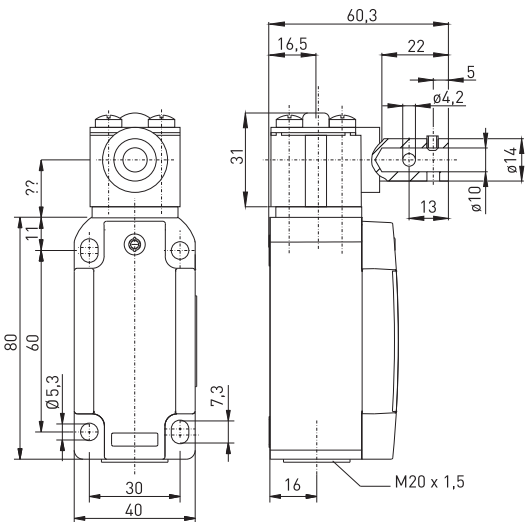
ES 95 SB 10/1S

Contact type 1NC/1NO (20, UE)
 Actuator SB
 Series
 S Slow action

Safety switches for hinged guard doors
// Series ES 98 SB

- Features/Options
- Metal enclosure
 - Mounting details to EN 50041
 - Slow action $\ominus$, change-over contact with double break
 - Max. 3 contacts
 - Actuator can be repositioned by 4 x 90°
 - Shaft bore $\varnothing$ 10 mm
 - Ex version available

// ES 98 SB

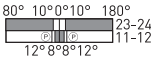
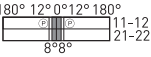


Technical data

Standards	EN 60947-5-1; EN 1088; BG-GS-ET-15; EN ISO 13849-1
Enclosure	zinc die-cast, enamel finish
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contact $\ominus$
Switching elements	change-over, 2 NC, 2 NC/1 NO or 1 NC/2 NO contacts with double break Zb, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	2 contacts: max. 2.5 mm ² , 3 contacts: max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	1 x M20 x 1,5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	2 contacts: 6 A, 3 contacts: 1.5 A
I _e /U _e	2 contacts: 6 A/250 VAC; 0.25 A/230 VDC 3 contacts: 1.5 A/230 VAC; 0.27 A/250 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	2 contacts: 6 A gG/gN fuse 3 contacts: 1.5 A gG/gN fuse
Ambient temperature	-20 °C ... +80 °C
Mechanical life	> 1 million operations

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Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 98 SB 10/1S 	on request
2 NC contacts	ES 98 SB 20 	on request

Type code

ES 98 SB 10/1S

Contact type 1NC/1NO
(20, 20/1S, 2S/10)

Actuator SB

Series

S Slow action

Position switches with/without safety function

Thermoplastic enclosure

// Series ES 13

from page 42

// Series ES/EM 14

from page 54

// Series ES/EM 95

from page 64

Metal enclosure

// Series E 12

from page 74

// Series ES/EM 98

from page 86

// Series ES 51

from page 92

// Series ES/EM 41

from page 104

// Series ES/EM 411

from page 104

// Series ES/EM 61

from page 118

// Series ES/EM 91

from page 126

Position switches with/without safety function

Range of application

The position switches with a safety function are suitable for sliding and hinged guard devices, which must be closed in order to guarantee the necessary operational safety. In combination with an appropriate safety control module, all safety switches shown in this chapter achieve SIL 3 according to EN 62061 and PL e according to EN ISO 13849-1.

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

The various application fields, ranging from fine mechanics to heavy-duty machinery, require different materials, electrical capacity and quality criteria regarding construction and design.

Design and operating principle

On the position switches with a safety function, the guard device and the positive break NC contact are positively linked. With the safety guard in closed condition, the position switch with safety func-

tion is not operated. 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. Many of the position switches fulfil the requirements of the EN 60947-5-1 standard and can therefore also be used as position switches with safety function. These products are identified by the symbol $\ominus$ for positive break. Some position switches fulfil the requirements for standardised switches to EN 50 047.

The position switches are available with snap and slow action and can be supplied with a metal roller on request. A large variety of actuators complete the program.

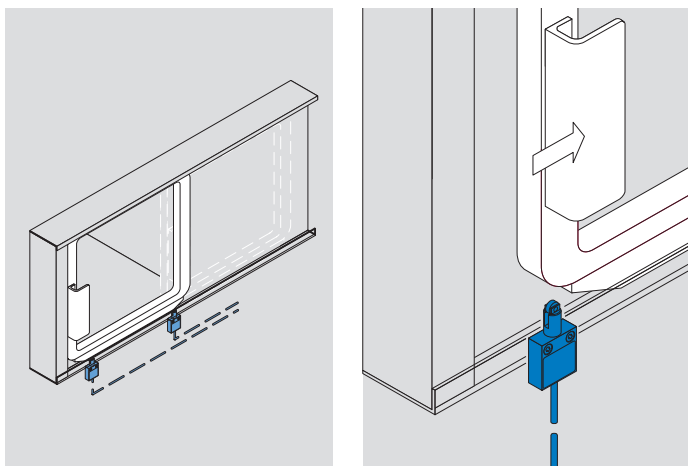
The devices are listed in the order of enclosure dimensions and materials, starting with the smallest and the plastic enclosures.

All position switches with safety function shown in this chapter bear the CE mark according to the Machinery Directive 2006/42/EC. The position switches shown in this chapter bear the CE mark according to the low Voltage Directive 06/95/EC.

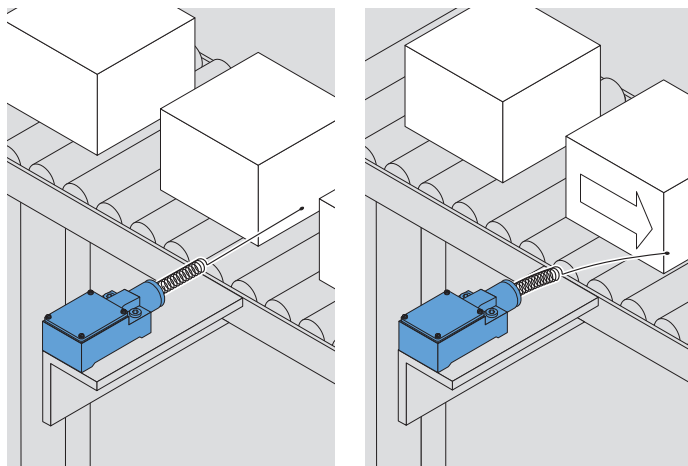
39

Application

Position monitoring on a conveyor belt

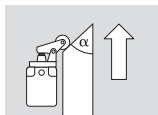


As a piece counter



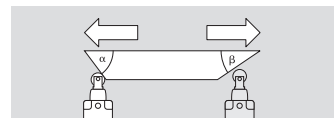
Legend

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



α : Actuating angle from right of switch axis

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



Selection table

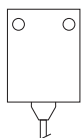
Position switches with/without safety function

// Series

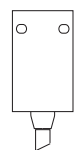
// Actuator

+ Default: plunger without watertight collar

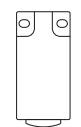
ES 13, from page 42
- Thermoplastic enclosure
- Cable



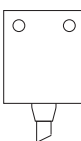
ES/EM 14, from page 54
- Thermoplastic enclosure
- 3 contacts
- Cable



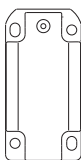
ES/EM 95, from page 64
- Thermoplastic enclosure
- Wiring compartment
- 1 cable entry
- Type to EN 50 047



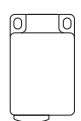
E 12, from page 74
- Metal enclosure
- Cable



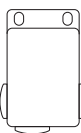
ES/EM 98, from page 86
- Metal enclosure
- 3 contacts
- Wiring compartment
- 1 cable entry



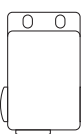
ES 51, from page 92
- Metal enclosure
- Wiring compartment
- 1 cable entry



ES/EM 41, from page 104
- Metal enclosure
- Wiring compartment
- 3 cable entries



ES/EM 411, from page 104
- Metal enclosure
- Wiring compartment
- 3 cable entries



ES/EM 61, from page 118
- Metal enclosure
- Wiring compartment
- 3 cable entries



↓	↓	↓	↺	↺	↺	↓	↔	
+ W		F	KU WKU	FKU			R WR	
+ W		F	KU WKU	FKU	VKU		R WR	
W							R	
+ W		F	KU WKU	FKU			R WR	
+							R	
+ W	ST WST		KU			WK	R WR	
+ W	ST WST		KU			WK	R WR	
+ W	ST WST		KU			WK	R WR	
W								

Actuating direction → / Free movement of actuator →

	↔	↔	↔	↔	↔	↑	↔→	↔	↔	↔	↔	↔	↺↻	↺↻	↺↻	↺↻
		FR		WH	WHL	WPH	WHK	D	DL	DS		DD	TL	TF		TK
		FR	VR					D	DL	DS		DD	TL	TF		TK
	RL			WH WHM	WHLM	WPH WPHM 4K	WHKM	D		DS	DF	DD	TL			TK
		FR		WH	WHL	WPH	WHK	D	DL	DS		DD	TL	TF		TK
				H		PH		D	DL	DS		DD				TK
				H WH	HL WHL	PH WPH	HK WHK	D	DL	DS	DF	DD				
				H WH	HL WHL	PH WPH	HK WHK	D	DL	DS	DF	DD	TL	TF	TFL	TK
				H WH	HL WHL	PH WPH	HK WHK	D	DL	DS	DF	DD	TL	TF	TFL	TK
				WH	WHL	WPH	WHK	D	DL	DS			TL	TF	TFL	TK
.steute																

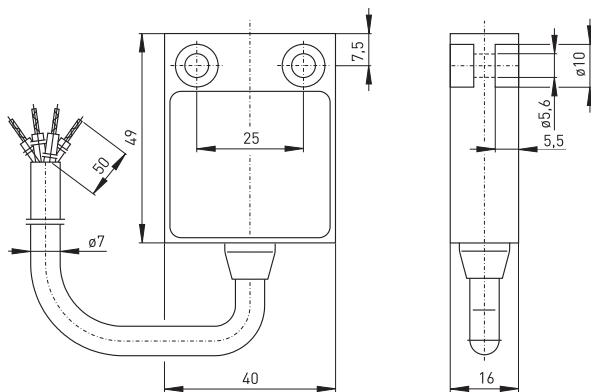
Position switches with/without safety function

// Series ES 13

Features/Options

- Thermoplastic enclosure
- Double insulated □
- Slow action ⊖, change-over or 2 NC/1 NO contact with double break
- Slow action with overlapping contacts available
- Version with 3 contacts has cable on left-hand side
- Suitable for in-line mounting
- With pre-wired cable, cable length 2 metres
- Ex version available

// ES 13



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts ⊖
Switching elements	change-over contact with double break, galvanically separated contact bridges
Connection	cable, 2 contacts: H05VV-F; 3 contacts: AWG 20
Cable cross-section	2 contacts: 4 x 0.75 mm ² ; 3 contacts: 6 x 0.56 mm ²
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, 4 A/24 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	6 A gG/gN fuse
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Frequency of operation	1800/h
Repeat accuracy of switching points	± 0.1 mm
Contact opening	2 contacts: max. 2 x 4.5 mm; 3 contacts: max. 2 x 3.5 mm
Approvals	 3 contacts:

Type code

ES 13 WR 10/1S-s-B-2m

- Cable length 2 m (5 m)
- Tapped bushing M16 x 1.5
- Cable on side
- Contact type 1NC/1NO (UE, 20/1S, 10/2S)
- Actuator R (H, TK, D, etc. ...)
- Watertight collar
- Series
- S Slow action

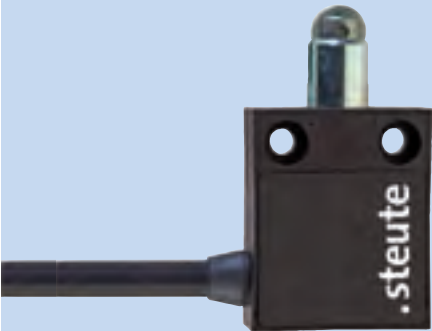
Position switches with/without safety function

// Series ES 13

- Features/Options
- With gold-plated contacts available on request
 - Pneumatic version available on request

- Features/Options
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

// Cable on side s



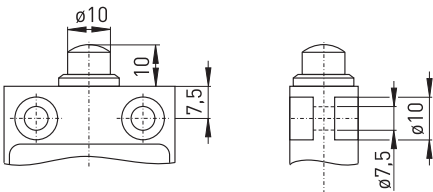
// Cable entry M16 x 1.5



// Connector M12 x 1, 4-pole



// Plunger



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 10̈/1S-2m
Material Number	1044856
	035.5 1.52.8BK-GYBN-BU

Position switches with/without safety function

// Series ES 13, actuators

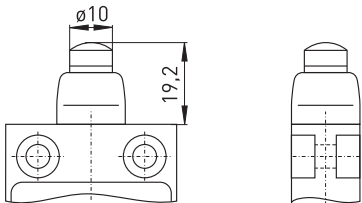
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Watertight collar for protection against penetration of dirt

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

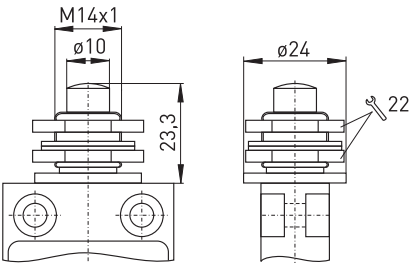
// Plunger collar W



Contact variants: switch travel/contacts

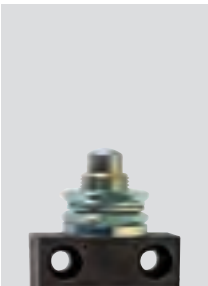
	Slow action
1 NC/1 NO contact	ES 13 W 10/1S-2m
Material Number	1181842
	035.5 1.52.8 BK-GY BN-BU

// Plunger for front mounting F



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 F 10/1S-2m
Material Number	1188773
	035.5 1.52.8 BK-GY BN-BU



Features/Options

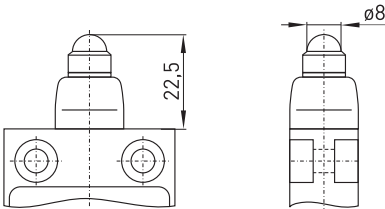
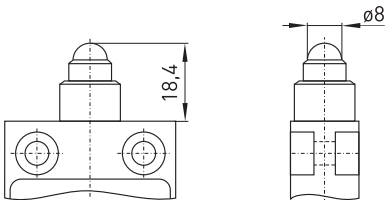
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 15°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point
- Watertight collar for protection against penetration of dirt

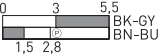
// Ball plunger KU

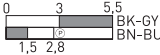
// Ball plunger collar WKU

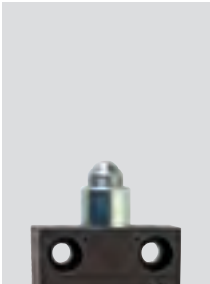


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 KU 1Ö/1S-2m
Material Number	1188774
	

	Slow action
1 NC/1 NO contact	ES 13 WKU 1Ö/1S-2m
Material Number	1188781
	



Position switches with/without safety function

// Series ES 13, actuators

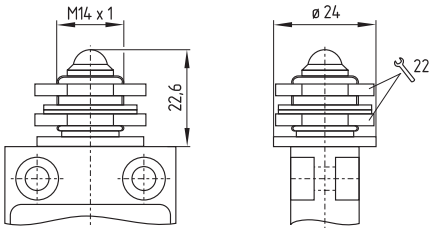
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Ball diameter 8 mm
- Exact repeatability of switching point

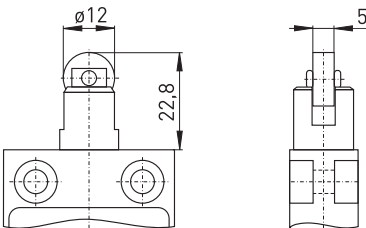
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°
- Metal roller
- Actuator can be repositioned by 90° on request

// Ball plunger for front mounting FKU



// Roller plunger R

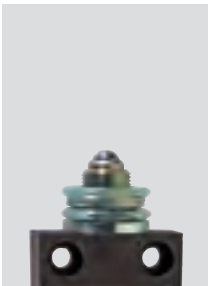


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 FKU 10/1S-2m
Material Number	1045242
	035.5 1.52.8 BK-GY BN-BU

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 R 10/1S-2m
Material Number	1044991
	035.5 1.52.8 BK-GY BN-BU



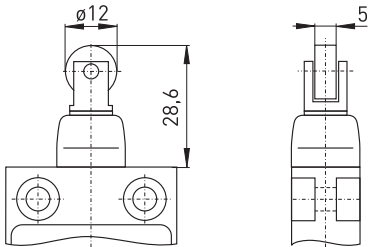
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator can be repositioned by 90° on request
- Watertight collar for protection against penetration of dirt

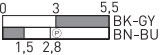
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator can be repositioned by 90° on request

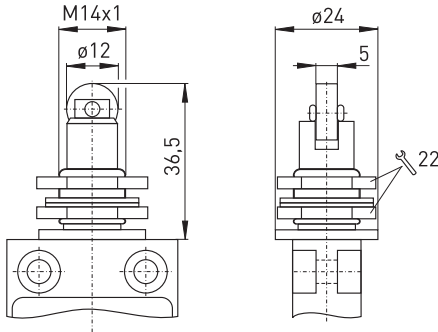
// Roller plunger collar WR



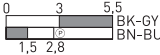
Contact variants: switch travel/contacts

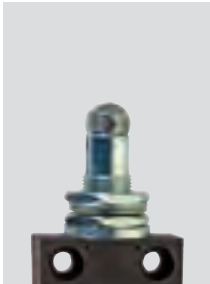
	Slow action
1 NC/1 NO contact	ES 13 WR 1Ö/1S-2m
Material Number	1045070
	

// Roller plunger for front mounting FR



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 FR 1Ö/1S-2m
Material Number	1045250
	



Position switches with/without safety function

// Series ES 13, actuators

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

Note

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

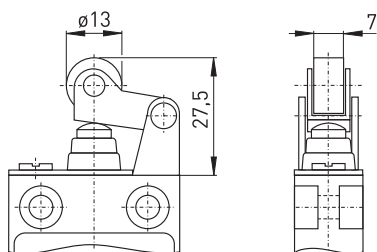
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

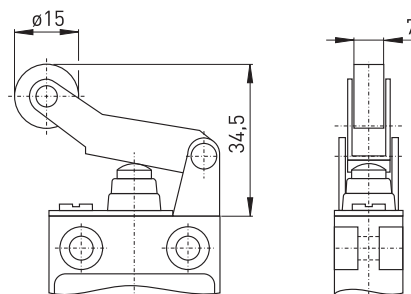
Note

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

// Roller lever collar WH



// Long roller lever collar WHL



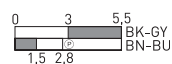
Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

Slow action

1 NC/1 NO contact
Material Number

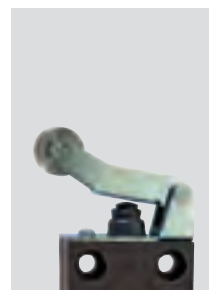
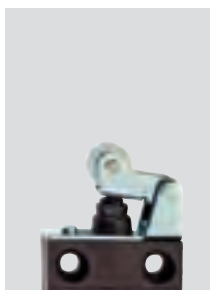
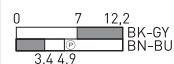
ES 13 WH 10/1S-2m
1045106



Slow action

1 NC/1 NO contact
Material Number

ES 13 WHL 10/1S-2m
1045140



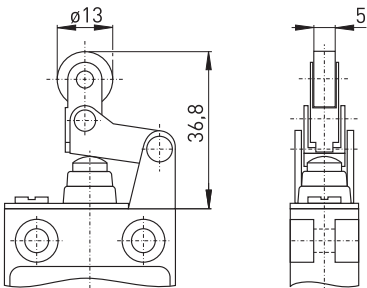
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

Features/Options

- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to switch from below
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

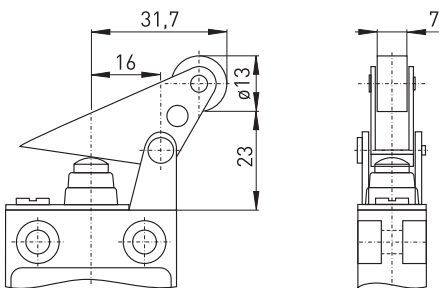
// Offset roller lever collar WHK



Contact variants: switch travel/contacts

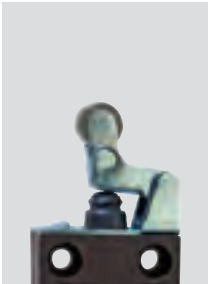
	Slow action
1 NC/1 NO contact	ES 13 WHK 1Ö/1S-2m
Material Number	1188929
	0 3,6 6,3 1,6 BK-GY BN-BU

// Parallel roller lever collar WPH



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 WPH 1Ö/1S-2m
Material Number	1188933
	0 3,2 5,4 1,5 BK-GY BN-BU



Position switches with/without safety function

// Series ES 13, actuators

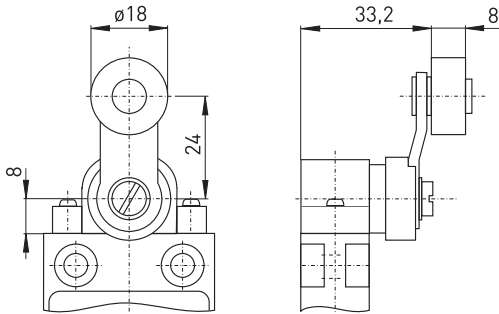
Features/Options

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

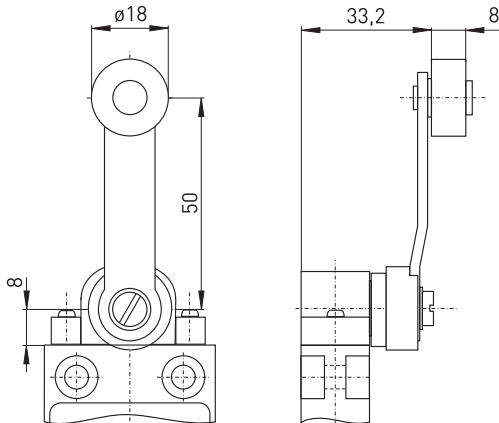
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 lever D



// Long rocking lever DL

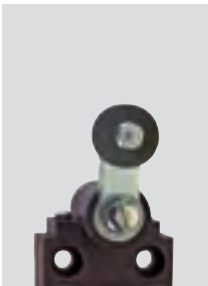


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 D 10/1S-2m
Material Number	1045179
	65° 35° 0° 35° 65° BK-GY BN-BU 15° 15°

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 DL 10/1S-2m
Material Number	1188936
	65° 35° 0° 35° 65° BK-GY BN-BU 15° 15°



