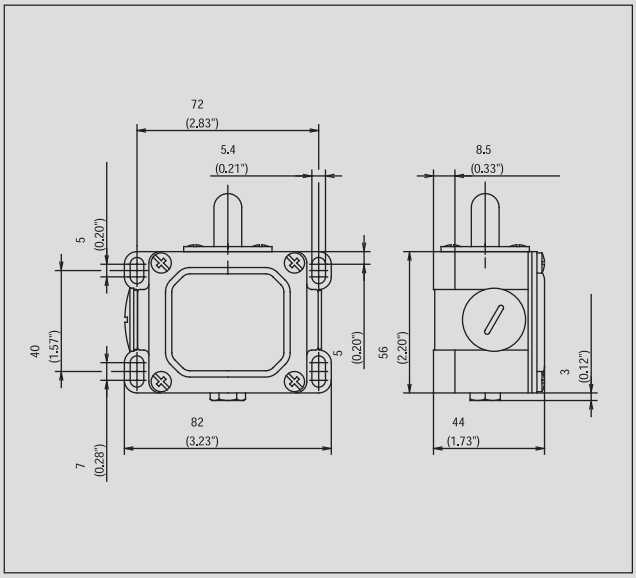
Metal-Enclosed Limit Switches

D



Recommended use

Heavy duty enclosure for harsh operating conditions with particularly tough design of actuator and switching systems.

Product advantages

- Protection class IP65 to VDE 0470 T1
- Enclosure: Aluminium pressure die-casting
- Cover: Sheet aluminium
- Actuator can be repositioned by 4 x 90° (depending on type)
- Cable entries 2x M20 x 1.5
- Connection designation conforming to DIN EN 50013
- Sturdy contacts
- Hard wearing guide bushes

Options

- AS interface versions on request
- Preassembled with customer-specific cables and connectors on request

Design layout

- Slow-action and snap-action contacts
- Versions: 1 NC / 1NO, 2 NC, 2 NO, 3 NC, 3 NO, overlapping contacts
- All NC contacts with ⊖ in the circuit diagram are positively opening contacts
- Latching function on request

Mounting

- 4 slots for M5 screws

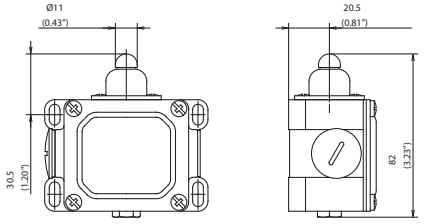
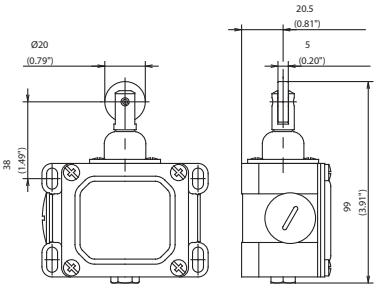
Installation advantages

- 2 cable entries for through-wiring
- Generously dimensioned connection space
- Captive cover screws

Technical data

Electrical data		
Rated insulation voltage	U_i max.	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A
Rated operating voltage	U_e max.	240 V
Utilization category		AC-15, U_e/I_e 240 V/3 A
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		I
Mechanical data		
Enclosure material		Aluminium pressure die-casting
Ambient temperature		–30 °C to + 80 °C
Mechanical service life		10 x 10^6 switching cycles
B10d		20 Mill.
Switching frequency		≤ 100/min.
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		2 x M20 x 1.5
Protection class		IP65 conforming to IEC/EN 60529
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 72 – 75.

	W	RW
		

Switching operation	Slow-action	Snap-action	Slow-action	Snap-action
1 NC / 1 NO contact	**6041103002** D-U1 W	**6041153156** D-SU1 W	**6041118229** D-U1Z RW	**6041168162** D-SU1 RW
2 NC contacts	**6041803090** D-A2 W		**6041818741** D-A2Z RW	
2 NO contacts	**6041803046** D-E2 W		**6041818052** D-E2 RW	
1 NC / 1 NO contact Overlapping	**6041303134** D-UV1Z W		**6041318140** D-UV1Z RW	
Approvals				

Replacement actuator: -

Replacement actuator: –

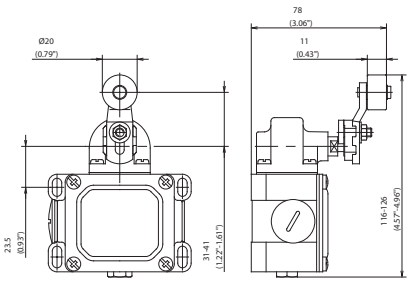
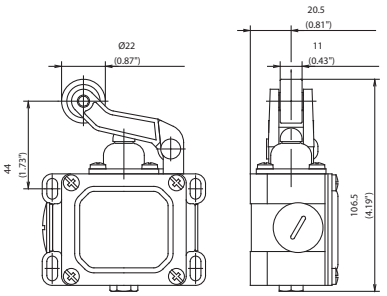
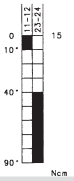
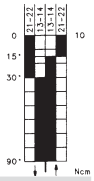
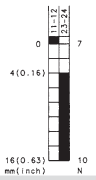
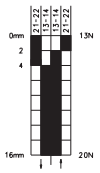
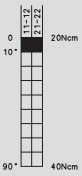
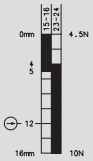
Special features / variants
(on request)