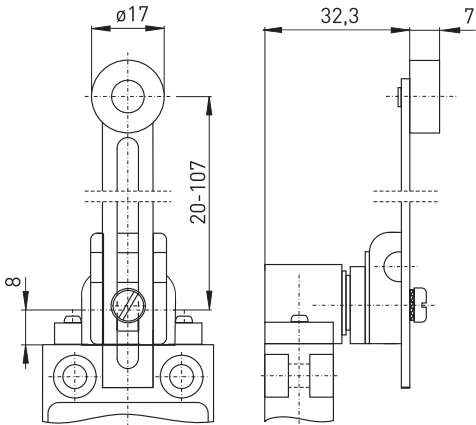
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 plastic tip
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°

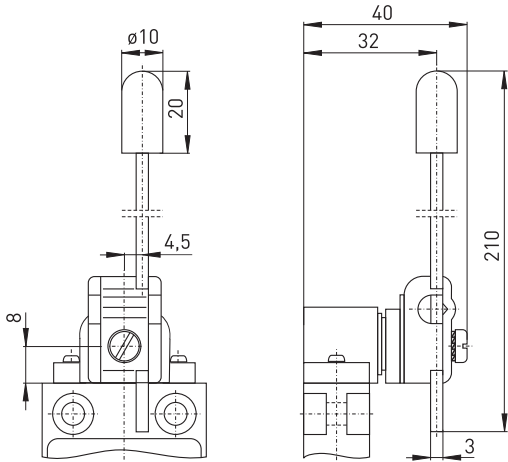
// Adjustable rocking lever DS



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 DS 10/1S-2m
Material Number	1188937
	65° 35° 0° 35° 65° 15° 15° BK-GY BN-BU

// Rod lever DD



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 DD 10/1S-2m
Material Number	1188938
	65° 35° 0° 35° 65° 15° 15° BK-GY BN-BU



Position switches with/without safety function

// Series ES 13, actuators

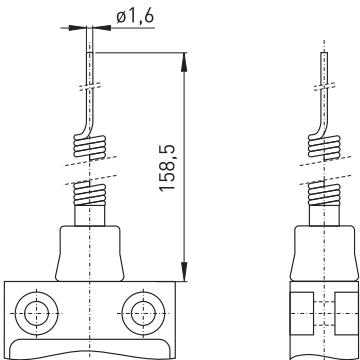
Features/Options

- 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 necessary
- Elasticity of the spring allows for deflection above the max. switching angle of 18°

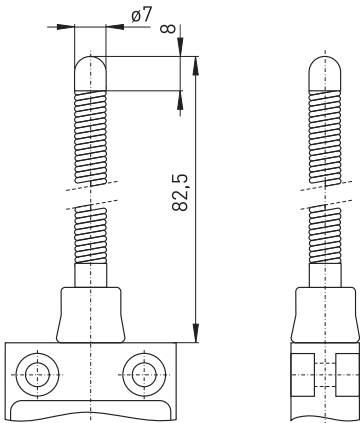
Features/Options

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

// Long spring rod TL



// Spring rod with steel tip TF



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 13 TL 10°/1S-2m
Material Number	1189007
	18° 15° 0° 15° 18° 10° 10° BK-GY BN-BU

Contact variants: switch travel/contacts

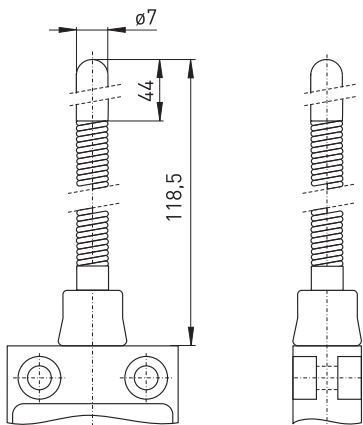
	Slow action
1 NC/1 NO contact	ES 13 TF 10°/1S-2m
Material Number	1189009
	18° 15° 0° 15° 18° 10° 10° BK-GY BN-BU



Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Spring rod can be actuated from any direction
- Elasticity of the 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	ES 13 TK 10/1S-2m
Material Number	1045216
	18°15°0°15°18° 10°10° BK-GY BN-BU



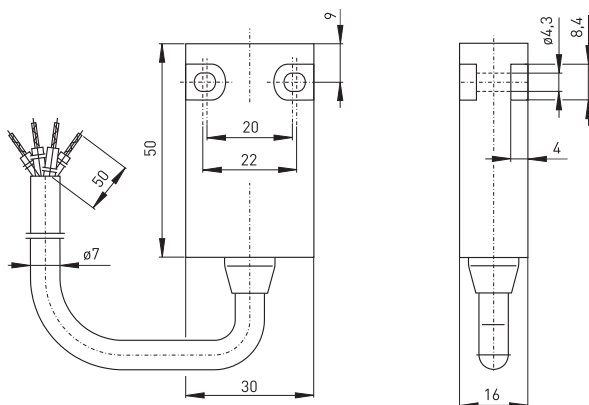
Position switches with/without safety function

// Series ES/EM 14

Features/Options

- Thermoplastic enclosure
- Double insulated □
- Slow action ⊖, change-over or 2 NC contacts with double break
- Snap action, change-over contact with single break
- Overlapping contacts available
- Mounting details to EN 50 047
- Suitable for in-line mounting
- With pre-wired cable, cable length 2 meters
- Ex version available

// ES/EM 14



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action; slow action positive break NC contacts ⊖
Switching elements	ES 14: change-over or 2 NC contact with double break, galvanically separated contact bridges EM 14: change-over contact with single break
Connection	cable PVC H05VV-F
Cable cross-section	ES 14, EM 14 10/1S: 4 x 0.75mm ² , EM 14: 3 x 0.75 mm ²
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	250 V
I _{the}	ES 14: 6 A; EM 14: 5 A
I _e /U _e	ES 14: 6 A/250 VAC; 0.25 A/230 VDC EM 14: 5 A/250 VAC; 0.16 A/230 VDC
Utilisation category	AC-15, DC-13
Max. fuse rating	ES 14: 6 A gG/gN fuse EM 14: 5 A gG/gN fuse
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Frequency of operation	1800/h
Repeat accuracy of switching points	± 0.1 mm
Contact opening	max. 2 x 4 mm
Approvals	 

Type code

ES 14 WR 10/1S-s-2m

- Cable length 2 m (5 m)
- Cable on side
- Contact type 1NC/1NO (UE, 2Ö, 2Ö/1S)
- Actuator R (H, TK, D, etc. ...)
- Watertight collar
- Series
- S Slow action (M Snap action)

Position switches with/without safety function

// Series ES/EM 14, actuators

Features/Options

- Snap action, change-over contact with double break available, e.g. EM 14 R 1NC/1NO
- With gold-plated contacts available on request
- Version with UL/CSA approval available
- With latching element available on request

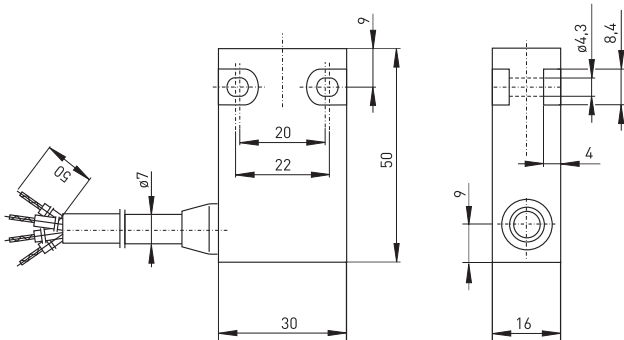
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

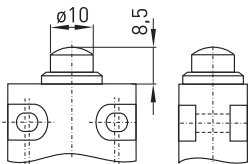
// Connector M12 x 1, 4-pole



// Cable on side



// Plunger



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 1045571 	ES 14 10/1S-2m 1045298



Position switches with/without safety function

// Series ES/EM 14, actuators

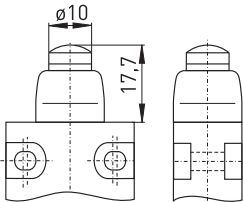
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Watertight collar for protection against penetration of dirt

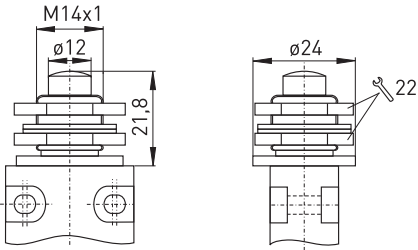
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

// Plunger with watertight collar W



// Plunger for front mounting F

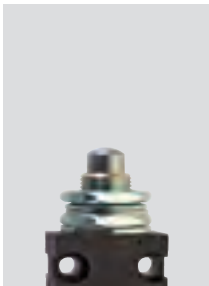


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 W-2m 1045580	ES 14 W 10/1S-2m 1189058
	01.55.5 GY-BK GY-BN	03.55 BK-GY BN-BU 1.52.8

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 F-2m 1188885	ES 14 F 10/1S-2m 1045438
	01.55.5 GY-BK GY-BN	03.55 BK-GY BN-BU 1.52.8



Features/Options

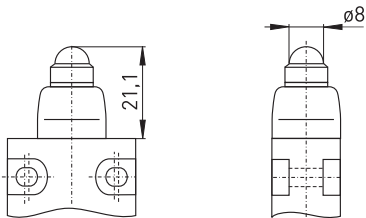
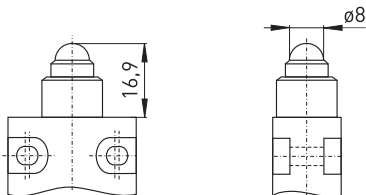
- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point

Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point
- Watertight collar for protection against penetration of dirt

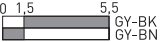
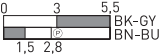
// Ball plunger KU

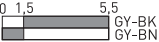
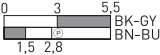
// Ball plunger collar WKU



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 14 KU-2m	ES 14 KU 10/1S-2m
Material Number	1188909	1189059
		

	Snap action	Slow action
1 NC/1 NO contact	EM 14 WKU-2m	ES 14 WKU 10/1S-2m
Material Number	1175538	1180567
		



Position switches with/without safety function

// Series ES/EM 14, actuators

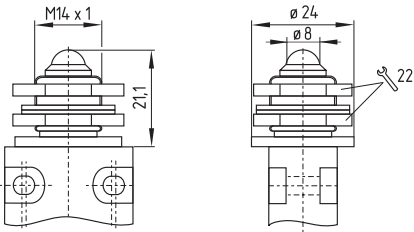
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point

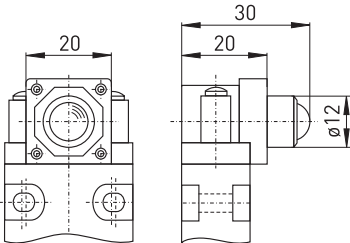
Features/Options

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

// Ball plunger for front mounting FKU



// Vertical ball plunger VKU

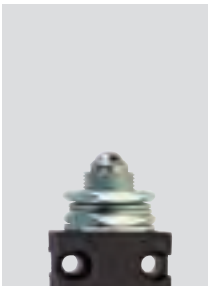


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 FKU-2m 1188910 	ES 14 FKU 1Ö/1S-2m 1053487

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 VKU-2m 1186354 	ES 14 VKU 1Ö/1S-2m 1189124



Features/Options

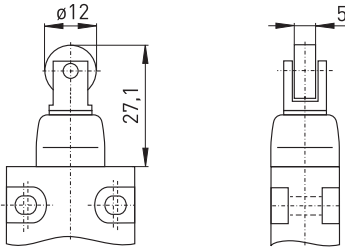
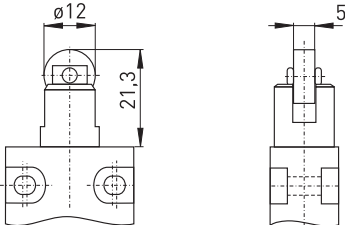
- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°
- Metal roller
- Actuator repositioned by 90° available on request

Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator repositioned by 90° available on request
- Watertight collar for protection against penetration of dirt

// Roller plunger R

// Roller plunger collar WR

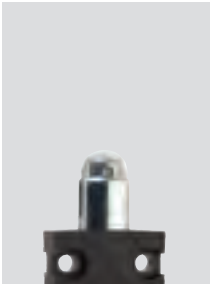


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 14 R-2m	ES 14 R 1Ö/1S-2m
Material Number	1045594	1045362

	Snap action	Slow action
1 NC/1 NO contact	EM 14 WR-2m	ES 14 WR 1Ö/1S-2m
Material Number	1178413	1045384



Position switches with/without safety function

// Series ES/EM 14, actuators

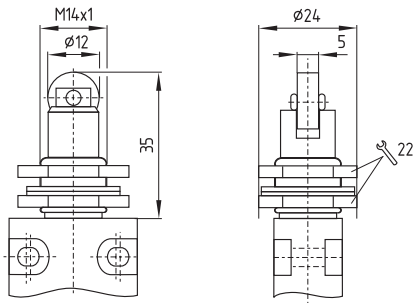
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator repositioned by 90° available on request

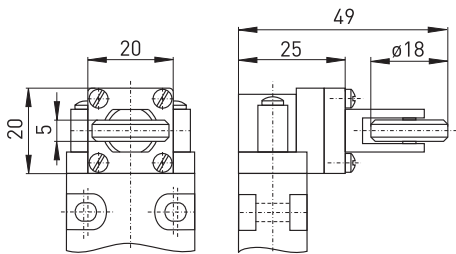
Features/Options

- Safety switch only version with slow action
- Actuator can be transposed by 90°
- Wear-resistant plastic 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 Material Number	EM 14 FR 1174494	ES 14 FR 10̊/1S-2m 1189131
	01,55,5 GY-BK GY-BN	035,5 BK-GY BN-BU 1,52,8

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 VR 1188914	ES 14 VR 10̊/1S-2m 1189132
	06,5 GY-BK GY-BN 1	046,5 BK-GY BN-BU 12,3



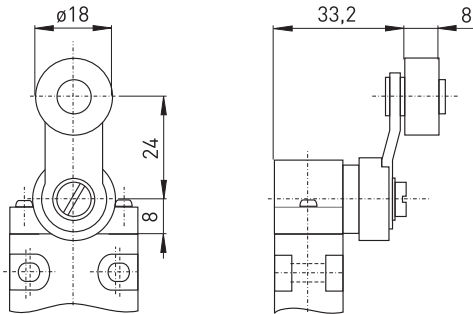
Features/Options

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

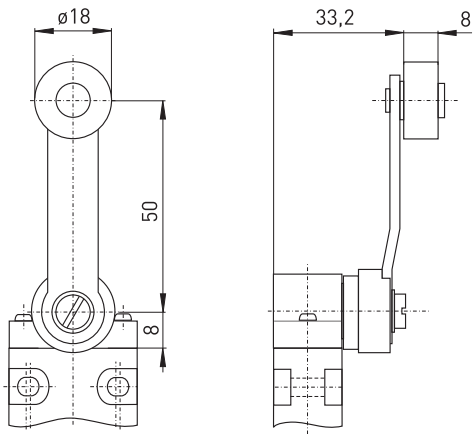
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 lever D

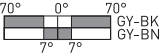
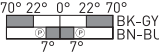


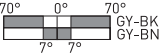
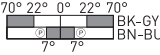
// Long rocking lever DL

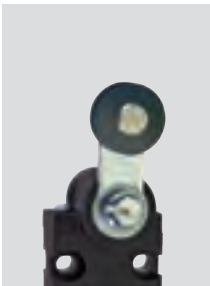


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 D 1045623	ES 14 D 10°/1S-2m 1045398
		

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 DL 1188924	ES 14 DL 10°/1S-2m 1189133
		



Position switches with/without safety function

// Series ES/EM 14, actuators

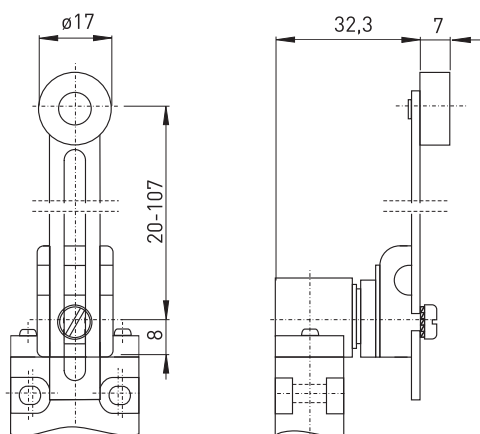
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 the spring allows for deflection above the max. switching angle of 18°

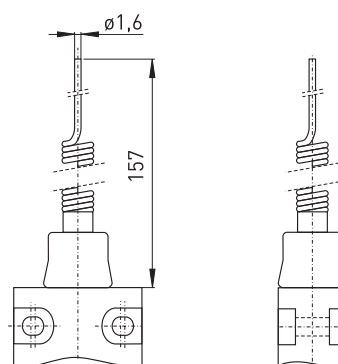
// Adjustable rocking lever DS



Contact variants: switch travel/contacts

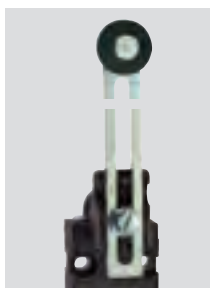
	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 DS-2m 1188928	ES 14 DS 10/1S-2m 1189134

// Long spring rod TL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 TL-2m 1045633	ES 14 TL 10/1S-2m 1189135

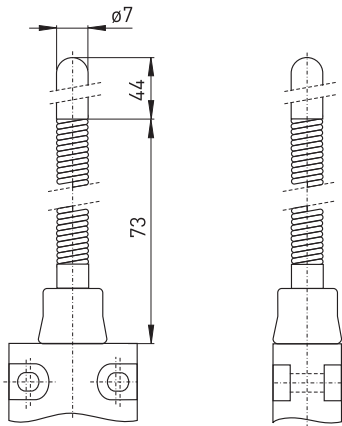
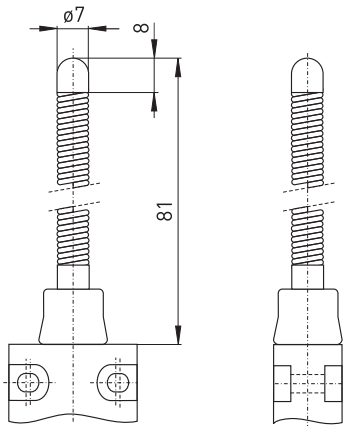


- Features/Options
- No safety switch!
 - With rounded steel tip
 - Spring rod can be actuated from any direction
 - Elasticity of the spring allows for deflection above the max. switching angle of 18°

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

// Spring rod with steel tip TF

// Spring rod with plastic tip TK



Contact variants: switch travel/contacts		
	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 TF-2m 1051636	ES 14 TF 10/1S-2m 1045429
	GY-BK GY-BN	BK-GY BN-BU

Contact variants: switch travel/contacts		
	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 14 TK-2m 1188932	ES 14 TK 10/1S-2m 1189136
	GY-BK GY-BN	BK-GY BN-BU



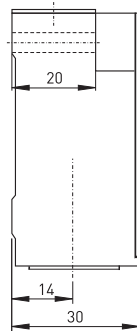
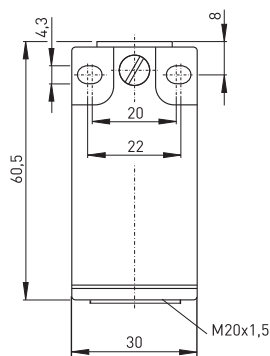
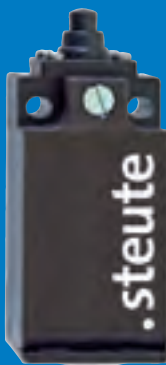
Position switches with/without safety function

// Series ES/EM 95

Features/Options

- Thermoplastic enclosure
- Horizontally slotted mounting holes
- Double insulated ☐
- Snap action with constant contact pressure up to switching point
- Slow action with overlapping contacts available
- Actuator can be repositioned by 4 x 90°
- Angle of offset roller lever can be adjusted in 10° steps
- 1 cable entry M20 x 1.5
- Good resistance to oil and petroleum spirit
- Ex version available

// ES/EM 95



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Design	EN 50 047
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action, positive break NC contacts $\ominus$
Switching elements	change-over, 2 NC or 2 NO contacts with double break Zb, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 2.5 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	400 V
I _{the}	6 A
Utilisation category	AC-15; DC-13
I _e /U _e	6 A/400 VAC; 0,25 A/230 VDC; 4 A/24 VDC
Max. fuse rating	6 A gG/gN fuse
Mechanical life	> 1 million operations
Frequency of operation	1800/h
Ambient temperature	- 20 °C ... + 80 °C
Contact opening	2 x 3.5 mm
Approvals	

Type code

ES 95 WH 10/1S-V-LL

- Longitudinal slotted holes
- Latching
- Contact type 1NC/1NO, (2Ö, 2S, UE)
- Actuator H (R, D, DS, etc. ...)
- Watertight collar
- Series
- S Slow action (M Snap action)

Position switches with/without safety function
// Series ES/EM 95, actuators

- Features/Options
- Available on request with mechanical latching V, release by means of push-button (only possible with slow action)
 - With gold-plated contacts available on request

- Features/Options
- Actuator type B to EN 50 047
 - Watertight collar for protection against penetration of dirt

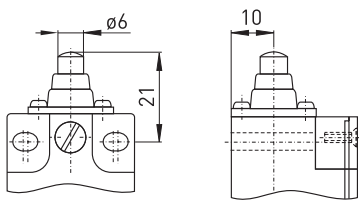
// Mechanical latching



// Connector M12 x 1, 4-pole

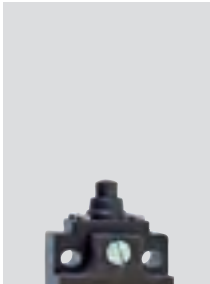


// Plunger with collar W



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 W 10/1S 1050060	ES 95 W 10/1S 1049911
1 NO/1 NC overlapping Material Number		ES 95 W UE 1050169
2 NC contacts Material Number		ES 95 W 2Ö 1050303
2 NO contacts Material Number		ES 95 W 2S 1050460



Position switches with/without safety function

// Series ES/EM 95, actuators

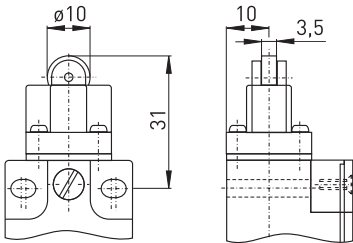
Features/Options

- Actuator type C to EN 50 047
- Wear-resistant plastic roller
- Metal roller available on request
- Actuator can be repositioned by 4 x 90°

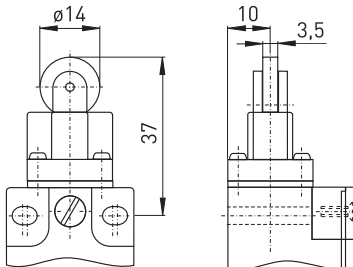
Features/Options

- Wear-resistant plastic roller
- Metal roller available on request
- Actuator can be repositioned by 4 x 90°

// Roller plunger R



// Long roller plunger RL

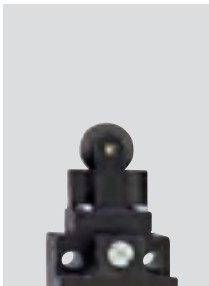
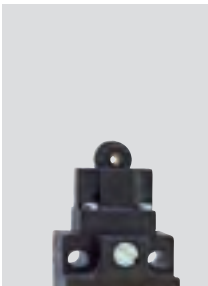


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 R 10/1S 1050071 	ES 95 R 10/1S 1049925
1 NO/1 NC overlapping Material Number		ES 95 R UE 1050176
2 NC contacts Material Number		ES 95 R 20 1050315
2 NO contacts Material Number		ES 95 R 2S 1050467

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 RL 10/1S 1050077 	ES 95 RL 10/1S 1049931
1 NO/1 NC overlapping Material Number		ES 95 RL UE 1050180
2 NC contacts Material Number		ES 95 RL 20 1050320
2 NO contacts Material Number		ES 95 RL 2S 1050471



Features/Options

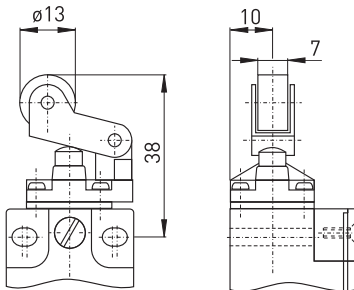
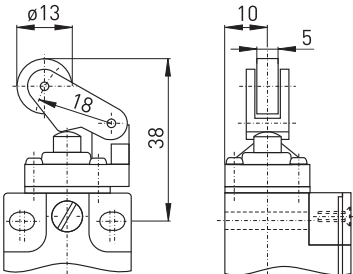
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Actuator type E to EN 50 047
- Watertight collar for protection against penetration of dirt
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Metal roller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

Features/Options

- Actuating speed max. 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 plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Metal roller available on request

// Roller lever with collar WH

// Metal roller lever with collar WH

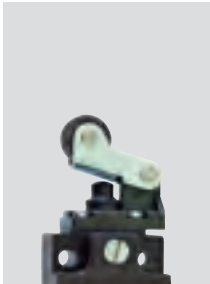
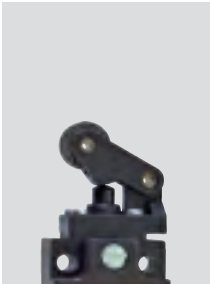


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 WH 10/1S 1050084	ES 95 WH 10/1S 1049944
1 NO/1 NC overlapping Material Number		ES 95 WH UE 1050185
2 NC contacts Material Number		ES 95 WH 20 1050326
2 NO contacts Material Number		ES 95 WH 2S 1050475

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 WHM 10/1S 1050086	ES 95 WHM 10/1S 1049946
1 NO/1 NC overlapping Material Number		ES 95 WHM UE 1050187
2 NC contacts Material Number		ES 95 WHM 20 1050328
2 NO contacts Material Number		ES 95 WHM 2S 1050477



Position switches with/without safety function

// Series ES/EM 95, actuators

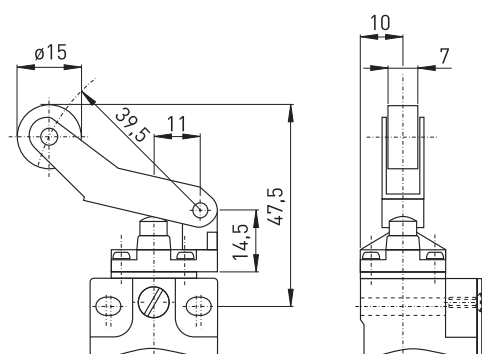
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Watertight collar for protection against penetration of dirt
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Metal roller available on request

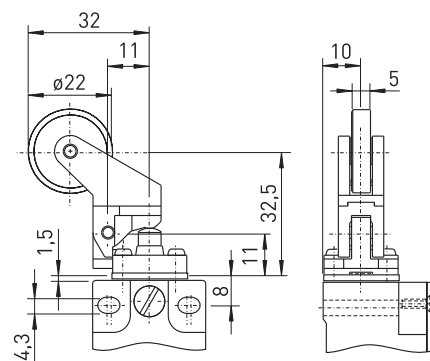
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation parallel to axis of switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Metal roller available on request

// Long metal roller lever collar WHLM



// Plastic roller lever with collar 4K

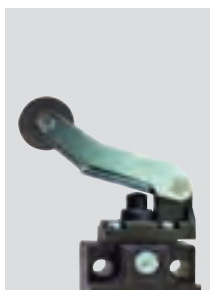


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 WHLM 10/1S 1050104	ES 95 WHLM 10/1S 1049972
1 NO/1 NC overlapping Material Number		
2 NC contacts Material Number		ES 95 WHLM UE 1050217
2 NO contacts Material Number		
		ES 95 WHLM 2Ö 1050360
		ES 95 WHLM 2S 1050507

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 4K 10/1S 1185690	ES 95 4K 10/1S 1183312
1 NO/1 NC overlapping Material Number		
2 NC contacts Material Number		ES 95 4K UE on request
2 NO contacts Material Number		
		ES 95 4K 2Ö 1183439
		ES 95 4K 2S on request



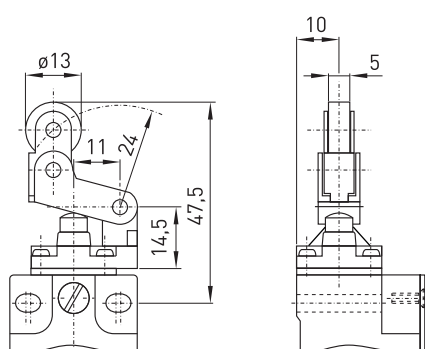
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Watertight collar for protection against penetration of dirt
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Metal roller available on request

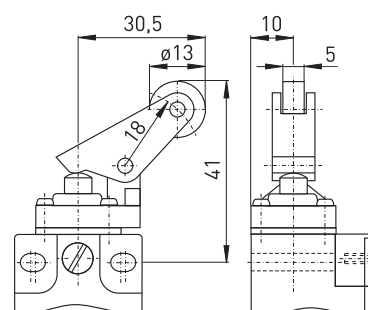
Features/Options

- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Watertight collar for protection against penetration of dirt
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Actuation parallel to switch from below
- Metal roller available on request

// Offset metal roller lever collar WHKM

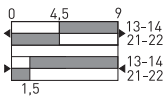
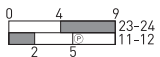
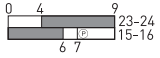


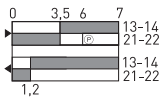
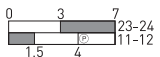
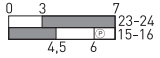
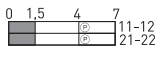
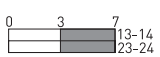
// Parallel roller lever with collar WPH

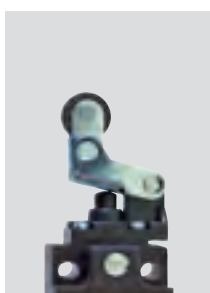


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 WHKM 10/1S 1050060 	ES 95 WHKM 10/1S 1049911 
1 NO/1 NC overlapping Material Number		ES 95 WHKM UE 1050233 
2 NC contacts Material Number		ES 95 WHKM 20 1050376 
2 NO contacts Material Number		ES 95 WHKM 2S 1050523 

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 WPH 10/1S 1050120 	ES 95 WPH 10/1S 1049995 
1 NO/1 NC overlapping Material Number		ES 95 WPH UE 1050249 
2 NC contacts Material Number		ES 95 WPH 20 1050392 
2 NO contacts Material Number		ES 95 WPH 2S 1050539 



Position switches with/without safety function

// Series ES/EM 95, actuators

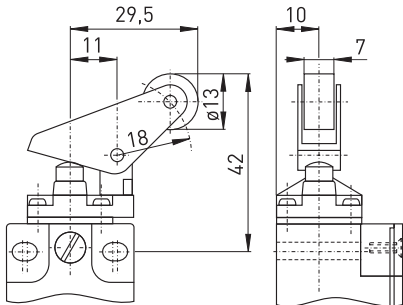
Features/Options

- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Watertight collar for protection against penetration of dirt
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Actuation parallel to switch from below
- Metal roller available on request

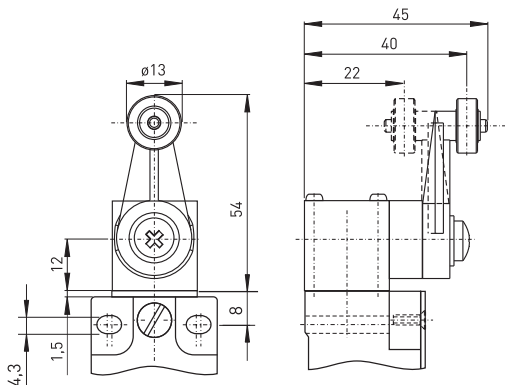
Features/Options

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

// Parallel metal roller lever collar WPHM



// Rocking lever D

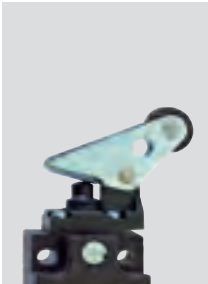


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 WPHM 10/1S 1050122 0 4 6 7 13-14 21-22 13-14 21-22 1,5	ES 95 WPHM 10/1S 1049997 0 3 8 23-24 11-12 1,5 4
1 NO/1 NC overlapping Material Number		ES 95 WPHM UE 1050251 0 3 7 23-24 15-16 4,5 6
2 NC contacts Material Number		ES 95 WPHM 2Ö 1050394 0 1,5 4 7 11-12 21-22
2 NO contacts Material Number		ES 95 WPHM 2S 1050541 0 3 7 13-14 23-24

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 D 10/1S 1050138 65° 38° 0° 38° 65° 13-14 21-22 55° 55° 17° 17°	ES 95 D 10/1S 1050006 65° 35° 0° 35° 65° 23-24 11-12 40° 25° 25° 40°
1 NO/1 NC overlapping Material Number		ES 95 D UE 1050281 65° 35° 0° 35° 65° 23-24 15-16 60° 45° 45° 60°
2 NC contacts Material Number		ES 95 D 2Ö 1050426 65° 25° 0° 25° 65° 11-12 21-22 40° 40°
2 NO contacts Material Number		ES 95 D 2S 1050571 65° 35° 0° 35° 65° 13-14 23-24



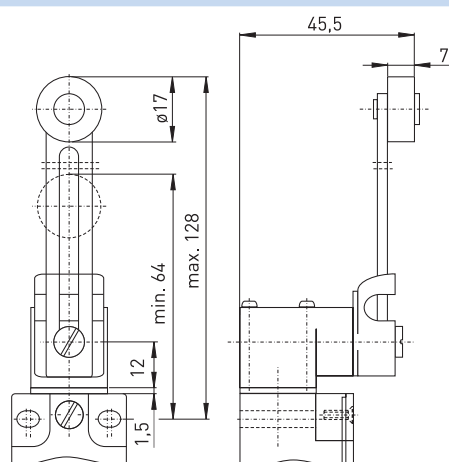
Features/Options

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

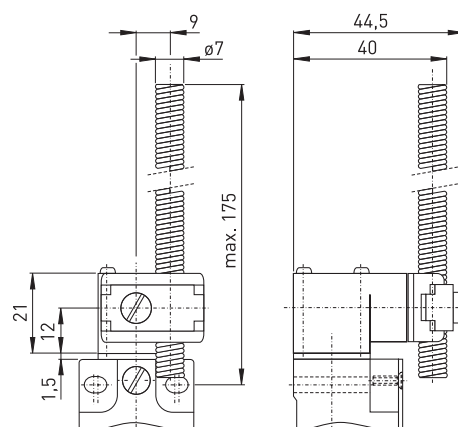
Features/Options

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

// Adjustable rocking lever DS



// Spring-rod lever DF



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 DS 10/1S 1050153 	ES 95 DS 10/1S 1050035
1 NO/1 NC overlapping Material Number		ES 95 DS UE 1050295
2 NC contacts Material Number		ES 95 DS 20 1050444
2 NO contacts Material Number		ES 95 DS 2S 1050585

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 DF 10/1S 1050149 	ES 95 DF 10/1S 1050031
1 NO/1 NC overlapping Material Number		ES 95 DF UE 1050291
2 NC contacts Material Number		ES 95 DF 20 1050440
2 NO contacts Material Number		ES 95 DF 2S 1050581



Position switches with/without safety function

// Series ES/EM 95, actuators

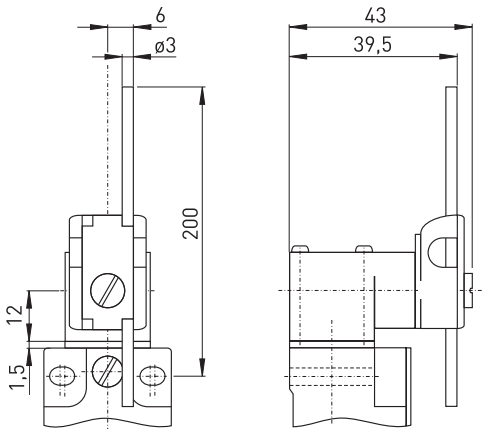
Features/Options

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

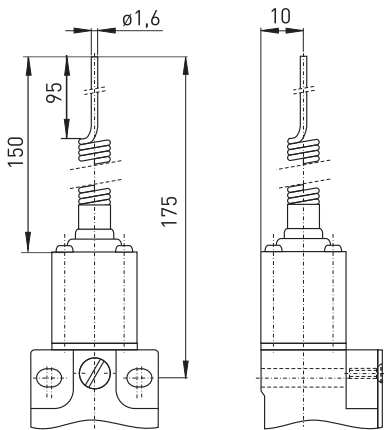
Features/Options

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

// Rod lever DD



// Long spring rod TL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 DD 10/1S 1050146 65° 38° 0° 38° 65° 13-14 21-22 13-14 21-22 17° 17°	ES 95 DD 10/1S 1050022 65° 35° 0° 35° 65° 23-24 11-12 25° 25°
1 NO/1 NC overlapping Material Number		ES 95 DD UE 1050286 65° 35° 0° 35° 65° 23-24 15-16 45° 45°
2 NC contacts Material Number		ES 95 DD 2Ö 1050434 65° 25° 0° 25° 65° 11-12 21-22
2 NO contacts Material Number		ES 95 DD 2S 1050577 65° 35° 0° 35° 65° 13-14 23-24

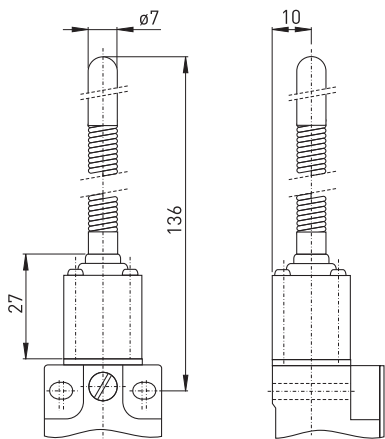
Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 TL 10/1S 1050159 0° 17° 13-14 21-22 7°	ES 95 TL 10/1S 1050043 0° 11° 23-24 11-12 6°
2 NC contacts Material Number		ES 95 TL 2Ö on request 0° 6° 11-12 21-22

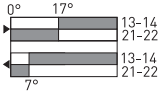
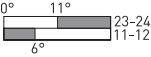
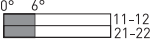


- Features/Options
- No safety switch!
 - Wear-resistant plastic tip
 - Spring rod can be actuated from any direction

// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 95 TK 1Ö/1S 1050161 	ES 95 TK 1Ö/1S 1052136 
2 NC contacts Material Number		ES 95 TK 2Ö 1050448 



Position switches with/without safety function

// Series E 12

Features/Options

- No safety switch!
- Metal enclosure
- Snap action, change-over contact with single break
- Suitable for in-line mounting
- With pre-wired cable, cable length 2 meters
- Ex version available

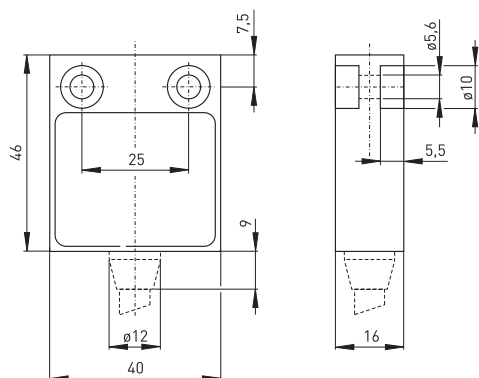
// E 12



Technical data

Standards	EN 60947-5-1
Enclosure	aluminium die-cast, enamel finish
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching elements	change-over contact with single break
Switching system	snap action
Connection	cable H05VV-F
Cable cross-section	4 x 0.75 mm ²
U _{imp}	4 kV
U _i	250 V
I _{the}	5 A
Utilisation category	AC-15; DC-13
I _e /U _e	5 A/250 VAC; 0.16 A/230 VDC
Max. fuse rating	5 A gG/gN fuse
Mechanical life	> 1 million operations
Frequency of operation	1800/h
Ambient temperature	-20 °C ... + 75 °C

Approvals



Type code

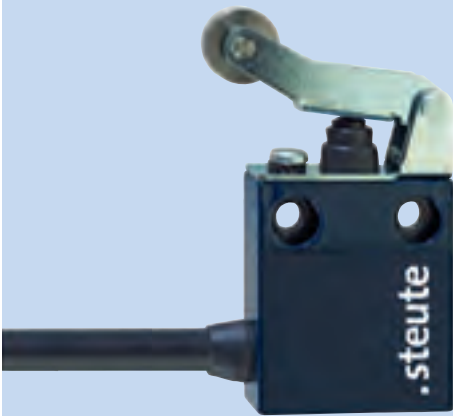
E 12 WKU-s-B-2m

- Cable length 2 m (5 m)
- Tapped bushing M16 x 1.5
- Cable on side
- Actuator KU (H, TK, D, etc. ...)
- Watertight collar
- Series

Features/Options

- With gold-plated contacts available on request

// Cable on side

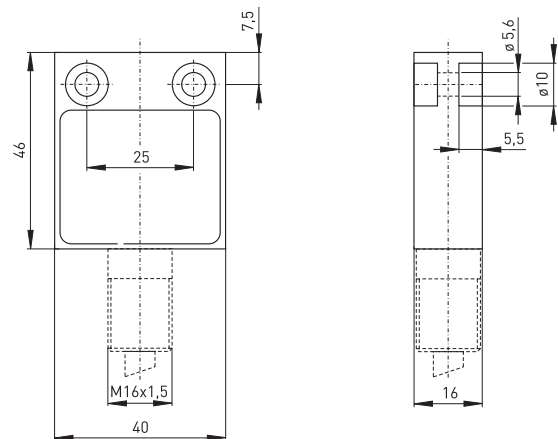
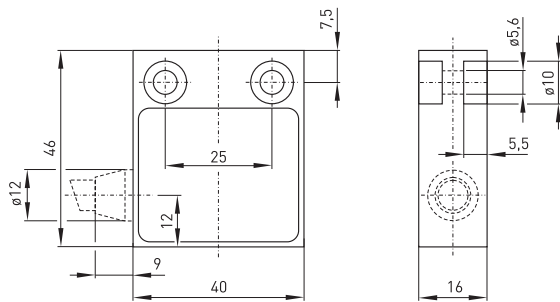


// Cable on side

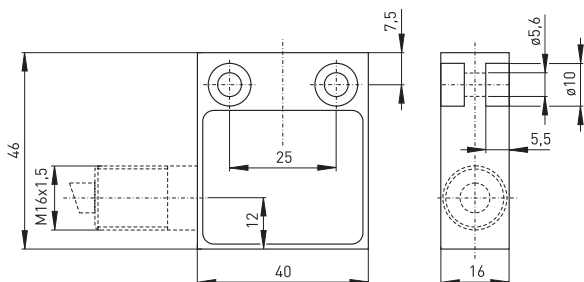
// Cable entry M16 x 1.5



// Cable entry M16 x 1.5



// Cable entry on side M16 x 1.5



// Connector M12 x 1, 4-pole



Position switches with/without safety function

// Series E 12, actuators

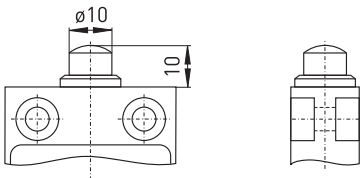
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Watertight collar for protection against penetration of dirt

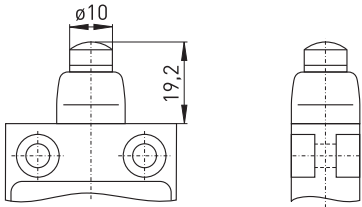
// Plunger



Contact variants: switch travel/contacts

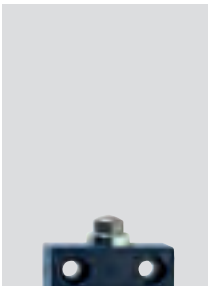
	Snap action
1 change-over contact	E 12-2m
Material Number	1044194
	0 1.5 5.5 GY-BK GY-BN

// Plunger with watertight collar W



Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 W-2m
Material Number	1044242
	0 1.5 5.5 GY-BK GY-BN



Features/Options

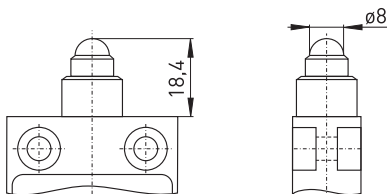
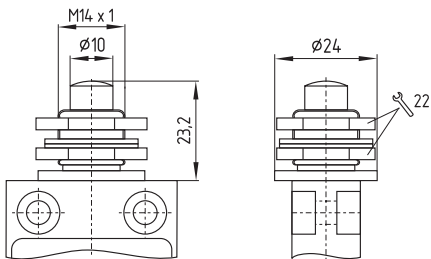
- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point

// Plunger for front mounting F

// Ball plunger KU

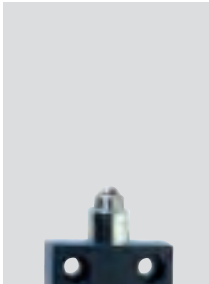
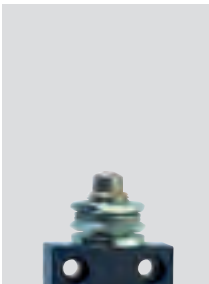


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 F-2m
Material Number	1188874
	0 1,5 5,5 GY-BK GY-BN

	Snap action
1 change-over contact	E 12 KU-2m
Material Number	1044268
	0 1,5 5,5 GY-BK GY-BN



Position switches with/without safety function

// Series E 12, actuators

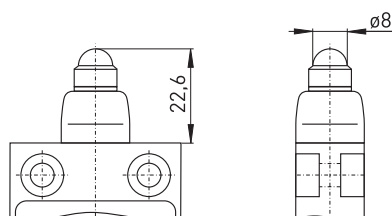
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 15°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point
- Watertight collar for protection against penetration of dirt

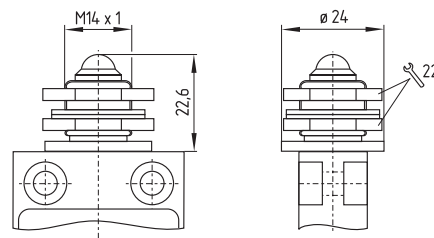
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Ball diameter 8 mm
- Exact repeatability of switching point