- Also available with following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

Special features / variants
(on request)

- Available for high temperature range
- With following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

D

	AH		HW	
				
Switching operation	**Slow-action**	**Snap-action**	**Slow-action**	**Snap-action**
1 NC / 1 NO contact	**6041135019** D-U1 AH 	**6041185173** D-SU1 AH 	**6041121010** D-U1 HW 	**6041171164** D-SU1 HW 
2 NC contacts	**6041835107** D-A2 AH 			
2 NO contacts				
1 NC / 1 NO contact Overlapping			**6041321142** D-UV1Z HW 	
Approvals				

Replacement actuator: 3914350924

Special features / variants
(on request)

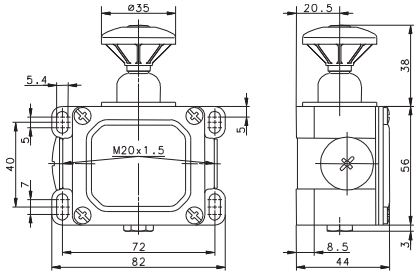
- With steel roller, various roller diameters
- Cranked or straight lever
- Different lever lengths
- Also available with following contacts:
  3 NC contacts
  2 NC / 2 NO contact

Replacement actuator: 3914211065

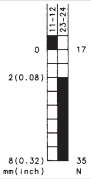
Special features / variants
(on request)

- Available for high temperature range
- With following contacts:
  3 NC contacts
  2 NC / 2 NO contact
  (larger enclosure)

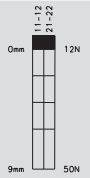
PW



Slow-action



6041113006
D-U1 PW



6041813835
D-A2Z PW

Replacement actuator: –

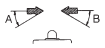
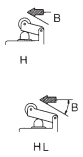
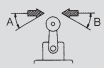
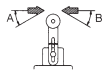
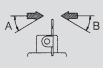
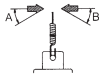
Special features / variants
(on request)

- Also available with following contacts:
  3 NC contacts
  3 NO contacts
  2 NC / 2 NO contact
  (larger enclosure)

Overview of Actuators

Actuator	Designation	Collar iw = internal w = external	Plastic series COMBI	TINY 2	IN62 IN65	BIGGY 2	ENK	Metal series GC I	SN 2	ENM 2	D I
Plunger	–	iw	–	–	–	–	●	–	–	–	–
	–	w	–	●	●	●	–	–	–	–	–
	–	IP30	●	–	–	–	–	–	–	–	–
	–	IP43	–	–	–	–	–	–	–	–	○
Ball	KU	iw	–	–	–	–	–	○	○	○	–
Mushroom head	P	w	–	–	–	–	–	–	–	–	●
Telescopic plunger	L	iw	–	–	–	–	–	●	○	○	–
Adjustable plunger	ST	w	–	–	–	–	–	●	○	○	●
	SM	iw	–	–	●	–	–	–	–	–	–
	SK	w	–	–	●	–	–	–	–	–	–
Plunger	ST	iw	–	–	–	–	–	●	○	○	–
	ST	IP30	●	–	–	–	–	–	–	–	–
Button	K	IP30	●	–	–	–	–	–	–	–	–
Roller	R	IP30	●	–	–	–	–	–	–	–	–
	R	iw	–	●	○	●	●	●	●	●	–
	RK	iw	–	–	●	–	–	–	–	–	–
		w	–	–	–	–	–	–	–	–	●
		IP43	–	–	–	–	–	–	–	–	○
Roller, long	R ... L	iw	–	○	●	○	–	–	–	–	–
Roller, short	R ... K	iw	–	○	●	○	–	–	–	–	–
Lever	H	IP30	●	–	–	–	–	–	–	–	–
	H	w	–	●	●	●	●	–	–	–	–
	H, HT	iw	–	–	–	–	–	●	○	○	–
	HK	iw	–	–	●	–	–	–	–	–	–
Lever, long	H/D-WI	w	–	–	–	–	–	●	●	○	●
	HL	iw	–	–	–	–	–	●	○	○	–
	HL/D-H	w	–	–	–	–	–	●	○	○	●
	D – H	IP43	–	–	–	–	–	–	–	–	○
Pivot joint, lever	DGH	w	–	○	●	○	○	○	●	●	–
	DGHK	iw	–	–	●	–	–	–	–	–	–
Pivot joint, cranked lever	DGK	w	–	○	●	○	○	○	●	●	–
	DGKK	iw	–	–	●	–	–	–	–	–	–
Cranked lever	KN	iw	–	–	–	–	–	●	○	○	–
	KN	w	–	○	●	○	–	●	○	○	○
	KNK	iw	–	–	●	–	–	–	–	–	–
Cranked lever link	KG	iw	–	–	–	–	–	●	○	○	–
	KG	w	–	○	●	○	–	●	○	○	–
Double roller	DR	iw	–	–	–	–	–	●	○	○	–
Spring feeler	FF	iw	–	–	–	–	–	●	●	○	–
	FF	w	–	●	○	●	●	–	–	–	–
Spring feeler, long	FFL	w	–	–	–	–	–	●	○	○	–
Spindle-mounted lever	AH	iw	–	●	–	●	–	●	○	○	●
	AHK	iw	–	–	●	–	–	–	–	–	–
Spindle-mounted lever, star clamping	AHS	iw	–	●	●	●	–	○	●	○	–
Spindle-mounted lever, star clamping, rubber roller	AHSGU	iw	–	–	●	–	●	–	–	–	–
Spindle-mounted lever, star clamping, fine spline	AHS-V	iw	–	–	–	–	●	○	●	●	–
Spindle-mounted lever for positive opening in forward/return dir.	AHZ	iw	–	–	–	–	–	○	○	●	–
Spindle-mounted lever, adjustable	AV	iw	–	●	–	●	●	●	○	●	●
	AVK	iw	–	–	●	–	–	–	–	–	–
Spindle-mounted lever, wire	AD	iw	–	●	–	●	●	●	○	●	○
	AHDM	iw	–	–	●	–	–	–	–	–	–
Spindle-mounted lever, spring	AF	iw	–	○	–	○	○	●	●	○	–