// Ball plunger collar WKU



// Ball plunger for front mounting FKU

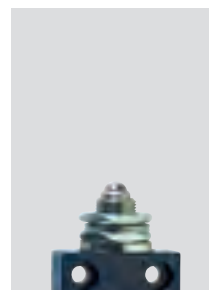
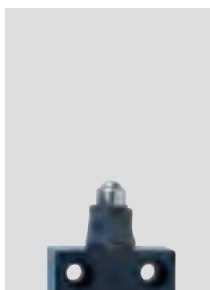


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 WKU-2m
Material Number	1052918
	0 1.5 5.5 GY-BK GY-BN

	Snap action
1 change-over contact	E 12 FKU-2m
Material Number	1188876
	0 1.5 5.5 GY-BK GY-BN



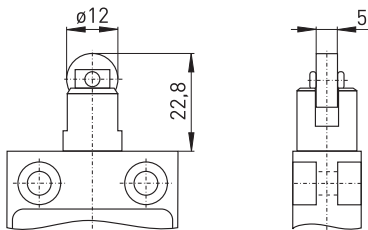
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°
- Metal roller
- Actuator repositioned by 90° available on request

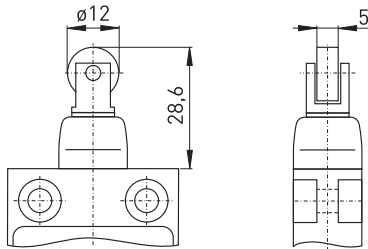
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator repositioned by 90° available on request
- Watertight collar for protection against penetration of dirt

// Roller plunger R



// Roller plunger collar WR

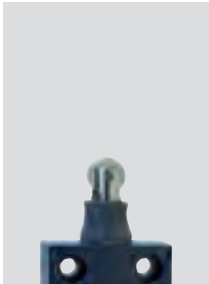
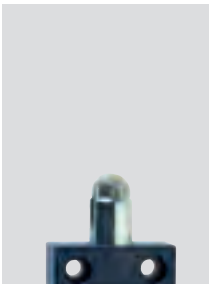


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 R-2m
Material Number	1044360
	0 1,5 5,5 GY-BK GY-BN

	Snap action
1 change-over contact	E 12 WR-2m
Material Number	1044440
	0 1,5 5,5 GY-BK GY-BN



Position switches with/without safety function

// Series E 12, actuators

Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator repositioned by 90° available on request

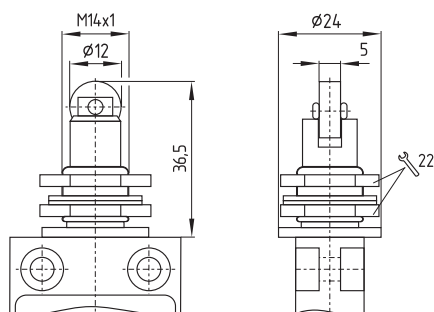
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

Note

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

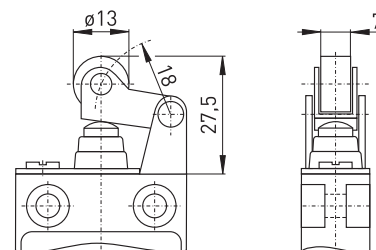
// Roller plunger for front mounting FR



Contact variants: switch travel/contacts

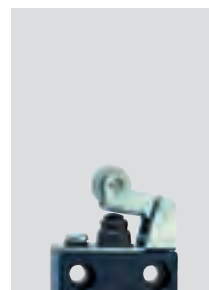
	Snap action
1 change-over contact	E 12 FR-2m
Material Number	1044839
	0 1.5 5.5 GY-BK GY-BN

// Roller lever collar WH



Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 WH-2m
Material Number	1044508
	0 1.5 5.5 GY-BK GY-BN



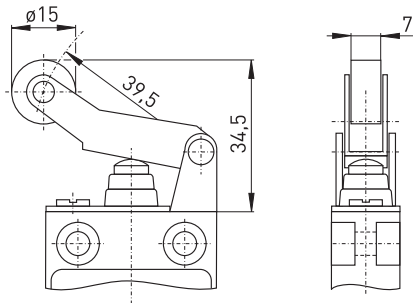
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

Note

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

// Long roller lever collar WHL



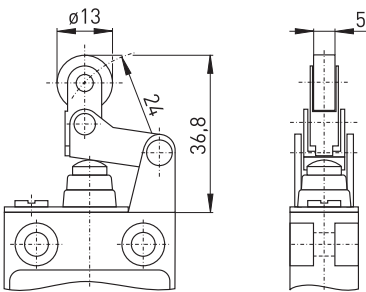
Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 WHL-2m
Material Number	1044553
	0 4.1 12.8 GY-BK GY-BN

Features/Options

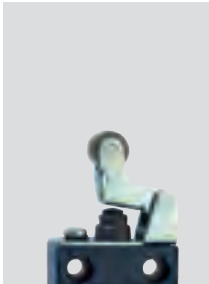
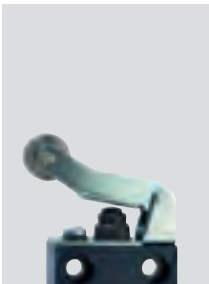
- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

// Offset roller lever collar WHK



Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 WHK-2m
Material Number	1044601
	0 2 6.8 GY-BK GY-BN



Position switches with/without safety function

// Series E 12, actuators

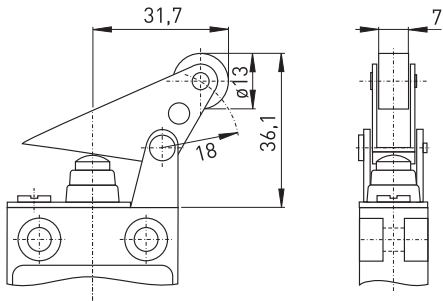
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to switch from below
- Metal roller
- Actuator repositioned by 180° available on request
- Watertight collar for protection against penetration of dirt
- With plastic roller available on request

Features/Options

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

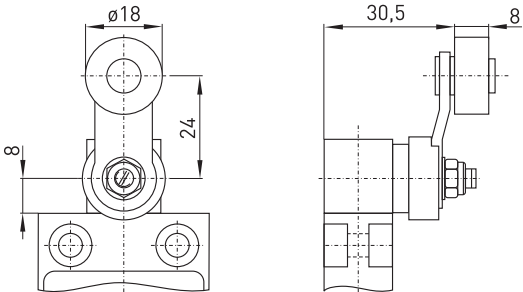
// Parallel roller lever collar WPH



Contact variants: switch travel/contacts

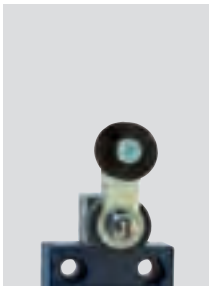
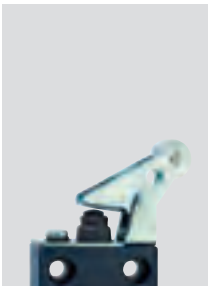
	Snap action
1 change-over contact	E 12 WPH-2m
Material Number	1188878
	0 1,5 5,5 GY-BK GY-BN

// Rocking lever D



Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 D-2m
Material Number	1188881
	70° 17° 0° 17° 70° GY-BK GY-BN



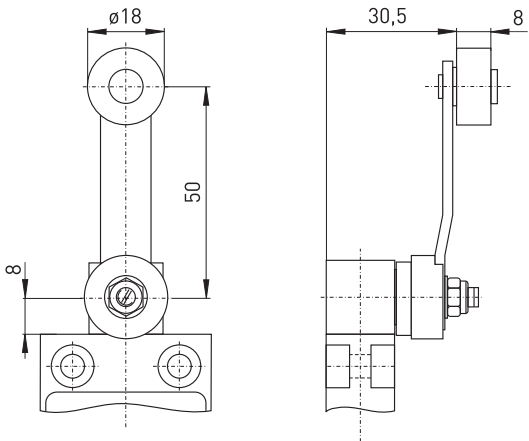
Features/Options

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

Features/Options

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

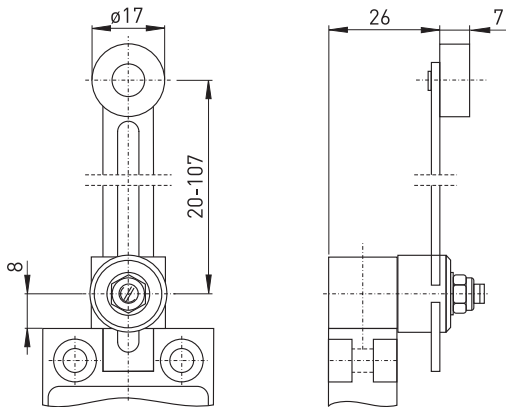
// Long rocking lever DL



Contact variants: switch travel/contacts

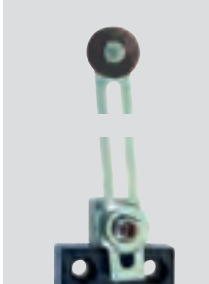
	Snap action
1 change-over contact	E 12 DL-2m
Material Number	1188883
	70° 17° 0° 17° 70° GY-BK GY-BN

// Adjustable rocking lever DS



Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 DS-2m
Material Number	1044675
	70° 17° 0° 17° 70° GY-BK GY-BN



Position switches with/without safety function

// Series E 12, actuators

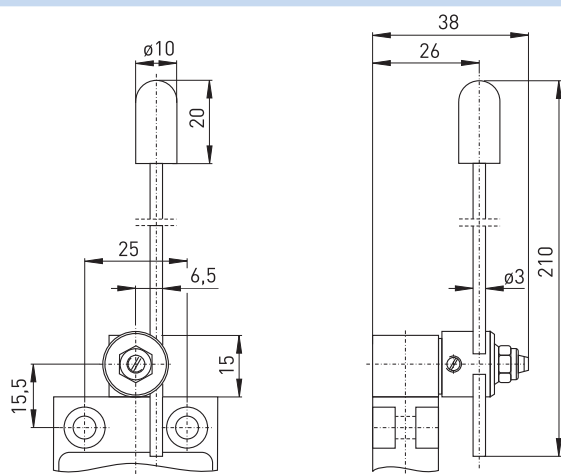
Features/Options

- No safety switch!
- Wear-resistant plastic tip
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator repositioned by 180° 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 the spring allows for deflection above the max. switching angle of 18°

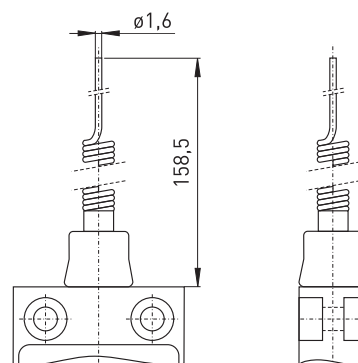
// Rod lever DD



Contact variants: switch travel/contacts

	Snap action
1 change-over contact Material Number	E 12 DD-2m 1188887
	70° 17° 0° 17° 70° GY-BK GY-BN

// Long spring rod TL



Contact variants: switch travel/contacts

	Snap action
1 change-over contact Material Number	E 12 TL-2m 1044703
	18° 0° 18° GY-BK GY-BN



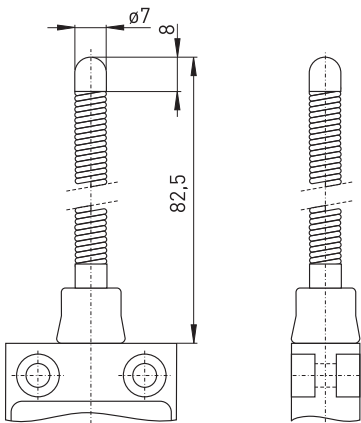
Features/Options

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

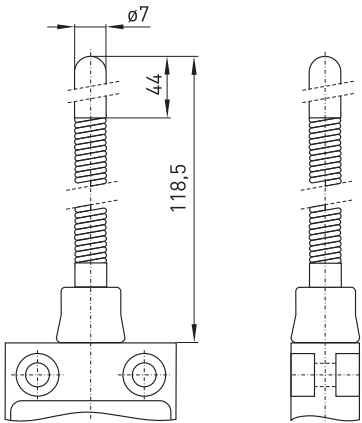
Features/Options

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

// Spring rod with steel tip TF



// Spring rod with plastic tip TK

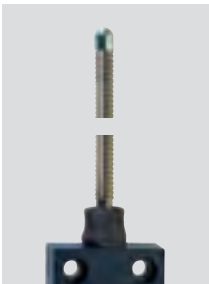


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action
1 change-over contact	E 12 TF-2m
Material Number	1188889

	Snap action
1 change-over contact	E 12 TK-2m
Material Number	1178560



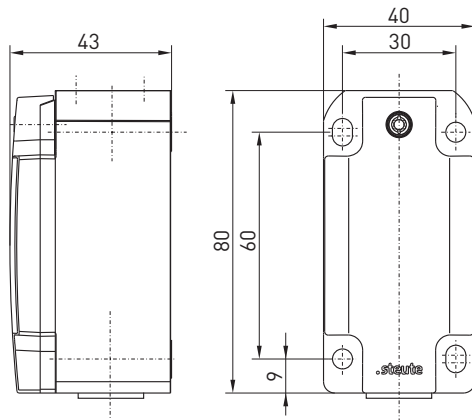
Position switches with/without safety function

// Series ES/EM 98

Features/Options

- Metal enclosure
- Design to EN 50041
- Slow action $\ominus$, change-over contact, 2 NC, 2 NC/1 NO or 1 NC/2 NO with double break
- Snap action, 2 NC/1 NO or 1 NC/2 NO contact with double break
- Available with overlapping contacts
- Actuator can be repositioned by $4 \times 90^\circ$
- Ex version available

// ES/EM 98



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Design	EN 50041
Enclosure	zinc die-cast, enamel finish
Degree of protection	IP 67 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action, positive break NC contacts $\ominus$
Switching elements	change-over, 2 NC, 2 NC/1 NO or 1 NC/2 NO contacts with double break Zb, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	2 contacts: max. 2.5 mm ² , 3 contacts: max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	1 x M20 x 1.5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	2 contacts: 6 A, 3 contacts: 1.5 A
I _e /U _e	2 contacts: 6 A/250 VAC; 0.25 A/230 VDC 3 contacts: 1.5 A/230 VAC; 0.27 A/250 VDC
Utilisation category	AC-15; DC-13
Max. fuse rating	2 contacts: 6 A gG/gN fuse 3 contacts: 1.5 A gG/gN fuse
Mechanical life	> 1 million operations
Frequency of operation	1800/h
Ambient temperature	- 20 °C ... +80 °C

Type code

EM 98 H-12

Contact type 2 NC/1 NO
 (-11, -11U, -02, -12, -21)
 Actuator H (R, D, etc. ...)
 Series
 M Snap action (S Slow action)

Features/Options

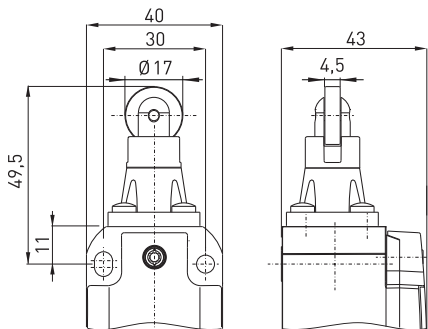
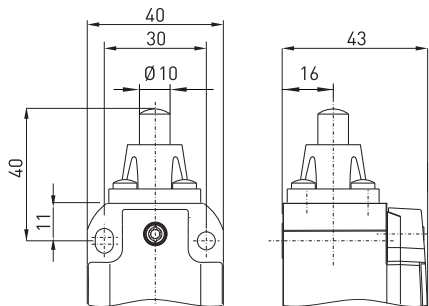
- Actuator type B to EN 50041
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°

Features/Options

- Actuator type C to EN 50041
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°

// Plunger

// Roller plunger R



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98-11 1188439
1 NO/1 NC overlapping Material Number		ES 98-11U on request
2 NC contacts Material Number		ES 98-02 on request
2 NC/1 NO contacts Material Number	EM 98-12 1190307 	ES 98-12 1190283
1 NC/2 NO contacts Material Number	EM 98-21 1190308 	ES 98-21 1190284

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 R-11 1198445
1 NO/1 NC overlapping Material Number		ES 98 R-11U on request
2 NC contacts Material Number		ES 98 R-02 on request
2 NC/1 NO contacts Material Number	EM 98 R-12 1190309 	ES 98 R-12 1190285
1 NC/2 NO contacts Material Number	EM 98 R-21 1190310 	ES 98 R-21 1190286



Position switches with/without safety function

// Series ES/EM 98, actuators

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°
- Actuation parallel to switch from right
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°

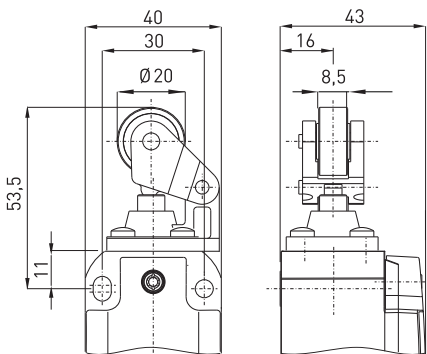
Note

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

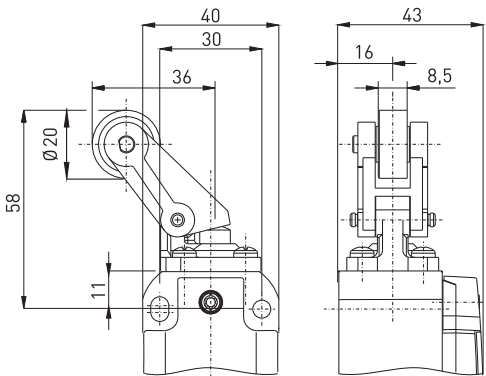
Features/Options

- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°

// Roller lever H



// Parallel roller lever PH



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 H-11 1190317 0 2 5 1 2,3 23-24 11-12
1 NO/1 NC overlapping Material Number		ES 98 H-11U on request 0 2 5 1 2,3 23-24 15-16
2 NC contacts Material Number		ES 98 H-02 on request 0 2 5 1 2,3 11-12 21-22
2 NC/1 NO contacts Material Number	EM 98 H-12 1190319 0 2,5 4,4 5,5 1 2,3 13-14 21-22 31-32	ES 98 H-12 1190315 0 2 5,5 1 2,3 33-34 11-12 21-22
1 NC/2 NO contacts Material Number	EM 98 H-21 1190320 0 2,5 4,4 5,5 1 2,3 13-14 23-24 31-32	ES 98 H-21 1190318 0 2 5,5 1 2,3 33-34 23-24 11-12

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 PH-11 on request 0 2,5 9 1 2,3 23-24 11-12
1 NO/1 NC overlapping Material Number		ES 98 PH-11U on request 0 2,5 9 1 2,3 23-24 15-16
2 NC contacts Material Number		ES 98 PH-02 on request 0 2 9 1 2,3 11-12 21-22
2 NC/1 NO contacts Material Number	EM 98 PH-12 on request	ES 98 PH-12 on request
1 NC/2 NO contacts Material Number	EM 98 PH-21 on request	ES 98 PH-21 on request



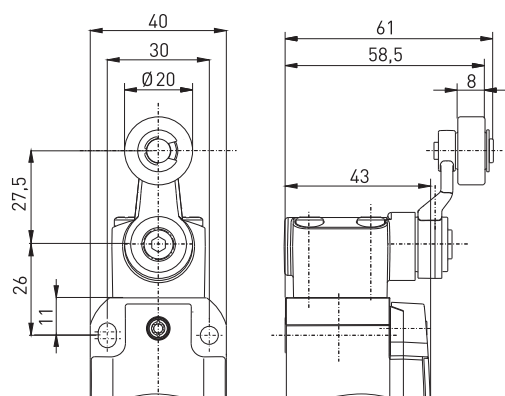
Features/Options

- Actuator type A to EN 50041
- Actuating speed max. 2.5 m/s with a vertical actuating angle of 30°
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°

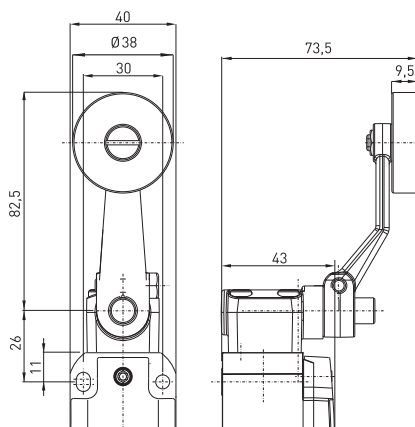
Features/Options

- Actuating speed max. 2.5 m/s with a vertical actuating angle of 30°
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°

// Rocking lever D



// Long rocking lever DL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 D-11 1189646 85° 25°0°25° 85° 23-24 30°15°15°30° 11-12
1 NO/1 NC overlapping Material Number		ES 98 D-11U on request 85° 20°0°20° 85° 23-24 40°25°25°40° 15-16
2 NC contacts Material Number		ES 98 D-02 on request 85° 30° 0° 30° 85° 11-12 15°15° 21-22
2 NC/1 NO contacts Material Number	EM 98 D-12 1190311	ES 98 D-12 1190288
1 NC/2 NO contacts Material Number	EM 98 D-21 1190312	ES 98 D-21 1190289

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 DL-11 1189905 85° 25°0°25° 85° 23-24 30°15°15°30° 11-12
1 NO/1 NC overlapping Material Number		ES 98 DL-11U on request 85° 20°0°20° 85° 23-24 40°25°25°40° 15-16
2 NC contacts Material Number		ES 98 DL-02 on request 85° 30° 0° 30° 85° 11-12 15°15° 21-22
2 NC/1 NO contacts Material Number	EM 98 DL-12 on request	ES 98 DL-12 on request
1 NC/2 NO contacts Material Number	EM 98 DL-21 on request	ES 98 DL-21 on request



Position switches with/without safety function

// Series ES/EM 98, actuators

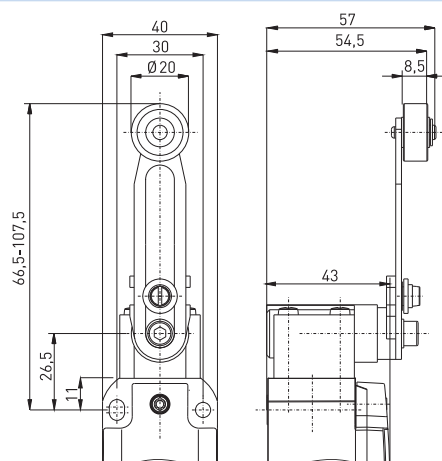
Features/Options

- No safety switch!
- Actuating speed max. 2.5 m/s with a vertical actuating angle of 30°
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°

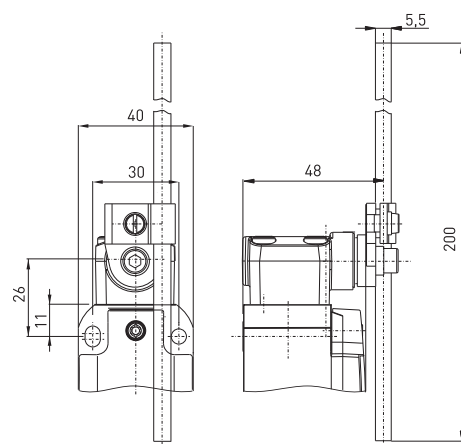
Features/Options

- No safety switch!
- Actuating speed max. 2.5 m/s with a vertical actuating angle of 30°
- Actuator type D to EN 50041

// Adjustable rocking lever DS



// Rod lever DD



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 DS-11 1190290 85° 25° 0° 25° 85° 23-24 11-12 15° 15°
1 NO/1 NC overlapping Material Number		ES 98 DS-11U on request 85° 20° 0° 20° 85° 23-24 15-16 25° 25°
2 NC contacts Material Number		ES 98 DS-02 on request 85° 0° 85° 11-12 21-22 15° 15°
2 NC/1 NO contacts Material Number	EM 98 DS-12 1190313	ES 98 DS-12 1190291
1 NC/2 NO contacts Material Number	EM 98 DS-21 1190314	ES 98 DS-21 1190306

Contact variants: switch travel/contacts

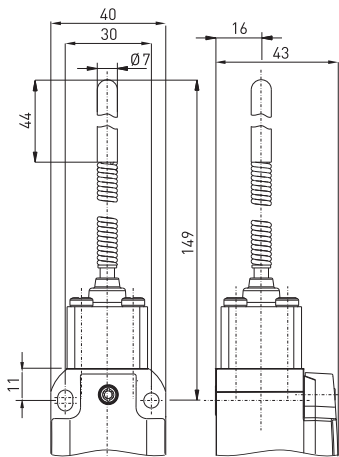
	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 DD-11 on request 85° 25° 0° 25° 85° 23-24 11-12 15° 15°
1 NO/1 NC overlapping Material Number		ES 98 DD-11U on request 85° 20° 0° 20° 85° 23-24 15-16 25° 25°
2 NC contacts Material Number		ES 98 DD-02 on request 85° 0° 85° 11-12 21-22 15° 15°
2 NC/1 NO contacts Material Number	EM 98 DD-12 on request	ES 98 DD-12 on request
1 NC/2 NO contacts Material Number	EM 98 DD-21 on request	ES 98 DD-21 on request



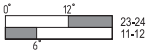
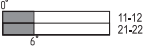
Features/Options

- 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°

// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number		ES 98 TK-11 on request 
2 NC contacts Material Number		ES 98 TK-02 on request 
2 NC/1 NO contacts Material Number	EM 98 TK-12 1218367	ES 98 TK-12 1221172
1 NC/2 NO contacts Material Number	EM 98 TK-21 on request	ES 98 TK-21 on request



Position switches with/without safety function

// Series ES 51

Features/Options

- Metal enclosure
- Slow action $\ominus$, change-over contact with double break
- 1 cable entry M16 x 1.5

Note

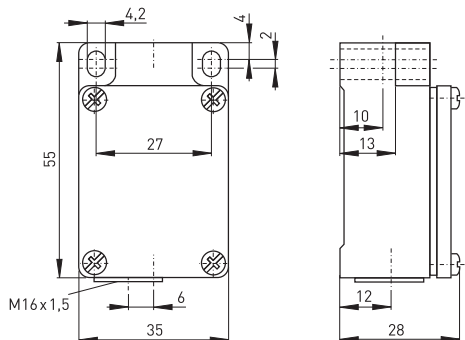
When used as safety switch, secure the enclosure against slipping with appropriate means, e.g. pinning.

// ES 51



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow action, positive break NC contacts $\ominus$
Switching elements	change-over contact with double break Zb, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 1.5 mm ² (incl. conductor ferrules)
Cable entry	1 x M16 x 1.5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	4 A
Utilisation category	AC-15
I _e /U _e	4 A / 400 VAC
Max. fuse rating	4 A gG/gN fuse
Mechanical life	> 1 million operations
Frequency of operation	3600/h
Ambient temperature	- 20 °C ... + 80 °C
Repeat accuracy of switching points	± 0.1 mm
Approvals	PG CCC



Type code

ES 51 WK 10/1S-ST

- Connector M12 x 1, 5-pole
- Contact type 1NC/1NO
- Actuator K (R, TK, D, etc. ...)
- Watertight collar
- Series
- S Slow action

Position switches with/without safety function

// Series ES 51, actuators

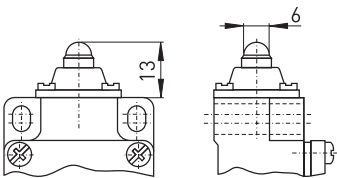
- Features/Options
- With gold-plated contacts available on request
 - Available on request with plug-in connector M12 x 1, 5-pole

- Features/Options
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
 - Vertical actuation or actuation from side possible
 - Actuator with captive stainless steel ball actuator
 - Exact repeatability of switching point

// Connector M12 x 1, 5-pole



// Plunger



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 10/1S
Material Number	1047001

Position switches with/without safety function

// Series ES 51, actuators

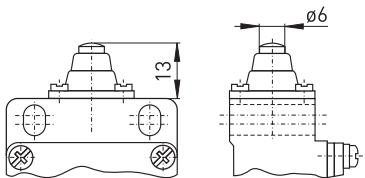
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Exact repeatability of switching point
- Watertight collar for protection against penetration of dirt

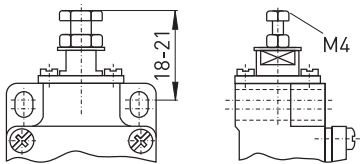
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Projection of plunger adjustable for fine setting of switching point

// Plunger collar W



// Adjustable plunger ST

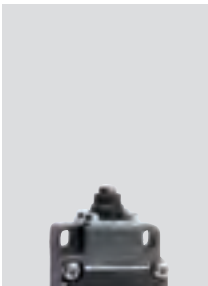


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 W 10/1S
Material Number	1047005
	0 2,5 5 23-24 11-12 1 2,5

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 ST 10/1S
Material Number	1047010
	0 2,5 5 23-24 11-12 1 2,5



Features/Options

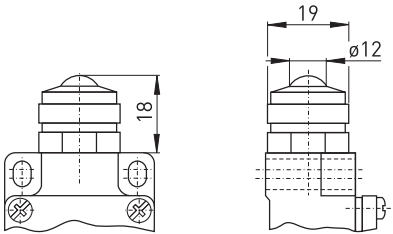
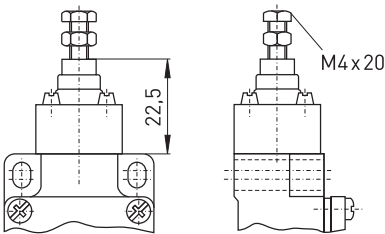
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Projection of plunger adjustable for fine setting of switching point
- Watertight collar for protection against penetration of dirt

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point

// Adjustable plunger collar WST

// Ball plunger KU

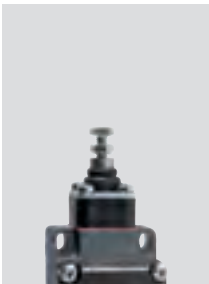


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WST 10/1S
Material Number	1047011

	Slow action
1 NC/1 NO contact	ES 51 KU 10/1S
Material Number	1047008



Position switches with/without safety function

// Series ES 51, actuators

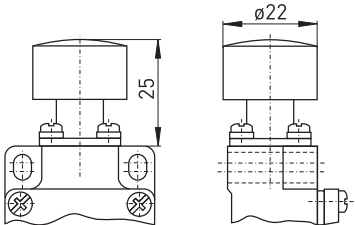
Features/Options

- Large actuating surface
- Safe switching even with imprecise actuation
- Suitable for manual operation
- Watertight collar for protection against penetration of dirt

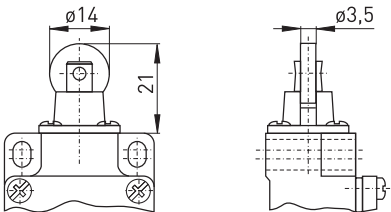
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°
- Metal roller
- Actuator can be repositioned by 4 x 90°

// Cap with collar WK



// Roller plunger R

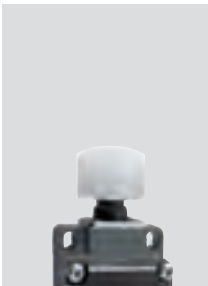


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WK 10/1S
Material Number	1047012
	02.55 23-24 11-12

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 R 10/1S
Material Number	1047013
	02.55 23-24 11-12



Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Metal roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt

Features/Options

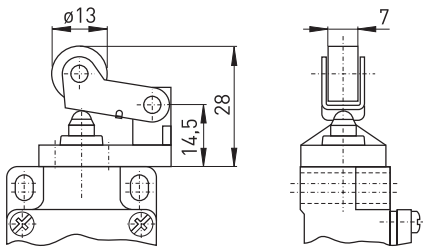
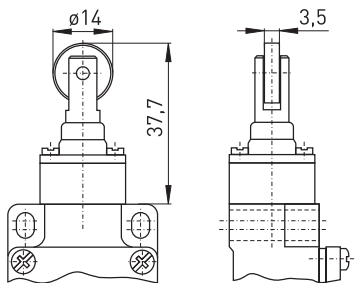
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Plastic roller
- Actuator can be repositioned by 4 x 90°
- With metal roller available on request

Note

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

// Roller plunger with collar WR

// Roller lever H



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WR 10/1S
Material Number	1047017

	Slow action
1 NC/1 NO contact	ES 51 H 10/1S
Material Number	1047019



Position switches with/without safety function

// Series ES 51, actuators

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

Note

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

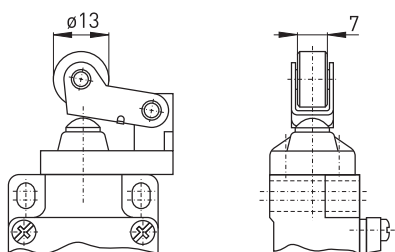
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- With metal roller available on request

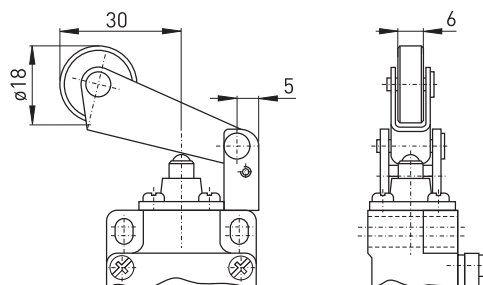
Note

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

// Roller lever collar WH



// Long roller lever HL



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WH 10/15
Material Number	1047022

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 HL 10/15
Material Number	1047027



Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

Note

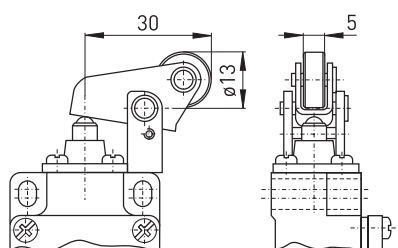
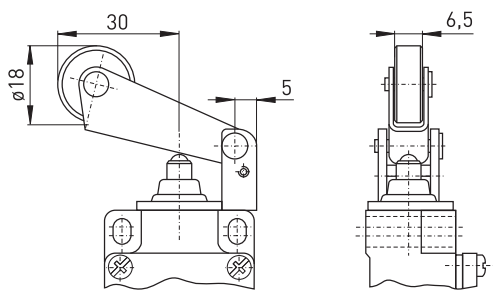
Actuation from the left should be avoided since this reduces the mechanical life of the position switch.

Features/Options

- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to axis of switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- With metal roller available on request

// Long roller lever collar WHL

// Parallel roller lever PH

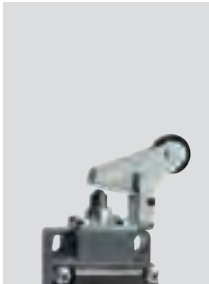


Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WHL 10/1S
Material Number	1047029

	Slow action
1 NC/1 NO contact	ES 51 PH 10/1S
Material Number	1047034



Position switches with/without safety function

// Series ES 51, actuators

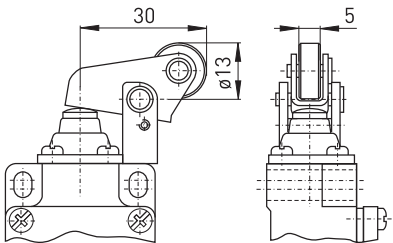
Features/Options

- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

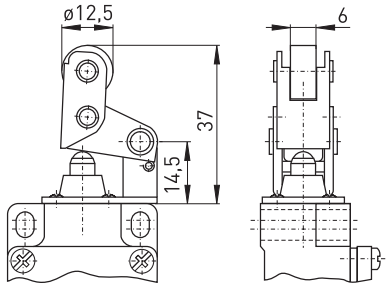
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- With metal roller available on request

// Parallel roller lever collar WPH



// Offset roller lever HK

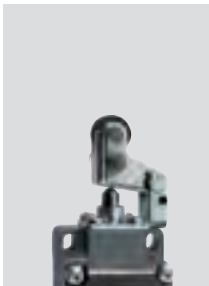


Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WPH 10/1S
Material Number	1047035
	01.54 0.52 23-2411-12

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 HK 10/1S
Material Number	1047032
	036 123-2411-12



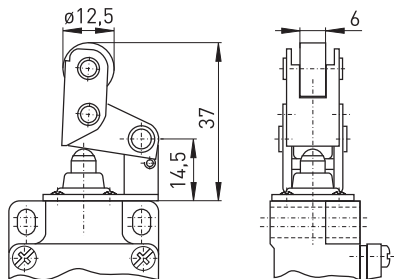
Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

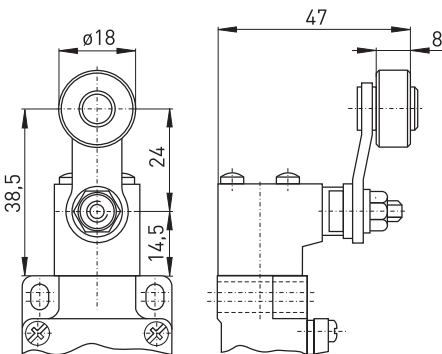
Features/Options

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

// Offset roller lever collar WHK



// Rocking lever D



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 WHK 1Ö/1S
Material Number	1047033

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 D 1Ö/1S
Material Number	1047036



Position switches with/without safety function // Series ES 51, actuators

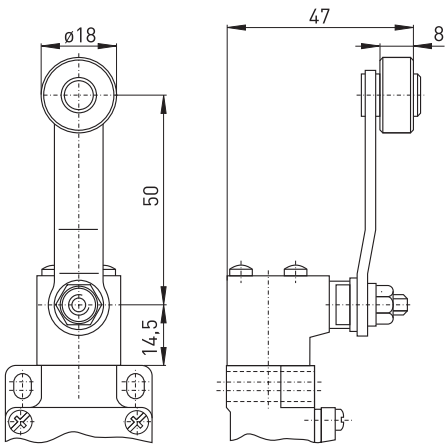
Features/Options

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

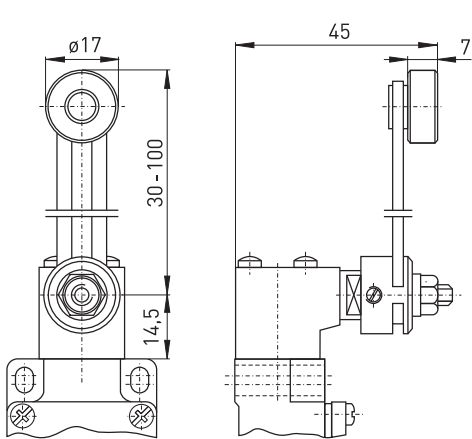
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 rocking lever DL



// Adjustable rocking lever DS



Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 DL 10/1S
Material Number	1047039
	70° 30° 0° 30° 70° 23-24 11-12 13° 13°

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 DS 10/1S
Material Number	1047042
	70° 30° 0° 30° 70° 23-24 11-12 13° 13°



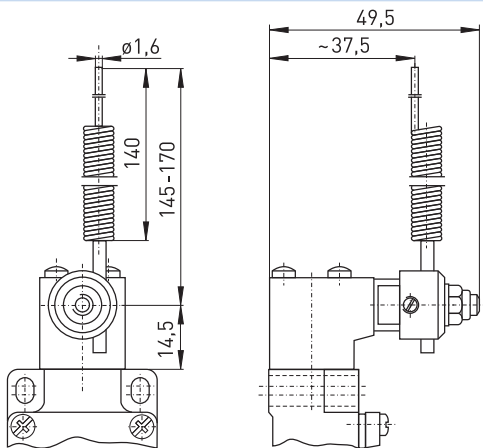
Features/Options

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

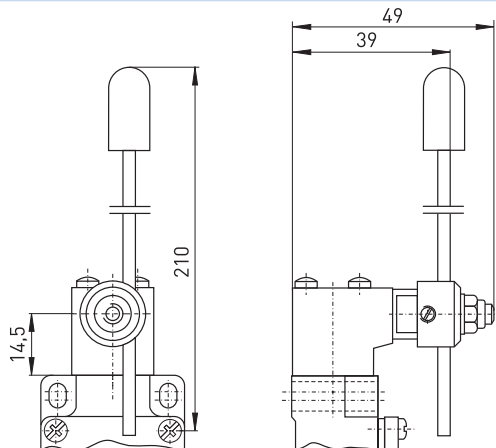
Features/Options

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

// Spring-rod lever DF



// Rod lever DD



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action
1 NC/1 NO contact	ES 51 DF 10/1S
Material Number	1047041
	70° 30° 0° 30° 70° 23-24 11-12 13° 13°

	Slow action
1 NC/1 NO contact	ES 51 DD 10/1S
Materialnummer	1047040
	70° 30° 0° 30° 70° 23-24 11-12 13° 13°



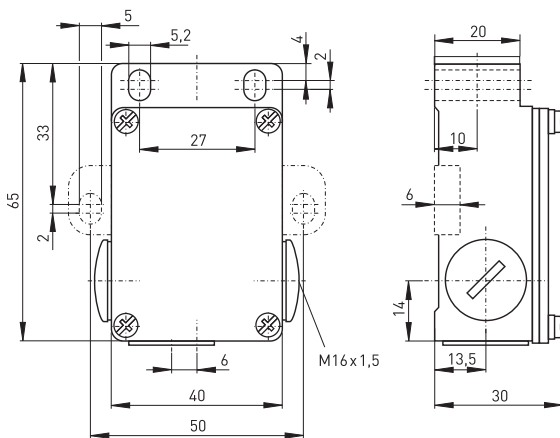
Position switches with/without safety function

// Series ES/EM 41 and ES/EM 411

Features/Options

- Metal enclosure
- Slow action $\ominus$, change-over contact or 2 NC contacts with double break
- Snap action, change-over contact with double break
- Slow action with overlapping contacts available
- ES/EM 411: with 25 mm mounting centres, depth 34 mm
- 3 cable entries M16 x 1.5
- Slow action version for high temperatures up to 180°C available on request

// ES/EM 41



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action; slow action: positive break NC contacts $\ominus$ change-over contact with double break Za or 2 NC contacts
Switching elements	
Connection	screw connection terminals
Cable cross-section	max. 2.5 mm ² (incl. conductor ferrules)
Cable entry	3 x M16 x 1.5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	6 A
Utilisation category	AC-15
I _e /U _e	6 A/400 VAC
Max. fuse rating	6 A gG/gN fuse
Mechanical life	> 1 million operations
Frequency of operation	3600/h
Ambient temperature	- 20 °C ... + 80 °C
Repeat accuracy of switching points	± 0.1 mm
Approvals	

Type code

ES 41 WH 10/1S-V

- Latching
- Contact type 1NC/1NO, (2Ö, UE)
- Actuator H (R, TK, D, etc. ...)
- Watertight collar
- Series 41 or 411
- S Slow action (M Snap action)

Position switches with/without safety function

// Series ES/EM 41 and ES/EM 411, actuators

Features/Options

- Available on request with mechanical latching V, release by means of push-button (only possible with slow action)
- Available on request with plug-in connector M12 x 1, 5-pole
- With gold-plated contacts available on request

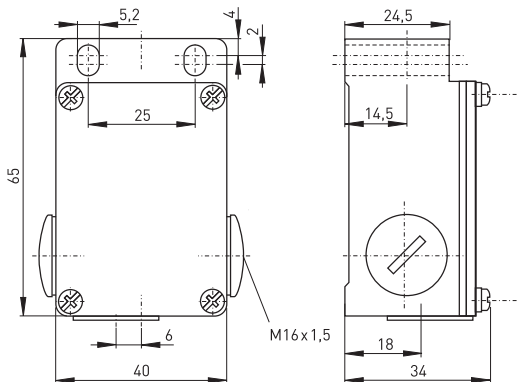
Note

When used as safety switch, secure the enclosure against slipping with appropriate means, e.g. pinning.