● Catalogue type (stock type or delivery time as per agreement) ○ Technical possible from modular system (from system layout) – Not included in design

Approach direction	Plunger direction	Approach speed/approach angle							Remarks
			m/s	0,1	0,5	1	2	5	
	⇩	Metal	A	20°	20°	10°	5°	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	20°	20°	10°	5°	–	
		Plastic	A	20°	20°	10°	5°	–	
			B	20°	20°	10°	5°	–	
	⇩	Metal	A	30°	5°	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction** ● Plunger tip adjustable in ST version
			B	30°	5°	–	–	–	
		Plastic	A	30°	5°	–	–	–	
			B	30°	5°	–	–	–	
	⇩	Metal	A	30°	30°	20°	10°	5°	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	30°	30°	20°	10°	5°	
		Plastic	A	30°	30°	20°	10°	5°	
			B	30°	30°	20°	10°	5°	
	⇩	Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel/force refer **to plunger direction**
			B	20°	20°	10°	–	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	30°	20°	10°	
	⇩	Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel / force refer **to plunger direction** ● Adjustable upper section of actuator with roller
			B	20°	20°	10°	–		
		Plastic	A	–	–	–	–	–	
			B	40°	40°	30°	20°	10°	
	⇩	Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel / force refer to **90° to plunger direction** ● Adjustable upper section of actuator with roller
			B	30°	30°	20°	10°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
	⇩	Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel / force refer to **90° to plunger direction**
			B	30°	30°	20°	10°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
	⇩	Metal	A	–	–	–	–	–	● The values shown in the switching diagrams for switching travel / force refer **to plunger direction**
			B	40°	40°	30°	20°	–	
		Plastic	A	–	–	–	–	–	
			B	40°	40°	40°	30°	20°	
	⇩	Metal	A	45°	45°	40°	30°	–	● The values shown in the switching diagrams for switching travel / force refer **to direction of rotation** ● Switch position retained after actuation
			B	45°	45°	40°	30°	–	
		Plastic	A	–	–	–	–	–	
			B	–	–	–	–	–	
	⇩	Metal	A	60°	50°	45°	–	–	● The values shown in the switching diagrams for switching angle / actuation torque refer **to any approach direction** ● Not suitable for personal protection
			B	–	–	–	–	–	
		Plastic	A	20°	20°	10°	5°	–	
			B	–	–	–	–	–	
	⇩	Metal	A	45°	45°	45°	40°	30°	● The values shown in the switching diagrams for switching angle / actuation torque refer **to direction of rotation** ● Graduated adjustment of roller lever on spindle with 180° repositioning
			B	45°	45°	45°	40°	30°	
		Plastic	A	45°	45°	45°	40°	30°	
			B	45°	45°	45°	40°	30°	
	⇩	Metal	A	45°	45°	45°	40°	30°	● The values shown in the switching diagrams for switching angle / actuation torque refer **to direction of rotation** ● Graduated adjustment of roller lever on spindle with 180° repositioning ● Not suitable for personal protection
			B	45°	45°	45°	40°	30°	
		Plastic	A	45°	45°	45°	40°	30°	
			B	45°	45°	45°	40°	30°	
	⇩	Metal	A	45°	45°	40°	30°	20°	● The values shown in the switching diagrams for switching angle / actuation torque refer **to direction of rotation** ● Graduate adjustment of rod about pivot axis and in longitudinal direction
			B	45°	45°	40°	30°	20°	
		Plastic	A	45°	45°	40°	30°	20°	
			B	45°	45°	40°	30°	20°	
	⇩	Metal	A	45°	45°	40°	30°	20°	● The values shown in the switching diagrams for switching angle / actuation torque refer **to direction of rotation** ● Graduated adjustment of spring about pivot axis ● Not suitable for personal protection
			B	45°	45°	40°	30°	20°	
		Plastic	A	45°	45°	40°	30°	20°	
			B	45°	45°	40°	30°	20°	

Limit Switch – Spindle-Mounted Lever

Switching devices with spindle-mounted lever enclosure

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams.