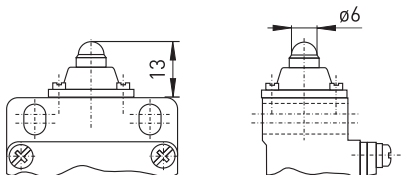
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball actuator
- Exact repeatability of switching point

// ES/EM 411



// Plunger



// Mechanical latching



// Connector M12 x 1, 5-pole



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 10/1S 1046364	ES 41 10/1S 1046253
Material Number	EM 411 10/1S 1046676	ES 411 10/1S 1046639
1 NO/1 NC overlapping Material Number		ES 41 UE 1046494
Material Number		ES 411 UE 1046733
2 NC contacts Material Number		ES 41 20 1046518
Material Number		ES 411 20 1046754



Position switches with/without safety function // Series ES/EM 41 und ES/EM 411, actuators

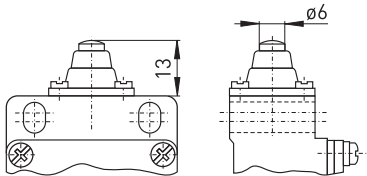
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Exact repeatability of switching point
- Watertight collar for protection against penetration of dirt

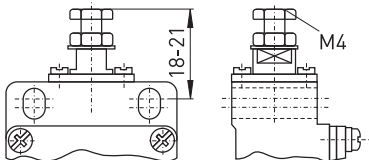
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Length of metal plunger adjustable by means of M4 screw for fine adjustment of switching travel

// Plunger collar W



// Adjustable plunger ST

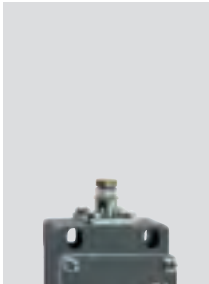
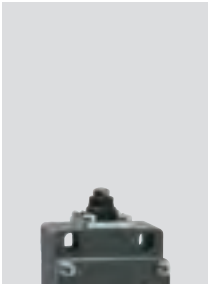


Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 W 10/1S 1046376	ES 41 W 10/1S 1046267
Material Number	EM 411 W 10/1S 1046677	ES 411 W 10/1S 1046640
1 NO/1 NC overlapping Material Number		ES 41 W UE 1046495
Material Number		ES 411 W UE 1046734
2 NC contacts Material Number		ES 41 W 20 1046520
Material Number		ES 411 W 20 1046755

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 ST 10/1S 1046380	ES 41 ST 10/1S 1046278
Material Number	EM 411 ST 10/1S 1046681	ES 411 ST 10/1S 1046642
1 NO/1 NC overlapping Material Number		ES 41 ST UE 1046497
Material Number		ES 411 ST UE 1046736
2 NC contacts Material Number		ES 41 ST 20 1046522
Material Number		ES 411 ST 20 1046757



Features/Options

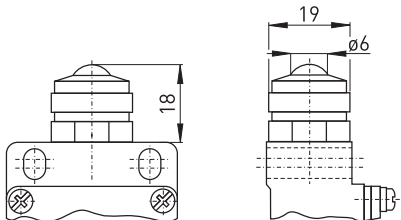
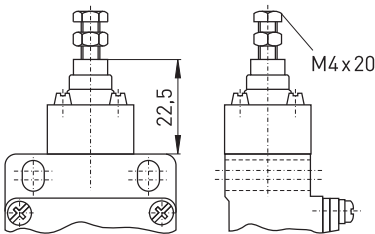
- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 0°
- Length of metal plunger adjustable by means of M4 screw for fine adjustment of switching travel
- Watertight collar for protection against penetration of dirt

Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 20°
- Vertical actuation or actuation from side possible
- Actuator with captive stainless steel ball
- Exact repeatability of switching point

// Adjustable plunger collar WST

// Ball plunger KU



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 WST 1Ö/1S	ES 41 WST 1Ö/1S
Material Number	1046382	1046282
Material Number	EM 411 WST 1Ö/1S	ES 411 WST 1Ö/1S
	1046683	1046644
1 NO/1 NC overlapping		ES 41 WST UE
Material Number		1046498
Material Number		ES 411 WST UE
		1046737
2 NC contacts		ES 41 WST 2Ö
Material Number		1046523
Material Number		ES 411 WST 2Ö
		1046758

	Snap action	Slow action
1 NC/1 NO contact	EM 41 KU 1Ö/1S	ES 41 KU 1Ö/1S
Material Number	1046379	1046277
Material Number	EM 411 KU 1Ö/1S	ES 411 KU 1Ö/1S
	1046680	1046641
1 NO/1 NC overlapping		ES 41 KU UE
Material Number		1046496
Material Number		ES 411 KU UE
		1046735
2 NC contacts		ES 41 KU 2Ö
Material Number		1046521
Material Number		ES 411 KU 2Ö
		1046756



Position switches with/without safety function
// Series ES/EM 41 and ES/EM 411, actuators

Features/Options

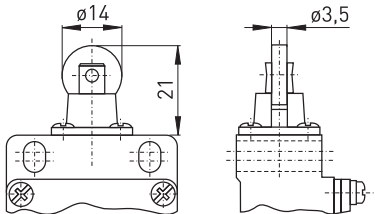
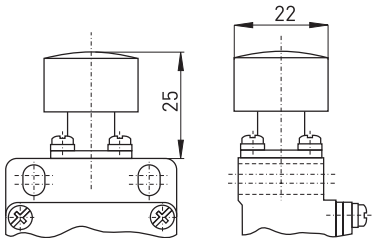
- Safety switch only version with slow action
- Large actuating surface
- Safe switching even with imprecise actuation
- Suitable for manual operation
- Watertight collar for protection against penetration of dirt

Features/Options

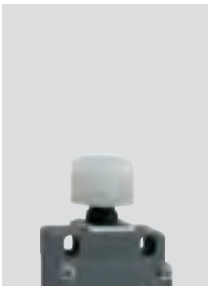
- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 30°
- Metal roller
- Actuator can be repositioned by 90°

// Cap with collar WK

// Roller plunger R



Contact variants: switch travel/contacts			Contact variants: switch travel/contacts		
	Snap action	Slow action		Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 WK 10/1S 1046383	ES 41 WK 10/1S 1046283	1 NC/1 NO contact Material Number	EM 41 R 10/1S 1046384	ES 41 R 10/1S 1046284
Material Number	EM 411 WK 10/1S 1046684	ES 411 WK 10/1S 1046645	Material Number	EM 411 R 10/1S 1046685	ES 411 R 10/1S 1046646
1 NO/1 NC overlapping Material Number		ES 41 WK UE 1046499	1 NO/1 NC overlapping Material Number		ES 41 R UE 1046500
Material Number		ES 411 WK UE 1046738	Material Number		ES 411 R UE 1046739
2 NC contacts Material Number		ES 41 WK 20 1046524	2 NC contacts Material Number		ES 41 R 20 1046525
Material Number		ES 411 WK 20 1046759	Material Number		ES 411 R 20 1046760



Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 25°
- Wear-resistant plastic roller
- Actuator can be repositioned by 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

Features/Options

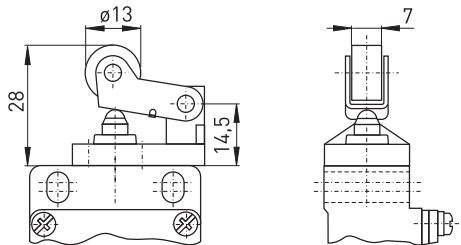
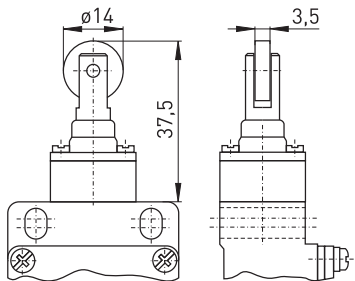
- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- With metal roller available on request

Note

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

// Roller plunger with collar WR

// Roller lever H



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 WR 10/1S	ES 41 WR 10/1S
Material Number	1046390	1046296
Material Number	EM 411 WR 10/1S	ES 411 WR 10/1S
	1046688	1046650
1 NO/1 NC overlapping		ES 41 WR UE
Material Number		1046501
Material Number		ES 411 WR UE
		1046740
2 NC contacts		ES 41 WR 20
Material Number		1046527
Material Number		ES 411 WR 20
		1046761

	Snap action	Slow action
1 NC/1 NO contact	EM 41 H 10/1S	ES 41 H 10/1S
Material Number	1046392	1046298
Material Number	EM 411 H 10/1S	ES 411 H 10/1S
	1046690	1046651
1 NO/1 NC overlapping		ES 41 H UE
Material Number		1046502
Material Number		ES 411 H UE
		1046741
2 NC contacts		ES 41 H 20
Material Number		1046528
Material Number		ES 411 H 20
		1046762



Position switches with/without safety function // Series ES/EM 41 and ES/EM 411, actuators

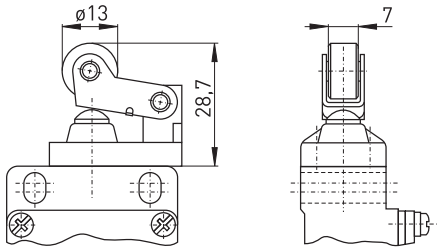
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

Note

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

// Roller lever collar WH



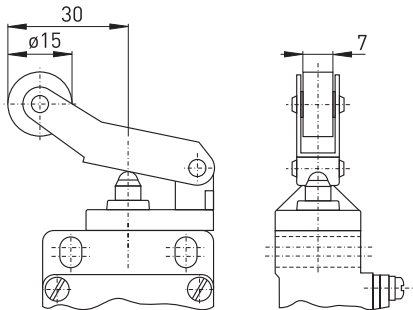
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- With metal roller available on request

Note

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

// Long roller lever HL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 WH 10/1S 1046408	ES 41 WH 10/1S 1046305
Material Number	EM 411 WH 10/1S 1046697	ES 411 WH 10/1S 1046654
1 NO/1 NC overlapping Material Number		ES 41 WH UE 1046504
Material Number		ES 411 WH UE 1046742
2 NC contacts Material Number		ES 41 WH 20 1046529
Material Number		ES 411 WH 20 1046763

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 HL 10/1S 1046417	ES 41 HL 10/1S 1046316
Material Number	EM 411 HL 10/1S 1046700	ES 411 HL 10/1S 1046656
1 NO/1 NC overlapping Material Number		ES 41 HL UE 1046505
Material Number		ES 411 HL UE 1046743
2 NC contacts Material Number		ES 41 HL 20 1046531
Material Number		ES 411 HL 20 1046764



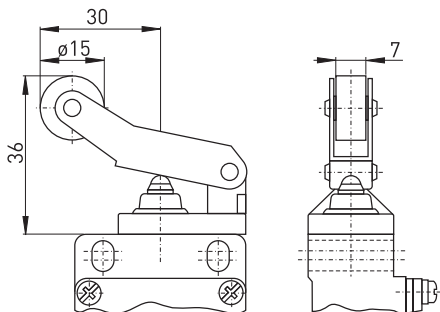
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

Note

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

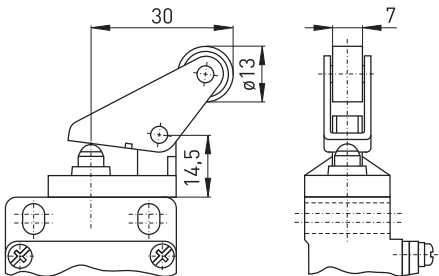
// Long roller lever collar WHL



Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to axis of switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- With metal roller available on request

// Parallel roller lever PH



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 WHL 10/1S	ES 41 WHL 10/1S
Material Number	1046421	1046318
Material Number	EM 411 WHL 10/1S	ES 411 WHL 10/1S
	1046702	1046657
1 NO/1 NC overlapping		ES 41 WHL UE
Material Number		1046506
Material Number		ES 411 WHL UE
		1046744
2 NC contacts		ES 41 WHL 20
Material Number		1046532
Material Number		ES 411 WHL 20
		1046765

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 PH 10/1S	ES 41 PH 10/1S
Material Number	1046431	1046324
Material Number	EM 411 PH 10/1S	ES 411 PH 10/1S
	1046706	1046661
1 NO/1 NC overlapping		ES 41 PH UE
Material Number		1046509
Material Number		ES 411 PH UE
		1046747
2 NC contacts		ES 41 PH 20
Material Number		1046538
Material Number		ES 411 PH 20
		1046768



Position switches with/without safety function // Series ES/EM 41 and ES/EM 411, actuators

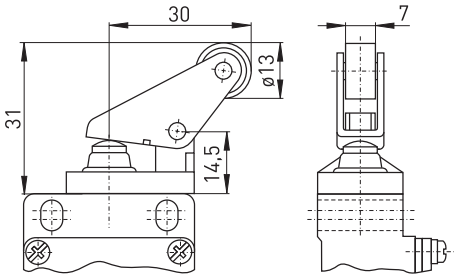
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

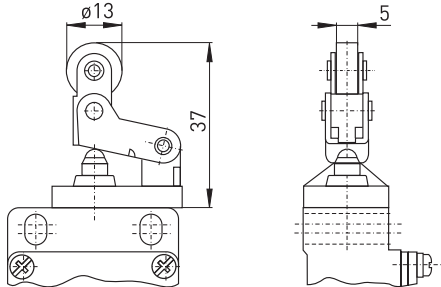
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- With metal roller available on request

// Parallel roller lever collar WPH



// Offset roller lever HK



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 WPH 10/1S 1046434	ES 41 WPH 10/1S 1046325
Material Number	EM 411 WPH 10/1S 1046711	ES 411 WPH 10/1S 1046662
1 NO/1 NC overlapping Material Number		ES 41 WPH UE 1046510
Material Number		ES 411 WPH UE 1046748
2 NC contacts Material Number		ES 41 WPH 20 1046539
Material Number		ES 411 WPH 20 1046769

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 HK 10/1S 1046426	ES 411 HK 10/1S 1046321
Material Number	EM 411 HK 10/1S 1046703	ES 411 HK 10/1S 1046659
1 NO/1 NC overlapping Material Number		ES 41 HK UE 1046507
Material Number		ES 411 HK UE 1046745
2 NC contacts Material Number		ES 41 HK 20 1046533
Material Number		ES 411 HK 20 1046766



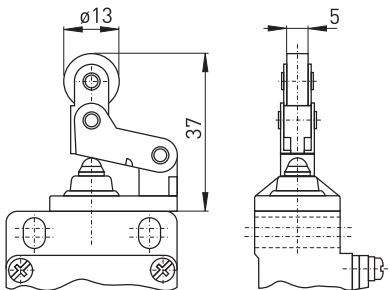
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 40°
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

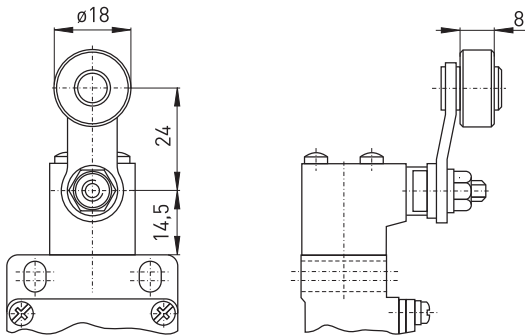
Features/Options

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

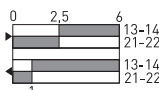
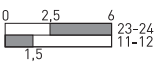
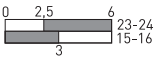
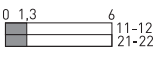
// Offset roller lever collar WHK



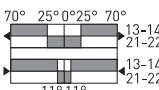
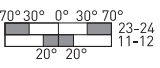
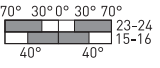
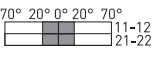
// Rocking lever D



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 WHK 1Ö/1S	ES 41 WHK 1Ö/1S
Material Number	1046427	1046323
Material Number	EM 411 WHK 1Ö/1S	ES 411 WHK 1Ö/1S
	1046705	1046660
		
1 NO/1 NC overlapping		ES 41 WHK UE
Material Number		1046508
Material Number		ES 411 WHK UE
		1046746
		
2 NC contacts		ES 41 WHK 2Ö
Material Number		1046534
Material Number		ES 411 WHK 2Ö
		1046767
		

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 D 1Ö/1S	ES 41 D 1Ö/1S
Material Number	1046438	1046327
Material Number	EM 411 D 1Ö/1S	ES 411 D 1Ö/1S
	1046712	1046664
		
1 NO/1 NC overlapping		ES 41 D UE
Material Number		1046511
Material Number		ES 411 D UE
		1046749
		
2 NC contacts		ES 41 D 2Ö
Material Number		1046540
Material Number		ES 411 D 2Ö
		1046770
		



Position switches with/without safety function

// Series ES/EM 41 and ES/EM 411, actuators

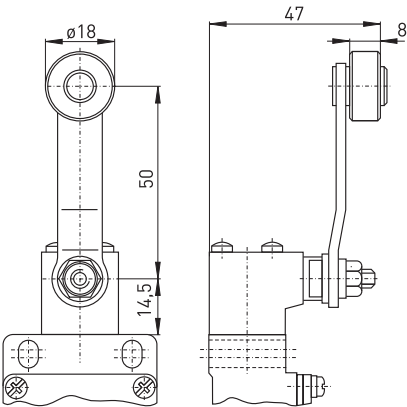
Features/Options

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

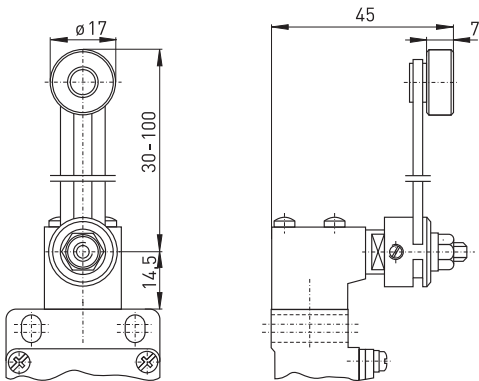
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 rocking lever DL



// Adjustable rocking lever DS



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 DL 10/1S	ES 41 DL 10/1S
Material Number	1046448	1046336
Material Number	EM 411 DL 10/1S	ES 411 DL 10/1S
	1046715	1046666
1 NO/1 NC overlapping		ES 41 DL UE
Material Number		1046513
Material Number		ES 411 DL UE
		1046750
2 NC contacts		ES 41 DL 2Ö
Material Number		1046543
Material Number		ES 411 DL 2Ö
		1046771

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 DS 10/1S	ES 41 DS 10/1S
Material Number	1046463	1046345
Material Number	EM 411 DS 10/1S	ES 411 DS 10/1S
	1046720	1046671
1 NO/1 NC overlapping		ES 41 DS UE
Material Number		1046516
Material Number		ES 411 DS UE
		1046753
2 NC contacts		ES 41 DS 2Ö
Material Number		1046546
Material Number		ES 411 DS 2Ö
		1046774



Features/Options

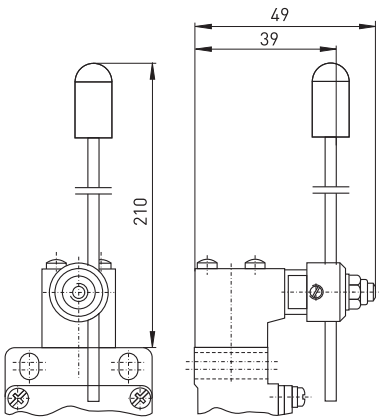
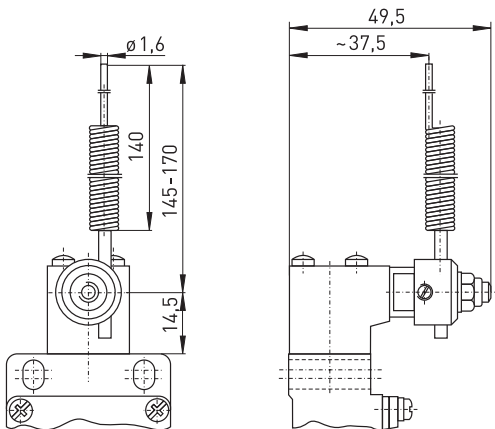
- No safety switch!
- Lever can be repositioned in 10° steps clockwise or counter-clockwise
- Actuator can be repositioned by 180°

Features/Options

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

// Spring-rod lever DF

// Rod lever DD



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact	EM 41 DF 10/1S	ES 41 DF 10/1S
Material Number	1046460	1046344
Material Number	EM 411 DF 10/1S	ES 411 DF 10/1S
	1046718	1046670
1 NO/1 NC overlapping		ES 41 DF UE
Material Number		1046515
Material Number		ES 411 DF UE
		1046752
2 NC contacts		ES 41 DF 20
Material Number		1046545
Material Number		ES 411 DF 20
		1046773

	Snap action	Slow action
1 NC/1 NO contact	EM 41 DD 10/1S	ES 41 DD 10/1S
Material Number	1046454	1046343
Material Number	EM 411 DD 10/1S	ES 411 DD 10/1S
	1046717	1046668
1 NO/1 NC overlapping		ES 41 DD UE
Material Number		1046514
Material Number		ES 411 DD UE
		1046751
2 NC contacts		ES 41 DD 20
Material Number		1046544
Material Number		ES 411 DD 20
		1046772



Position switches with/without safety function

// Series ES/EM 41 and ES/EM 411, actuators

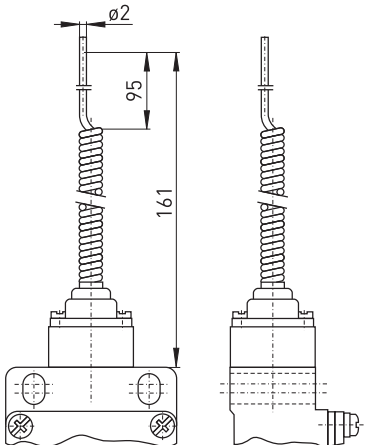
Features/Options

- 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 necessary
- Elasticity of the spring allows for deflection above the max. switching angle

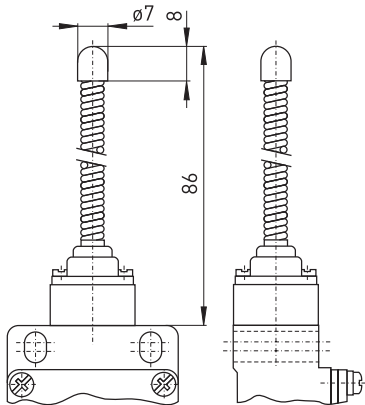
Features/Options

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

// Long spring rod TL



// Spring rod with steel tip TF



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Materialnummer	EM 41 TL 10/1S 1046468	ES 41 TL 10/1S
Material Number	EM 411 TL 10/1S 1046722	ES 411 TL 10/1S
2 NC contacts Material Number		ES 41 TL 2Ö
Material Number		ES 411 TL 2Ö

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 41 TF 10/1S 1046471	ES 41 TF 10/1S 1159563
Material Number	EM 411 TF 10/1S 1046723	ES 411 TF 10/1S 1046672
2 NC contacts Material Number		ES 41 TF 2Ö
Material Number		1182124
		ES 411 TF 2Ö
		1169189

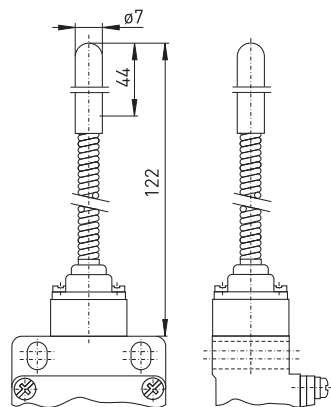
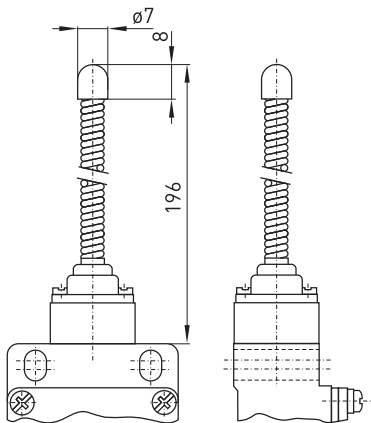


- Features/Options
- No safety switch!
 - With rounded steel tip
 - Spring rod can be actuated from any direction
 - Elasticity of the spring allows for deflection above the max. switching angle

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

// Long spring rod with 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	EM 41 TFL 10/1S	ES 41 TFL 10/1S
Material Number	1046481	1167396
Material Number	EM 411 TFL 10/1S	ES 411 TFL 10/1S
	1046728	
2 NC contacts		ES 41 TFL 20
Material Number		1053803
Material Number		ES 411 TFL 20

	Snap action	Slow action
1 NC/1 NO contact	EM 41 TK 10/1S	ES 41 TK 10/1S
Material Number	1046477	
Material Number	EM 411 TK 10/1S	ES 411 TK 10/1S
	1046724	1046674
2 NC contacts		ES 41 TK 20
Material Number		1046547
Material Number		ES 411 TK 20



Position switches with/without safety function

// Series ES/EM 61

Features/Options

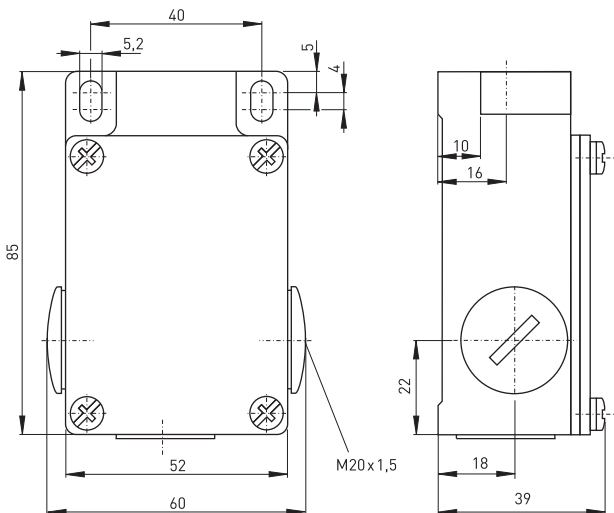
- Metal enclosure
- Slow action $\ominus$, change-over contact or 2 NC contacts with double break
- Snap action, change-over contact with double break
- Available with overlapping contacts
- 3 cable entries M20 x 1.5
- Actuator can be repositioned by 4 x 90°
- Ex version available

// ES/EM 61



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	aluminium die-cast, enamel finish
Degree of protection	IP 65 to IEC/EN 60529
Contact material	silver
Switching system	slow or snap action; slow action positive break NC contacts $\ominus$ change-over contact or 2 NC contacts with double break Zb, galvanically separated contact bridges
Switching elements	
Connection	screw connection terminals
Cable cross-section	max. 2.5 mm ² (incl. conductor ferrules)
Cable entry	3 x M20 x 1.5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	6 kV
U _i	400 V
I _{the}	6 A
Utilisation category	AC-15
I _e /U _e	ES 61: 16 A/400 VAC ES 61 2Ö: 6 A/400 VAC EM 61: 6 A/400 VAC
Max. fuse rating	ES 61: 16 A gG/gN fuse ES 61 2Ö: 6 A gG/gN fuse EM 61: 6 A gG/gN fuse
Mechanical life	> 1 million operations
Frequency of operation	3600/h
Ambient temperature	- 20 °C ... + 80 °C
Repeat accuracy of switching points	± 0,1 mm
Approvals	 



Type code

EM 61 WH 1Ö/1S

 Contact type 1NC/1NO, (2Ö, UE)
 Actuator H (R, HK, D, etc. ...)
 Watertight collar
 Series
 M Snap action (S Slow action)

Position switches with/without safety function

// Series ES/EM 61, actuators

Features/Options

- With gold-plated contacts available on request
- Available on request with plug-in connector M12 x 1, 5-pole

Note

When used as safety switch, secure the enclosure against slipping with appropriate means, e.g. pinning.