Adaptation of basic actuator setting on spindle

The basic setting of the device can be varied in steps and fixed for exact positioning:

- AH, AHS, AHZ, AF, AD, AV:
  Adjustment in steps of 15° (Fig. 1)
- AHS-V:
  Adjustment in steps of 7.5° or 15° (only here ⊖) by repositioning the intermediate piece (Fig. 2)
- Adaptation AV, AD:
  Adjustment in radial direction
- AH, AHS, AHS-V, AHZ, AV:
  The roller levers can be used in a different axial actuating plane by repositioning by 180° (Fig. 3 and 4)

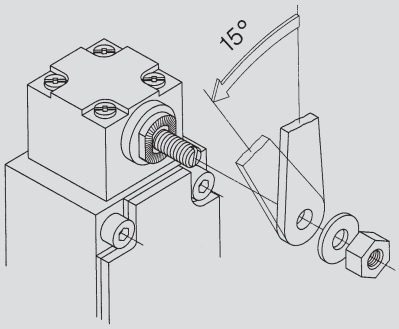


Fig.1

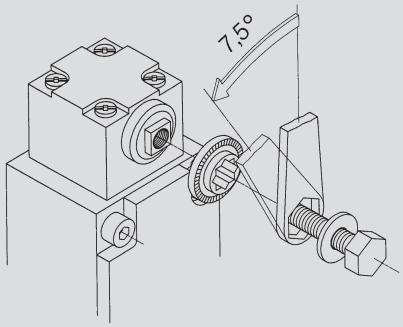


Fig. 2

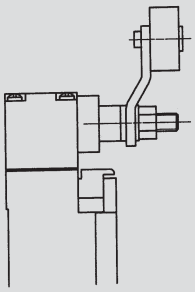


Fig. 3

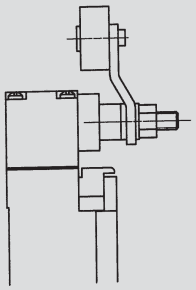


Fig. 4

Adaptation of direction-independent switching function

With actuators AHS, AHS-V, AV, AD.

On delivery, contact-making takes place in both pivot directions corresponding to the switching diagrams. An idle function in the required pivot direction is achieved by simply repositioning the actuator cam (Fig. 5 and 6).

The idle function can be used in control systems that cannot process successive rebound pulses caused by oscillatory movement of extremely long AV/AD actuators.

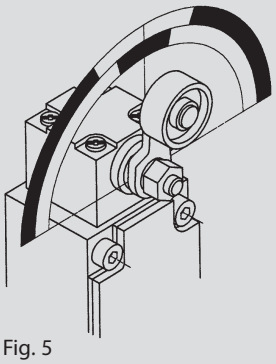


Fig. 5

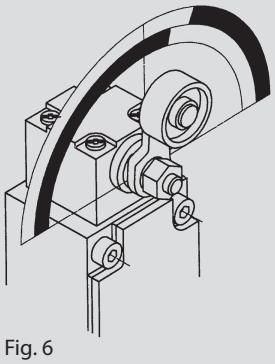


Fig. 6

Positive opening action Forward and return AHZ

For special safety applications, the positive opening action of the normally-closed contacts takes place both in forward (moving in one direction) as well as in return (moving back to home position) direction. For personal protection applications movement of the roller must be restrained in a guide block in both directions (Fig. 7 and 8).

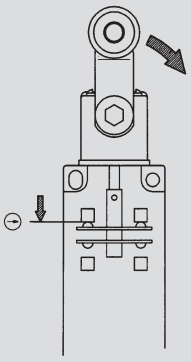


Fig. 7

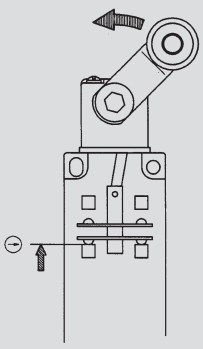


Fig. 8

Note on changing actuators AH, AHS, AHS-V, AHZ, AF, AD, AV, DGH, DGK

The guaranteed as-delivered properties change when the actuation directions are adjusted and when actuators are repositioned by 90°.

The user himself must ensure that the device achieves safe operation for its intended purpose.

Accessories for Insulation-Enclosed Limit Switches

The Finger guard help to prevent the user from an electric shock.

The guide element allows additional support to the rear of the switch.

Article	Finger guard	Guide element
Series	Biggy 2, ENK	IN62 / IN65 / I81
Article number	3595900060	3515900209

The mounting plate allows IN62 / IN65 / I81 switches to be din rail mounted in control enclosures.

Article	Mounting plate, control cabinet	Sealed cable gland	
Series	IN62 / IN65	M16	M20
Article number	3595900087	3998000120	3998000121

Article	NPT adapter M16 on 1/2" (NPT 14)	NPT adapter M20 on 1/2" (NPT 14)
Series	Various families	Various families
Article number	3998000115	3998000116

Electrical data

Type 1 switches

Slow-action contact			C2 / Ti2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact	1NC/1S	U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact, overlapping	1NC/1S	UV1Z	–	–	–	–	–	–	–	–
Normally-open contact	2S	E2	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–	–	–

Snap-action contact			C2 / Ti2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Changeover contact	1NC/1S	SU1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A
Normally-open contact	2S	SE2	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–	–	–

Slow-action contact			Bi2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.	400 V	5 A
Changeover contact	1NC / 1NO	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	400 V	10 A
Changeover contact, overlapping	1NC / 1NO	UV1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	E2	–	–	–	–	–	–	–	–

Snap-action contact			Bi2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–	–	–
Changeover contact	1NC / NO	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	SE2	–	–	–	–	–	–	–	–

Slow-action contact			GC							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	A2Z	400 V	6 A	–	Fuse 6 A gL/gG	1×10^5	0,2mill.①	400 V	10 A
Changeover contact	1NC / 1NO	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.②	400 V	10 A
Changeover contact, overlapping	1NC / 1NO	UV1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.	–	–
Normally-open contact	2S	E2	400 V	6 A	–	Fuse 6 A gL/gG	3×10^6	–	–	–

① 6021820175 GC-A2 HIW = 20 million ② 60121100622 GC-U1Z VKS, 6121100623 GC-U1Z VKW = 2 million

Snap-action contact			GC							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–	–	–
Changeover contact	1NC / 1NO	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A
Normally-open contact	2S	SE2	–	–	–	–	–	–	–	–

IF				I88					
Utilization category	Short-circuit protection	Mechanical service life	B10d	U_i	I_{the}	Utilization category	Short-circuit protection	Mechanical service life	B10d
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	–

*6116819140 I88-U1Z KS, 6186103005 I88-U1Z W RAST = 2 million

IF				I88					
Utilization category	Short-circuit protection	Mechanical service life	B10d	U_i	I_{the}	Utilization category	Short-circuit protection	Mechanical service life	B10d
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–	–	–	–	–	–	–

ENK			
Utilization category	Short-circuit protection	Mechanical service life	B10d
AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–

*6181135251 ENK-U1Z AHSGU RAST RO50 = 2 million

ENK			
Utilization category	Short-circuit protection	Mechanical service life	B10d
–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–

SN2				ENM2					
Utilization category	Short-circuit protection	Mechanical service life	B10d	U_i	I_{the}	Utilization category	Short-circuit protection	Mechanical service life	B10d
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	10×10^6	20 mill.	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	–	20 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.*
–	–	–	–	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	–

*6087135013 ENM2-U1Z AHS-V, 6087135030 ENM2-U1Z AHZ = 2 million

SN2				ENM2					
Utilization category	Short-circuit protection	Mechanical service life	B10d	U_i	I_{the}	Utilization category	Short-circuit protection	Mechanical service life	B10d
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	6 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 2 A gL/gG	10×10^6	20 mill.
–	–	–	–	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	3×10^6	–

Electrical data

Type 1 switches

Slow-action contact			D					
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Changeover contact	1NC/1S	U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Changeover contact, overlapping	1NC/1S	UV1Z	400 V	16 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Normally-open contact	2S	E2	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	–

Snap-action contact			D					
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**
			–	–	–	–	–	–
Normally-closed contact	2NC	SA2Z	–	–	–	–	–	–
Changeover contact	1NC/1S	SU1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	10×10^6	20 mill.
Normally-open contact	2S	SE2	–	–	–	–	–	–

Type 2 switches

Slow-action contact			SKT							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z								
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A DC-13 U_e/I_e 250V / 0.27 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	250 V	10 A
Changeover contact	1NC/1S	U1/U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A DC-13 U_e/I_e 250V / 0.27 A	Fuse 6 A gL/gG	A* $\times 10^6$ B* 1×10^5	2 mill.	250 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	250 V	5 A	–	–	–	–	250 V	5 A
									*A = Standard; B = Increased actuating force	

Slow-action contact			SK							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z	–	–	–	–	–	–	–	–
Normally-closed contact	2NC	A2Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.		
Changeover contact	1NC/1S	U1/U1Z	250 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	250 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	400 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.	–	–

Slow-action contact			ENM2							
Switching function	**Switching contacts**	**Designation**	**U_i**	**I_{the}**	**Utilization category**	**Short-circuit protection**	**Mechanical service life**	**B10d**	**U_i**	**I_{the}**
Normally-closed contact	1NC	A1Z	–	–	–	–	–	–	–	–
Normally-closed contact	2NC	A2Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.	400 V	6 A
Changeover contact	1NC/1S	U1/U1Z	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	400 V	10 A
Changeover contact, overlapping	2NC/1S	UV15Z	250 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.		

U_i Rated insulation voltage
I_{the} Conventional thermal output from devices in enclosure

BERNSTEIN

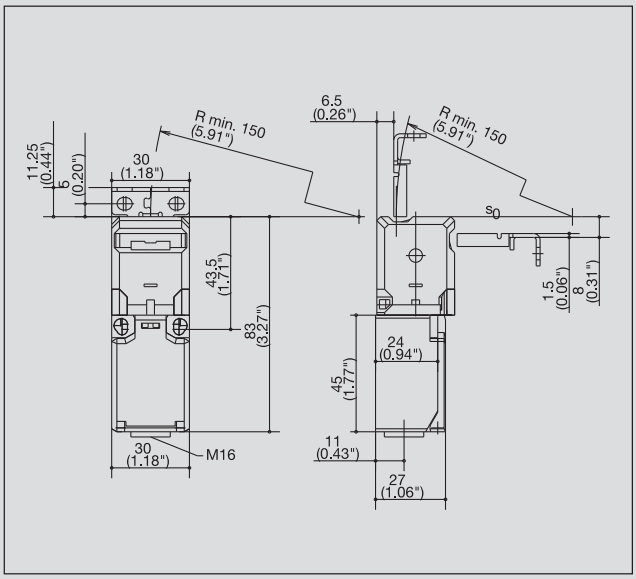
SKI				SKC					
Utilization category	Short-circuit protection	Mechanical service life	B10d	U_i	I_{the}	Utilization category	Short-circuit protection	Mechanical service life	B10d
				250 V	5 A	AC-15 U_e/I_e 240 V/1,5 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	A* 1×10^6 B* 1×10^5	2 mill.	–	–	–	–	–	–
		*A = Standard; B = Increased actuating force							

I88				ENK					
Utilization category	Short-circuit protection	Mechanical service life	B10d	U_i	I_{the}	Utilization category	Short-circuit protection	Mechanical service life	B10d
–	–	–	–	–	–	–	–	–	–
				400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.	400 V	10 A	AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.
–	–	–	–	400 V	5 A	AC-15 U_e/I_e 240 V/1.5 A	Fuse 6 A gL/gG	1×10^6	2 mill.