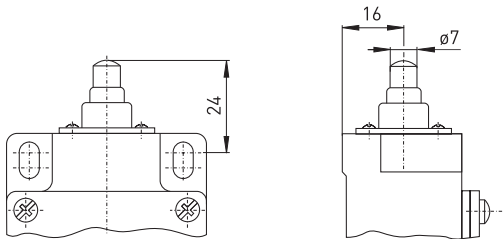
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 15°
- Exact repeatability of switching point
- Watertight collar for protection against penetration of dirt

// Connector M12 x 1, 5-pole



// Plunger with collar W



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 W 10/1S 1047870 	ES 61 W 10/1S 1047803
1 NO/1 NC overlapping Material Number		ES 61 W UE 1047914
2 NC contacts Material Number		ES 61 W 20 1047966



Position switches with/without safety function

// Series ES/EM 61, actuators

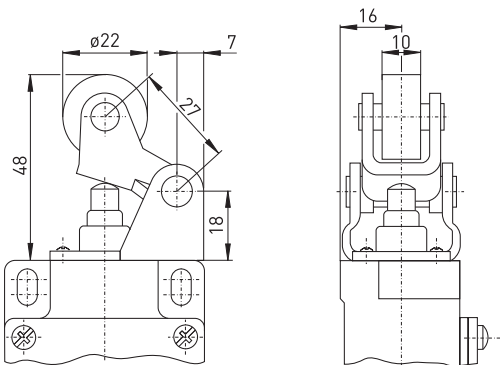
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 25^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Watertight collar for protection against penetration of dirt
- With metal 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



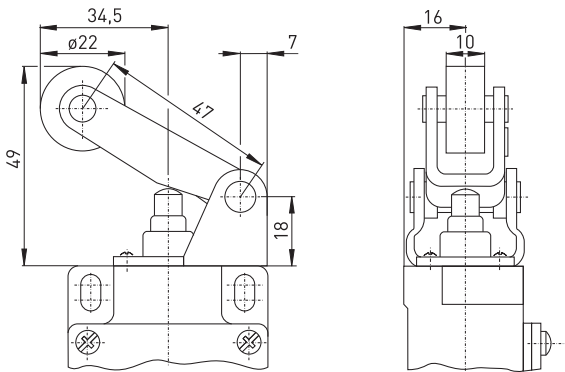
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with a vertical actuating angle of $\alpha = 40^\circ$ and $\beta = 30^\circ$
- Wear-resistant plastic roller
- Actuator can be repositioned by $4 \times 90^\circ$
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

Note

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

// Long roller lever collar WHL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 WH 10/1S 1047876 	ES 61 WH 10/1S 1047807
1 NO/1 NC overlapping Material Number		ES 61 WH UE 1047916
2 NC contacts Material Number		ES 61 WH 20 1047969

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 WHL 10/1S 1047884 	ES 61 WHL 10/1S 1047811
1 NO/1 NC overlapping Material Number		ES 61 WHL UE 1047918
2 NC contacts Material Number		ES 61 WHL 20 1047971



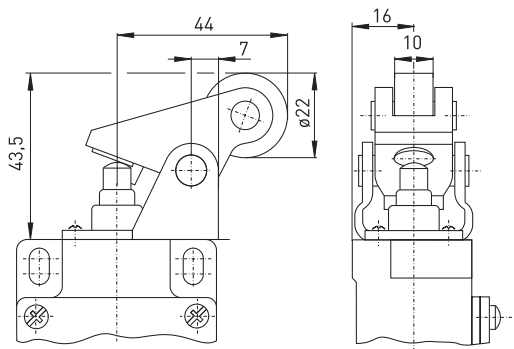
Features/Options

- Safety switch only version with slow action
- Actuating speed max. 0.5 m/s with an actuating angle of 30°
- Actuation parallel to switch from below
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

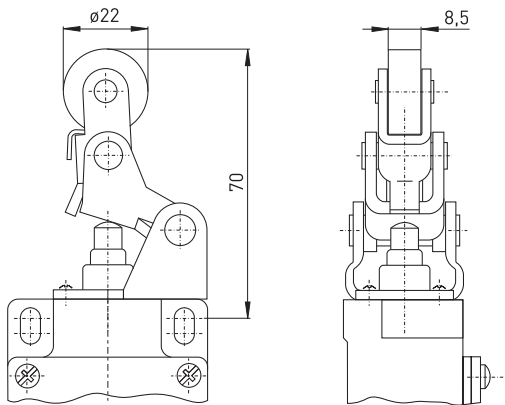
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of α and $\beta = 40^\circ$
- Actuation only possible from right-hand side
- Free movement of actuator from left-hand side
- Wear-resistant plastic roller
- Actuator can be repositioned by 4 x 90°
- Watertight collar for protection against penetration of dirt
- With metal roller available on request

// Parallel roller lever collar WPH



// Offset roller lever collar WHK



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 WPH 10/1S 1047889 	ES 61 WPH 10/1S 1047818
1 NO/1 NC overlapping Material Number		ES 61 WPH UE 1047922
2 NC contacts Material Number		ES 61 WPH 20 1047975

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 WHK 10/1S 1047886 	ES 61 WHK 10/1S 1047816
1 NO/1 NC overlapping Material Number		ES 61 WHK UE 1047920
2 NC contacts Material Number		ES 61 WHK 20 1047973



Position switches with/without safety function

// Series ES/EM 61, actuators

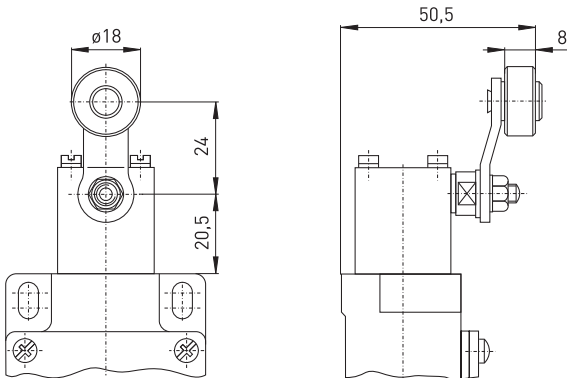
Features/Options

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

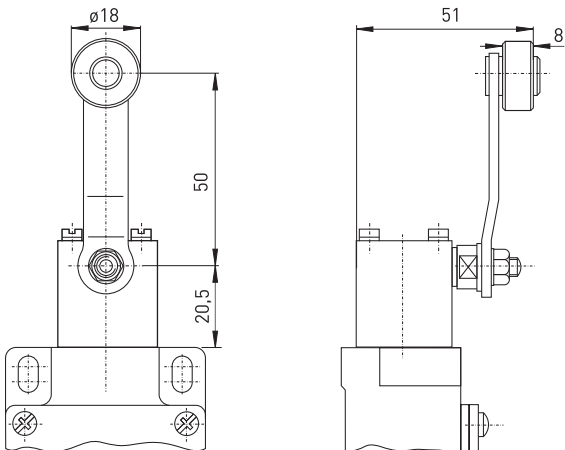
Features/Options

- No safety switch!
- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Wear-resistant plastic 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 lever D



// Long rocking lever DL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 D 10/1S 1047891	ES 61 D 10/1S 1047819
1 NO/1 NC overlapping Material Number		ES 61 D UE 1047923
2 NC contacts Material Number		ES 61 D 20 1163751

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 DL 10/1S 1047895	ES 61 DL 10/1S 1047820
1 NO/1 NC overlapping Material Number		ES 61 DL UE 1047924
2 NC contacts Material Number		ES 61 DL 20 1182267



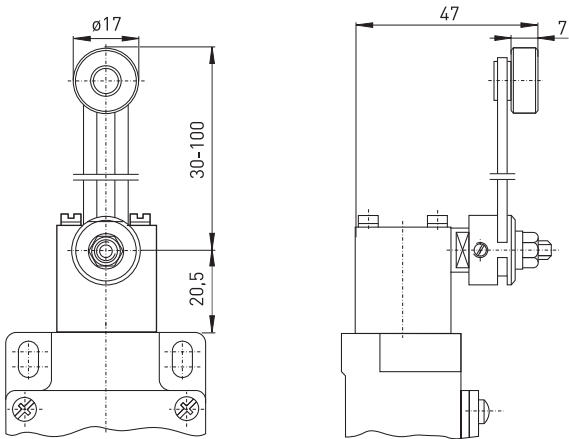
Features/Options

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

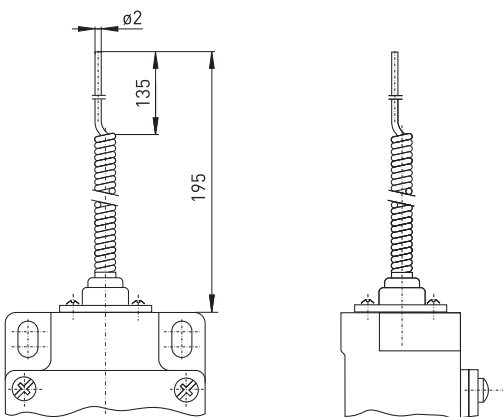
Features/Options

- 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 the spring allows for deflection above the max. switching angle

// Adjustable rocking lever DS



// Long spring rod TL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 DS 10/1S 1047898 	ES 61 DS 10/1S 1047823
1 NO/1 NC overlapping Material Number		ES 61 DS UE 1047927
2 NC contacts Material Number		ES 61 DS 20 1181846

Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 TL 10/1S 1047900 	ES 61 TL 10/1S 1165952
1 NO/1 NC overlapping Material Number		ES 61 TL UE 1052152
2 NC contacts Material Number		ES 61 TL 20 on request



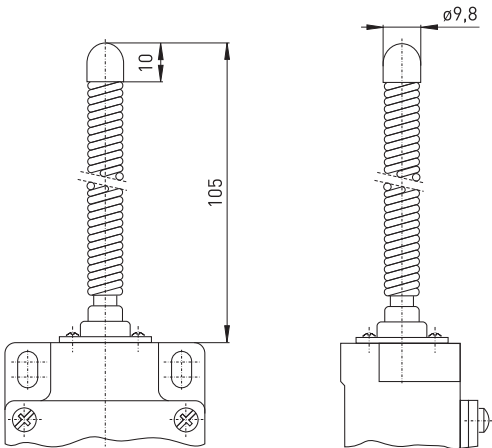
Position switches with/without safety function

// Series ES/EM 61, actuators

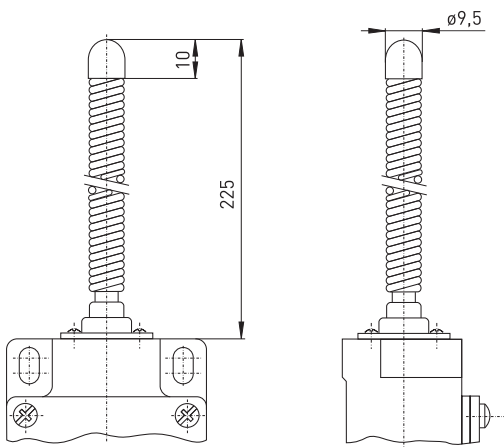
- Features/Options
- No safety switch!
 - With rounded steel tip
 - Spring rod can be actuated from any direction
 - Elasticity of the spring allows for deflection above the max. switching angle

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

// Spring rod with steel tip TF



// Long spring rod with steel tip TFL



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 TF 10/1S 1047902	ES 61 TF 10/1S 1181105
1 NO/1 NC overlapping Material Number		ES 61 TF UE on request
2 NC contacts Material Number		ES 61 TF 20 1175986

Contact variants: switch travel/contacts

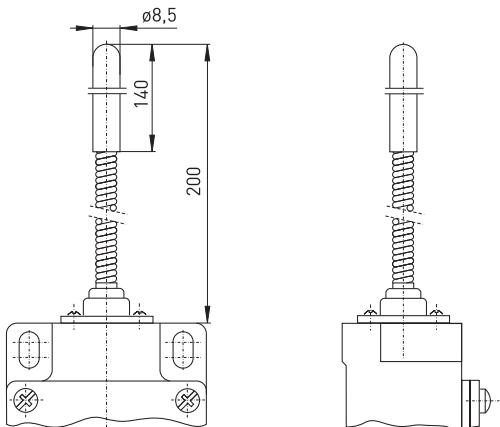
	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 TFL 10/1S 1047908	ES 61 TFL 10/1S 1165960
1 NO/1 NC overlapping Material Number		ES 61 TFL UE on request
2 NC contacts Material Number		ES 61 TFL 20 1160807



Features/Options

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

// Spring rod with plastic tip TK



Contact variants: switch travel/contacts

	Snap action	Slow action
1 NC/1 NO contact Material Number	EM 61 TK 10/1S 1047903 	ES 61 TK 10/1S on request
1 NO/1 NC overlapping Material Number		ES 61 TK UE on request
2 NC contacts Material Number		ES 61 TK 20 on request



Position switches with/without safety function

// Series ES/EM 91

Features/Options

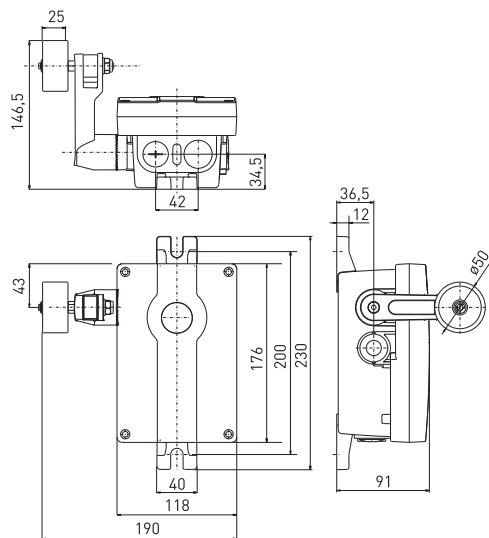
- Thermoplastic enclosure
- Slow or snap action $\ominus$, max. 6 contacts
- 2 cable entries M25 x 1.5
- Versions with rated operating current I_e up to 16 A available on request
- Ex version available

// ES/EM 91 DL



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, UV resistant to EN ISO 4892
Degree of protection	IP 66/67 to IEC/EN 60529
Switch insert	ES 232 or EM 232
Contact material	silver
Switching system	slow or snap action, positive break NC contacts $\ominus$
Switching elements	2 NC/2NO, 4 NC/2 NO or 3 NC/3 NO contacts with double break Zb, galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 2.5 mm ² (incl. conductor ferrules)
Cable entry	2 x M25 x 1.5
B _{10d} (10 % load)	2 million
T _M	max. 20 years
U _{imp}	6 kV
U _i	400 V
I _{the}	6 A
Utilisation category	AC-15
I _e /U _e	6 A/400 VAC
Max. fuse rating	6 A gG/gN fuse
Mechanical life	> 1 million operations
Ambient temperature	-40 °C ... +85 °C



Type code

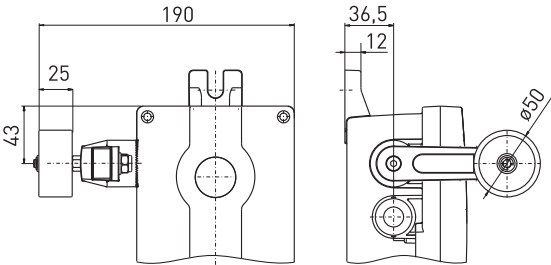
EM 91 DL-2Ö/2S

Contact type 2NC/2NO (4Ö/2S, 3Ö/3S)
 Actuator DL
 Series 91
 M Snap action (S Slow action)

Features/Options

- Actuating speed max. 0.5 m/s with a vertical actuating angle of 45°
- Metal roller
- Lever can be repositioned in 6° steps clockwise or counter-clockwise

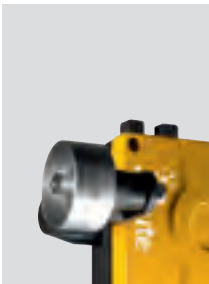
// Long rocking lever DL



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Contact variants: switch travel/contacts

	Snap action	Slow action
2 NC/2 NO contact Material Number	EM 91 DL 2Ö/2S 1211724 	ES 91 DL 2Ö/2S 1242734
4 NC/2 NO contact Material Number	EM 91 DL 1Ö/1S 1242732 	ES 91 DL 1Ö/1S 1215301
3 NC/3 NO contacts Material Number	EM 91 DL 3Ö/3S 1215105 	ES 91 DL 3Ö/3S 1213694



Miniature limit switches

Thermoplastic enclosure

// [Series C 50](#)

from page 132

// [Series C 500](#)

from page 136

// [Series ES 50](#)

from page 140

Miniature limit switches

Range of application

Miniature limit switches are used, for example, in control, regulation, precision engineering and on appliances, as well as motor vehicles.

Design and operating principle

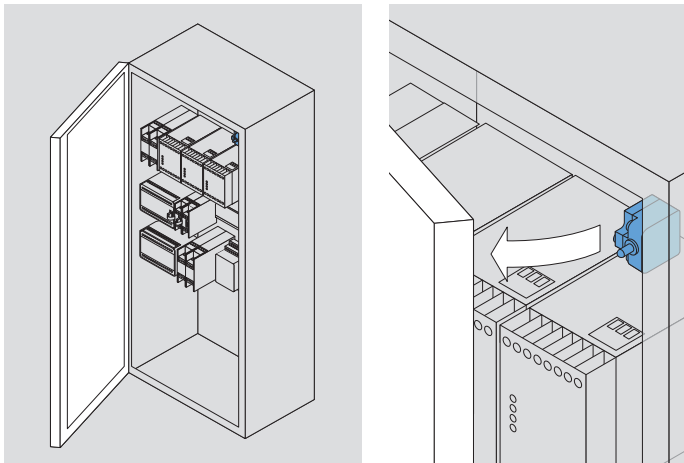
Minimum space requirement, high switching capacity and robust design are some of the many advantages of these miniature limit switches.

The miniature limit switches are available with slow action and are equipped with positive break NC contacts. A large variety of actuators are available. The miniature limit switches all have IP 30 degree of protection.

All miniature limit switches shown in this chapter bear the CE mark according to the Low Voltage Directive 06/95/EC.

Application

Position monitoring of a control cabinet door.