GC			
Utilization category	Short-circuit protection	Mechanical service life	B10d
–	–	–	–
AC-15 U_e/I_e 240 V/3 A	Fuse 6 A gL/gG	1×10^6	2 mill.
AC-15 U_e/I_e 240 V/3 A	Fuse 10 A gL/gG	1×10^6	2 mill.

Safety Switches with Separate Actuator

SKT



Safety switches with separate actuator are positive opening position switches. In terms of design, the switching element and actuator are separated. On actuation, the switching element and actuator are either brought together or separated. The positive opening NC contact is always open when the actuator is withdrawn. These switches are assigned to Type 2.

BERNSTEIN offers various versions of these Type 2 switches. The differences and advantages of the individual switch groups are outlined in the following.

The SKT is the smallest safety switch with a separate actuator. It is particularly suited for applications that require an extremely slim and short switch design. Its rotary head, two actuator openings and various switching functions underscore its versatility in extremely confined spaces.

Added to this, the SKT features other options to meet any requirements:

- **Integrated eject function (FE):**

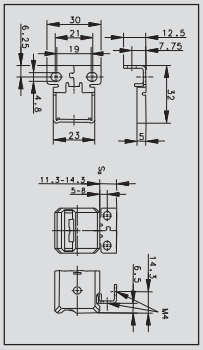
  The actuator is ejected if the door is not locked securely. Consequently, the safety contact is opened, thus preventing the machine from starting up. In addition, this function makes it apparent that the door still needs to be locked.

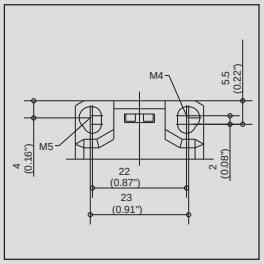
- **Actuating force (up to 50 N):**

  The standard actuating force is 10 N. Depending on the switch variant, an actuating force of 50 N can also be selected. In many applications, hatches and doors need to be secured to prevent them being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications requiring increased actuating force.

- **Universal Hinged Actuator (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.





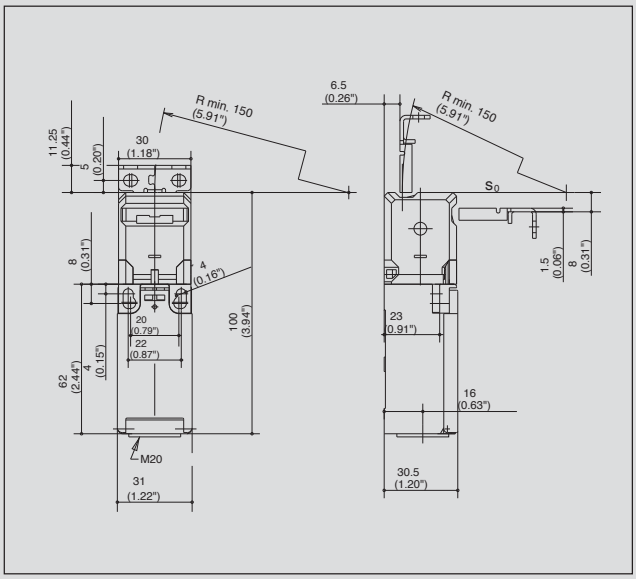
R_{min} 150 mm
Actuating forces FE to FI50

Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	240 V AC
Conventional thermal current	I_{the}	10 A
Utilization category		AC-15, U_e/I_e 240 V / 3 A; DC-13, U_e/I_e 250 V / 0.27 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life Standard Mechanical service life encreased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		–30 °C to + 80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		M16 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 72 – 75.

SKI



The SKI is the slimline version of a safety switch with a separate actuator. It is based on the BERNSTEIN I88 family. Its dimensions, not including the actuating head, correspond to EN 50047.

The actuating head is rotary mounted and has two actuator openings. The SKI safety switch is predestined for installation on section structures and in applications with confined installation conditions. Compared to the SKT, it offers more connection space for the wiring and variants with up to three switching contacts available.

Other advantages of this series include:

- **Integrated eject function (FE):**

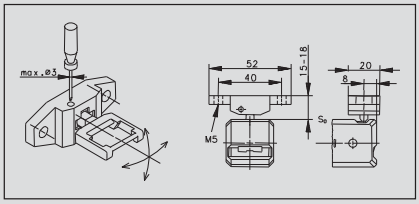
  The actuator is ejected if the door is not locked securely. Consequently, the safety contact is opened, thus preventing the machine from starting up. In addition, this function makes it apparent that the door still needs to be locked.

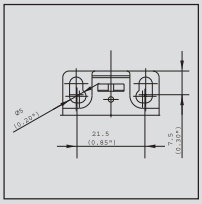
- **Actuating force (up to 50 N):**

  The standard actuating force is 10 N. Depending on the switch variant, an actuating force of 50 N can also be selected. In many applications, hatches and doors need to be secured to prevent them from being opened unintentionally. This is achieved by means of bolts, fasteners or other latching mechanisms. The SKI safety switch should be selected for applications requiring increased actuating force.

- **Universal radius actuator (MRU):**

  The MRU actuator is ideally suited for applications where the installation conditions severely restrict the actuating travel or radius. It has an adjustable actuating radius in the horizontal and vertical plane.





R_{min} in setting directions 50 mm
Actuating forces FE to FI50

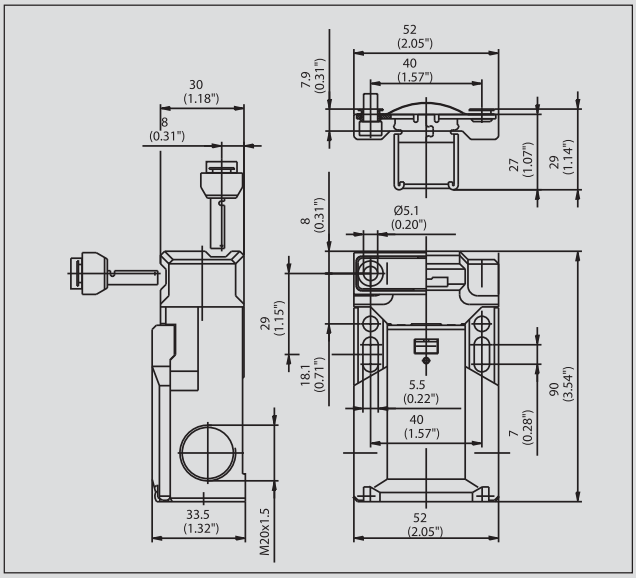
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) ①	I_{the}	10 A
Utilization category (up to) ①		AC-15, U_e /I_e 240 V / 3 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life Standard Mechanical service life encreased actuator holding force		1 x 10^6 switching cycles 1 x 10^5 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		–30 °C to + 80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		1 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 72 – 75.

Safety Switches with Separate Actuator

SK



The SK safety position switch is an industry standard and can be used in virtually any application.

Thanks to design safety features conforming to VDE 0660 T200, IEC 60947-5-1 and the test regulations GS-ET 15, the SK is particularly suitable for personal protection applications. Its versatility is enhanced by the variable actuator head and two actuator openings.

Other decisive advantages include:

- **Different actuating forces:**

  Corresponding to your specific application, in addition to the standard 10 N, you can also choose an actuating force of 5, 20 or 30 N.

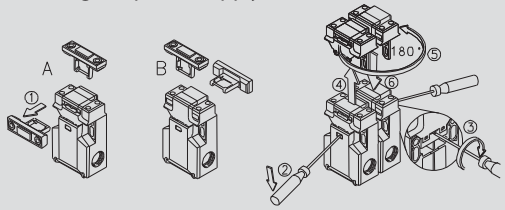
  Actuating forces from 30 to 100 N can be realised with the aid of additional components that are mounted on the outside of the switch.

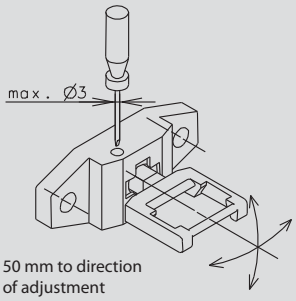
- **Anti-tamper facility:**

  The switching system is protected by multiple coding to ensure enhanced safety of your application.

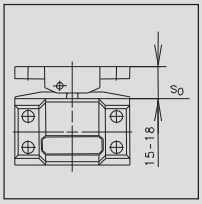
- **Outstanding handling:**

  With the two slots you can easily adjust the SK safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.





50 mm to direction
of adjustment
Actuator: metal

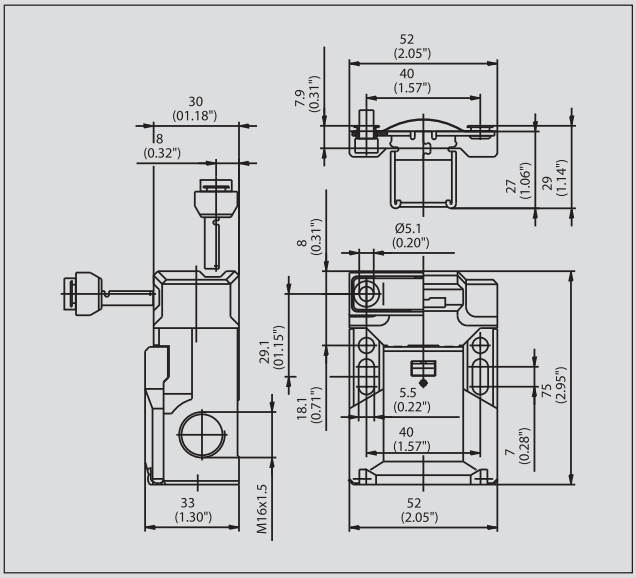


Technical data

Electrical data		
Rated insulation voltage (up to) ①	U_i max.	400 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current (up to) ①	I_{the}	10 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min
Mechanical service life		1 x 10^6 switching cycles
B10d (bis zu) ①		2 Mill.
Short-circuit protection (up to) ①		Fuse 10 A gL/gG
Protection class		II, Insulated
Ambient temperature		–30 °C ... + 80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm² or Stranded wire with ferrule 0.5 – 1.5 mm²
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M20 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

① Depending on switching system. See Table on Pages 72 – 75.