Miniature limit switches

// Series C 50

Features/Options

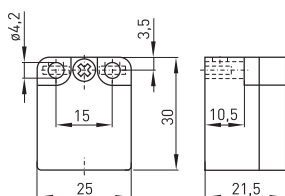
- Thermoplastic enclosure
- Change-over contact with double break, positive break NC contact $\ominus$
- Galvanically separated contact bridges
- Available for top mounting with 2 x M3 tapped holes

// C 50



Technical data

Standards	EN 60947-5-1; EN ISO 18349-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Actuator	plunger: brass
Degree of protection	IP 30 to IEC/EN 60529
Degree of pollution	3
Contact material	silver
Switching system	slow action, positive break NC contact $\ominus$
Switching elements	change-over contact with double break Zb and galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 1.5 mm ²
B _{10d} (10 % Load)	70.000
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	4 A
I _e /U _e	4 A/400 VAC
Utilisation category	AC-15
Max. fuse rating	4 A gG/gN fuse
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy of switching points	± 0.1 mm
Contact opening	2 x 4 mm
Approvals	 



Type code

C 50 R 10/1S

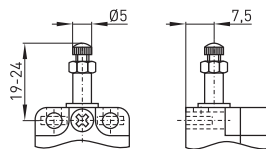
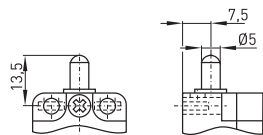
 Contact type 1NC/1NO
 Actuator R (ST, K,)
 Series

Miniature limit switches
// Series C 50, actuators

- Features/Options
- Plunger with knurled-head setting screw
 - Length of metal plunger adjustable for fine adjustment of switching travel

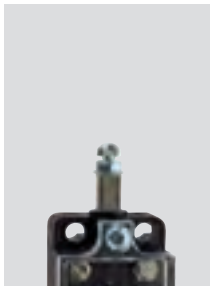
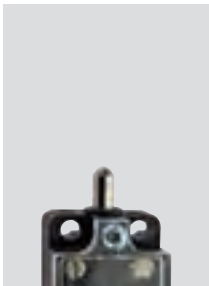
// Plunger

// Adjustable plunger ST



Contact variants: switch travel/contacts		
	Slow action	Material Number
1 NC / 1 NO contact	C 50 10/1S 	1046955

Contact variants: switch travel/contacts		
	Slow action	Material Number
1 NC / 1 NO contact	C 50 ST 10/1S 	1046958



Miniature limit switches // Series C 50, actuators

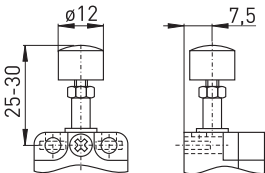
Features/Options

- Adjustable thermoplastic cap
- Large actuating surface
- Safe switching even with imprecise actuation

Features/Options

- Available on request with roller plunger turned 90°

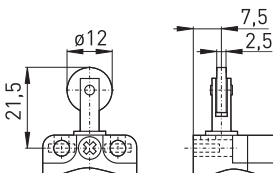
// Cap K



Contact variants: switch travel/contacts

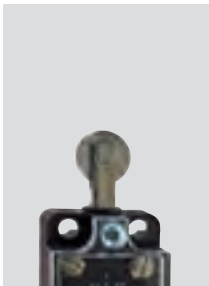
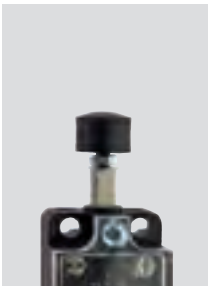
	Slow action	Material Number
1 NC / 1 NO contact	C 50 K 10/1S 02.55 1323-2411-12	1046960

// Roller plunger R



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	C 50 R 10/1S 02.55 1323-2411-12	1046962



Miniature limit switches

// Series C 500

Features/Options

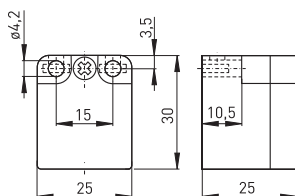
- Thermoplastic enclosure
- Change-over contact with double break, positive break NC contact $\ominus$
- Galvanically separated contact bridges
- Available for top mounting with 2 x M3 tapped holes

// C 500



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Actuator	plunger: brass
Degree of protection	IP 30 to IEC/EN 60529
Degree of pollution	3
Contact material	silver
Switching system	slow action, positive break NC contact $\ominus$
Switching elements	change-over contact with double break Zb and galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 1.5 mm ²
B _{10d} (10 % Load)	70.000
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	4 A
I _e /U _e	4 A/400 VAC
Utilisation category	AC-15
Max. fuse rating	4 A gG/gN fuse
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy of switching points	± 0.1 mm
Contact opening	2 x 4 mm
Approvals	 



Type code

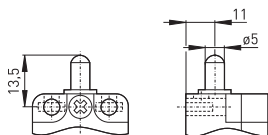
C 500 R 10/1S

Series
Contact type 1NC/1NO
Actuator R (ST)

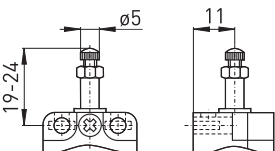
Miniature limit switches
// Series C 500, actuators

- Features/Options
- Plunger with knurled-head setting screw
 - Length of metal plunger adjustable for fine adjustment of switching travel

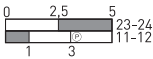
// Plunger



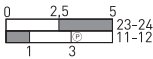
// Adjustable plunger ST

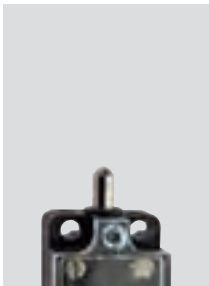


Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	C 500 10/1S 	1046930

Contact variants: switch travel/contacts

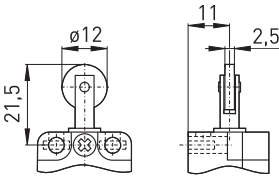
	Slow action	Material Number
1 NC / 1 NO contact	C 500 ST 10/1S 	1046931



Miniature limit switches
// Series C 500, actuators

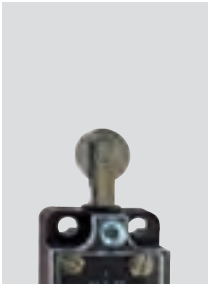
Features/Options
- Available on request with roller plunger turned 90°

// Roller plunger R



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	C 500 R 10/1S	1046932



Miniature limit switches

// Series ES 50

Features/Options

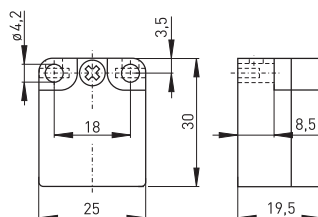
- Thermoplastic enclosure
- Change-over contact with double break, positive break NC contact $\ominus$
- Galvanically separated contact bridges
- Available for top mounting with 2 x M3 tapped holes

// ES 50



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Actuator	plunger: brass
Degree of protection	IP 30 to IEC/EN 60529
Degree of pollution	3
Contact material	silver
Switching system	slow action, positive break NC contact $\ominus$
Switching elements	change-over contact with double break Zb and galvanically separated contact bridges
Connection	screw connection terminals
Cable cross-section	max. 1.5 mm ²
B _{10d} (10 % Load)	70.000
T _M	max. 20 years
U _{imp}	4 kV
U _i	400 V
I _{the}	4 A
I _e /U _e	4 A/400 VAC
Utilisation category	AC-15
Max. fuse rating	4 A gG/gN fuse
Ambient temperature	-20 °C ... +75 °C
Mechanical life	> 1 million operations
Switching frequency	1800/h
Repeat accuracy of switching points	± 0.1 mm
Contact opening	2 x 4 mm
Approvals	



Type code

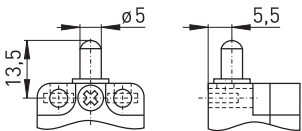
ES 50 R 10/1S

Contact type 1NC/1NO
 Actuator R (ST, K, J)
 Series
 S Slow action

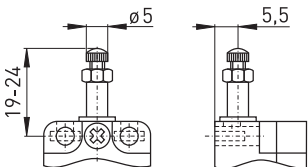
Miniature limit switches
// Series ES 50, actuators

- Features/Options
- Plunger with knurled-head setting screw
 - Length of metal plunger adjustable for fine adjustment of switching travel

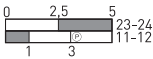
// Plunger



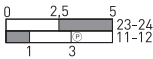
// Adjustable plunger ST

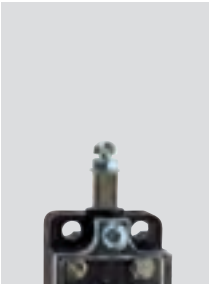
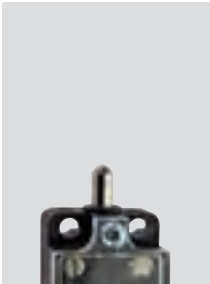


Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 50 10/1S 	1046984

Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 50 ST 10/1S 	1046989



Miniature limit switches // Series ES 50, actuators

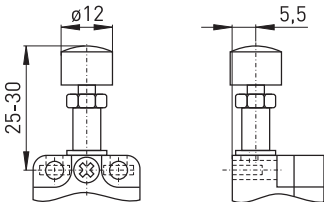
Features/Options

- Adjustable thermoplastic cap
- Large actuating surface
- Safe switching even with imprecise actuation

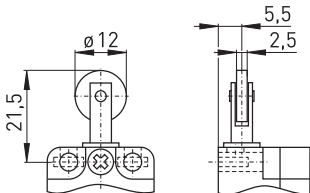
Features/Options

- Available on request with roller plunger turned 90°

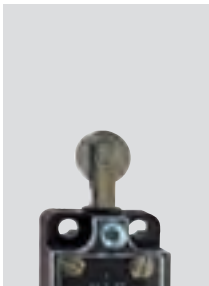
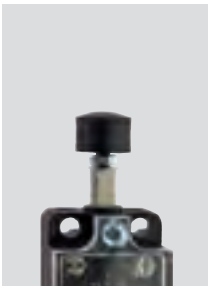
// Cap K

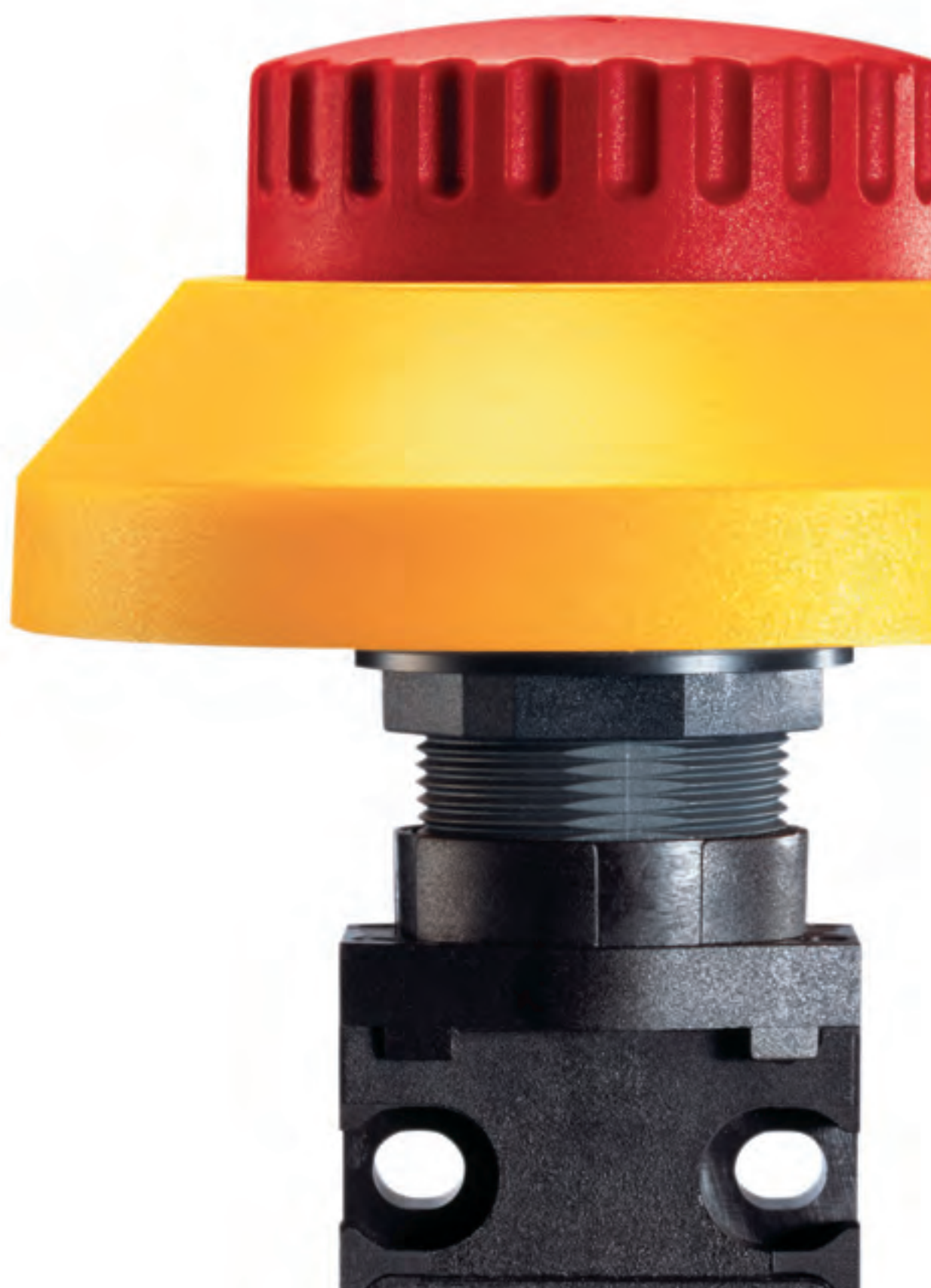


// Roller plunger R



Contact variants: switch travel/contacts			Contact variants: switch travel/contacts		
	Slow action	Material Number		Slow action	Material Number
1 NC / 1 NO contact	ES 50 K 10/1S 	1046991	1 NC / 1 NO contact	ES 50 R 10/1S 	1046992





Command devices

Thermoplastic enclosure
// [Series ES 14](#)
from page 148

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Command devices

Range of application

Command devices are mounted in switchboards, control panels, two-hand control panels 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.

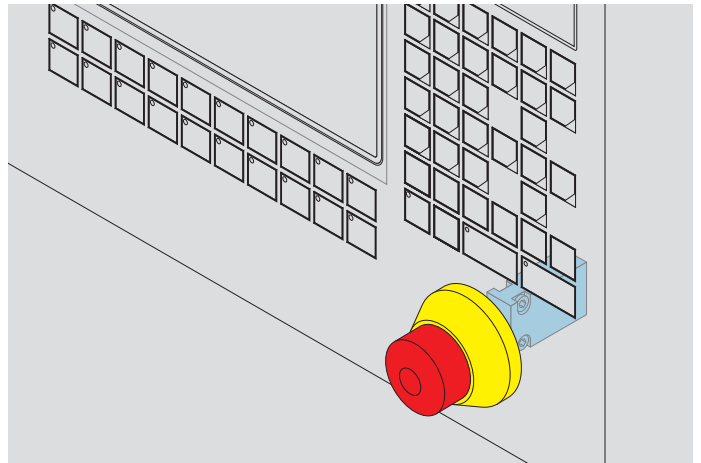
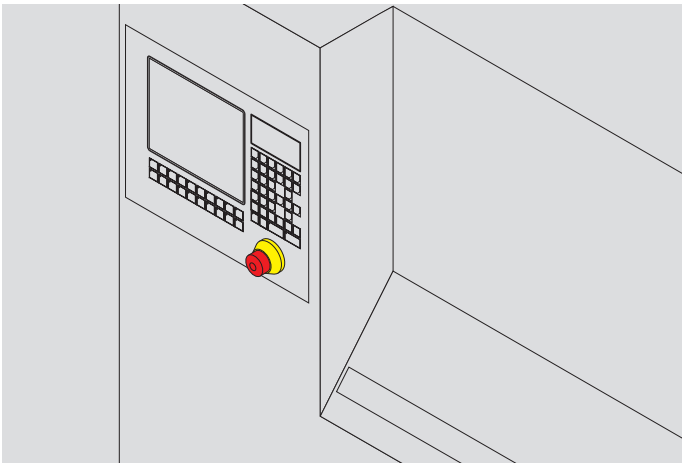
Design and operating principle

The command devices are fit for $\varnothing 22.5$ mm mounting holes and suitable for spacings of 30 mm between centres. All command devices provide degree of protection IP 65/67 and are double insulated for class II.

The actuator is connected to the ES14 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 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.

Application



Command devices

// Series ES 14

Features/Options

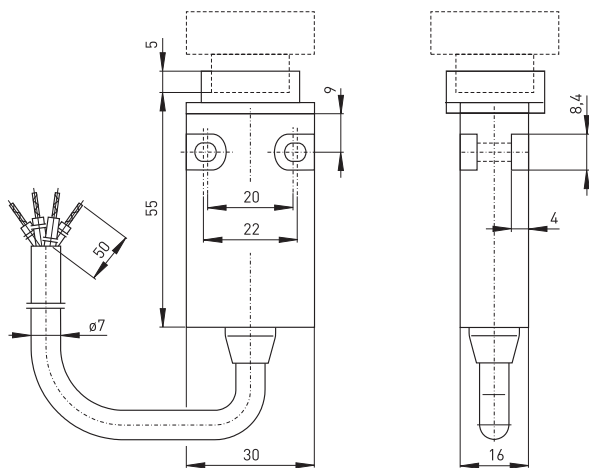
- Thermoplastic enclosure
- Double insulated □
- Slow action ⊖, change-over contact or 2 NC contacts with double break
- Overlapping contacts available
- Mounting hole diameter 22.5 mm
- With pre-wired cable, cable length 1 meter
- Ex version available

// ES 14



Technical data

Standards	EN 60947-5-1; EN ISO 13849-1
Enclosure	glass-fibre reinforced, shock-proof thermoplastic, self-extinguishing UL 94-V0
Degree of protection	IP 65/67 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, galvanically separated contact bridges
Connection	cable H05VV-F
Cable cross-section	4 x 0.75 mm ²
B _{10d} (10 % load)	60 000
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 ... +75 °C
Mechanical life	>30 000 operations
Frequency of operation	1800/h
Contact opening	2 x 4 mm
Approvals	 



Type code

ES 14 RUV-S 10/IS-1m

- Cable length 1 m
- Contact type 1NC/1NO (2Ö)
- Cable on side
- Actuator RUV (RT, RSSA, RW, etc. ...)
- Series
- S Slow action

Command devices
// Series ES 14, actuators

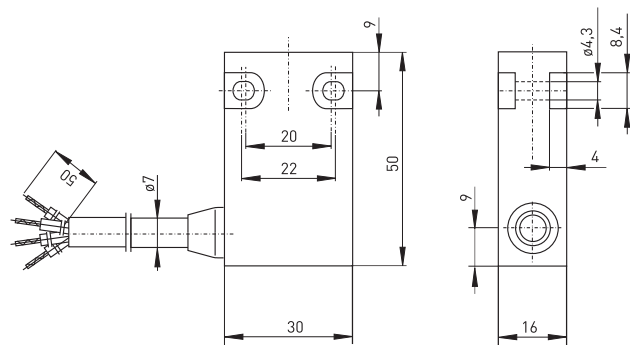
Features/Options
- With gold-plated contacts available on request

Features/Options
- With pre-wired cable, cable length 1 meter
- Degree of protection IP 65

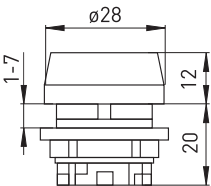
// Connector M12 x 1, 4-pole



// Cable on side



// Push-button RT



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 14 RT 	1051617



Command devices // Series ES 14, actuators

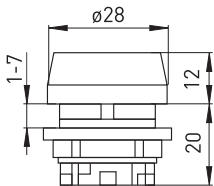
Features/Options

- Diaphragm of transparent silicon material
- IP 67 for actuators with diaphragm
- With pre-wired cable, cable length 1 meter

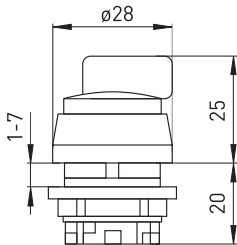
Features/Options

- Selector with rest positions
- Available in 3 different versions
- Degree of protection IP 65
- With pre-wired cable, cable length 1 meter

// Push-button with diaphragm RTM



// Selector RW



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 14 RTM 	1052982

Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 14 RW ... 	
2 switching positions Switching angle 90° 0 - I or I - II	ES 14 RWA 0 - I ES 14 RWA I - II 	1178655 1178656
3 switching positions Switching angle - 45° + 45° I - 0 - II	ES 14 RWB I - 0 - II 	1178657
Control switch actuated selector Left-hand side switching, right-hand side stroke Switching angle - 45° + 45° I - 0 ← II	ES 14 RWC I - 0 ← II 	on request

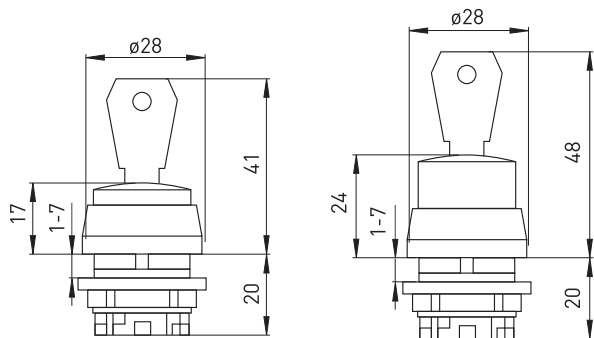
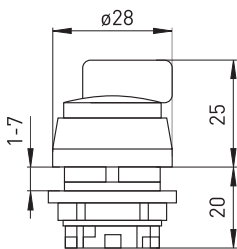


- Features/Options**
- RST with spring return
 - Available in 2 different versions
 - Degree of protection IP 65
 - With pre-wired cable, cable length 1 meter

- 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
 - Degree of protection IP 65
 - With pre-wired cable, cable length 1 meter

// Control switch RST

// Key switch RSSA



Contact variants: switch travel/contacts

Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 14 RST ... BK — GY BU — BN	
Switching angle 90° with return to left position, 0 ← I	ES 14 RSTA 0 ← I BK-GY BN-BU	on request
Switching angle - 45° + 45° with return to central position I → 0 ← II	ES 14 RSTB I → 0 ← II BK-GY BN-BU	1184714

	Slow action	2 switching positions	3 switching positions
1 NC / 1 NO contact		ES 14 RSSA ... BK-GY BN-BU	BK-GY BN-BU
Key switch			
Material Number		ES 14 RSSA 14 1045513 	ES 14 RSSA 12 on request
Material Number		ES 14 RSSA 15 1045514 	ES 14 RSSA 13 1178658
Material Number		ES 14 RSSA 17 on request 	ES 14 RSSA 23 on request
Material Number		ES 14 RSSA 18 on request 	ES 14 RSSA 24 on request
Material Number		ES 14 RSSA 27 on request 	

- Legend**
- I — Switching position
 - ↺ — Spring return
 - — Position for key removal



Command devices // Series ES 14, actuators

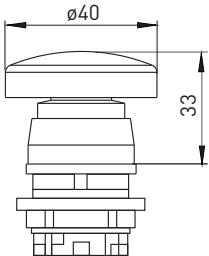
Features/Options

- Thermoplastic actuator
- Degree of protection IP 65
- With pre-wired cable, cable length 1 meter

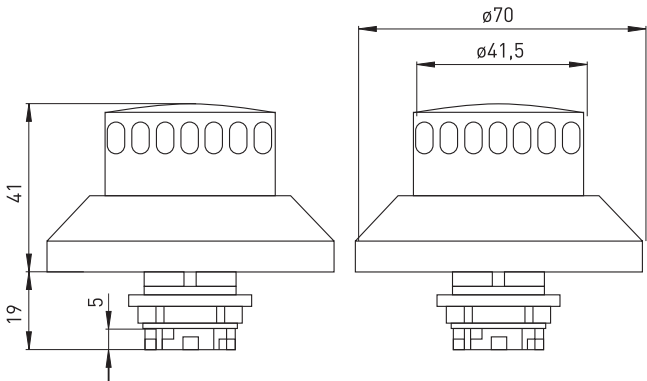
Features/Options

- Thermoplastic actuator
- To EN 13850
- 1 NC contact and 1 NO contact, double break, type Zb
- Projection from front of panel 41 mm
- With collar to prevent blocking
- Reset by turning clockwise
- With pressure-point to protect against unintentional actuation
- Degree of protection IP 65
- With pre-wired cable, cable length 1 meter

// Push-button RS SW



// Emergency-stop push-button RUV



Contact variants: switch travel/contacts

	Slow action	Material Number
1 NC / 1 NO contact	ES 14 RS SW BK — GY BU — BN	1179171
2 NC contacts	ES 14 RS SW 2Ö BK — GY BU — BN	on request

Contact variants: switch travel/contacts

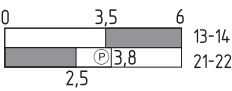
	Slow action	Material Number
1 NC / 1 NO contact	ES 14 RUV BK — GY BU — BN	1045525
2 NC contacts	ES 14 RUV 2Ö BK — GY BU — BN	1053257



LEGEND

	A/F
	Double insulated
	Positive break NC contact
	Positive break travel/angle
	Actuated
	Not actuated
	CSA/UL approval, Canada
	TÜV approved
	Trade association type-tested
	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 the switch travel diagrams



 Contact opened
 Contact closed

X1-X2	NC contacts
X3-X4	NO contacts
X5-X6	Contact overlapping

Color 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

steute

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steute develops and manufactures safe switchgear for demanding and critical application. Besides a comprehensive standard range of products for »Wireless, Automation, Extreme and Meditec« applications, we also and increasingly develop customised switchgear for extreme conditions in all four business fields. Some examples: emergency pull-wire switches for the mining industry, position switches for industrial automation and control panels for laser surgery. Our head office is in Löhne, Westphalia, Germany; worldwide sales are conducted through steute's subsidiaries and trading partners.