SKC



In terms of lengths, the SKC safety position switch is the 15 mm shorter variant of the SK. This makes it the right choice for confined installation conditions.

The SKC otherwise offers the same advantages as the SK: Industrial standard with particular emphasis on safety, personal protection and a variable actuator head with two actuator openings.

Other decisive advantages include:

- **Different actuating forces:**

  Corresponding to your specific application, in addition to the standard 10 N, you can also choose an actuating force of 5, 20, 30 or 50 N.

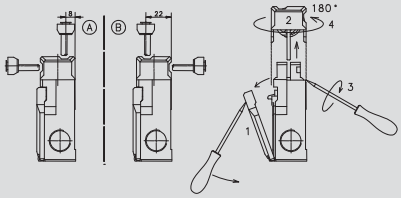
  Actuating forces from 30 to 100 N can be realised with the aid of additional components that are mounted on the outside of the switch.

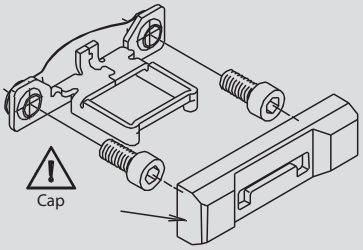
- **Anti-tamper facility:**

  The switching system is protected by multiple coding to ensure enhanced safety of your application.

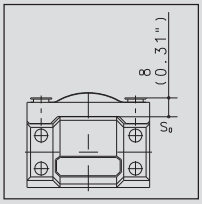
- **Outstanding handling:**

  With the two slots you can easily adjust the SKC safety switch and lock it in position by means of the two holes accessible from the top or the two holes accessible from the front. The switch can be wired from three different sides. A transparent cover prevents foreign particles from entering the contact space while connecting the power supply cable.





R_{min} 150 mm (5.9")
Actuator: Metal



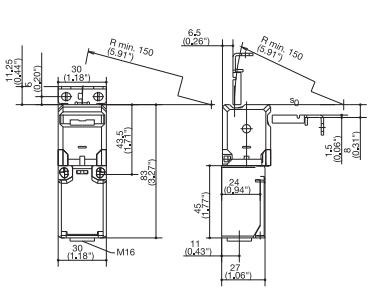
Technical data

Electrical data		
Rated insulation voltage	U_i max.	250 V AC
Rated operating voltage	U_e max.	240 V
Conventional thermal current	I_{the}	5 A
Utilization category		AC-15, U_e /I_e 240 V / 1.5 A
Mechanical data		
Switching frequency		≤ 30/min.
Mechanical service life		1 x 10^6 switching cycles
B10d (up to) ①		2 Mill.
Short-circuit protection		Fuse 6 A gL/gG
Protection class		II, Insulated
Ambient temperature		–30 °C ... + 80 °C
Protection class		IP65 conforming to IEC/EN 60529
Type of connection		Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Enclosure		Thermoplastic, glass fibre-reinforced (UL94-V0)
Cable entry		3 x M16 x 1.5
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

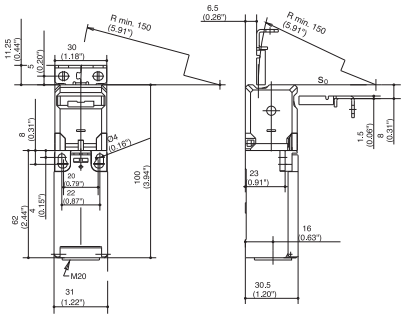
① Depending on switching system. See Table on Pages 72 – 75.

Safety Switches with Separate Actuator

SKT



SKI



Switching operation	Standard	High actuating force	Radius actuation
1 NC / 1 NO contact	**6016419059** SKT-U1Z M3		
1 NC contacts			
2 NC contacts	**6016469066** SKT-A2Z M3		
2 NC / 1 NO contact Overlapping			
Approvals			

Switching operation	Standard	High actuating force	Radius actuation
1 NC / 1 NO contact	**6016819052** SKI-U1Z M3	**6016819139** SKI-U1Z FI50 M3	**6016819123** SKI-U1Z MRU
1 NC contacts			
2 NC contacts	**6016869056** SKI-A2Z M3		**6016869122** SKI-A2Z MRU
2 NC / 1 NO contact Overlapping	**6016869058** SKI-UV15Z M3	**6016869145** SKI-UV15Z FI50 M3	**6016869131** SKI-UV15Z MRU
Approvals			

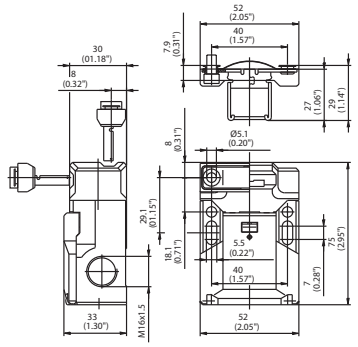
Special features / variants
(on request)

- Replacement actuator for:
  3112850340

Special features / variants
(on request)

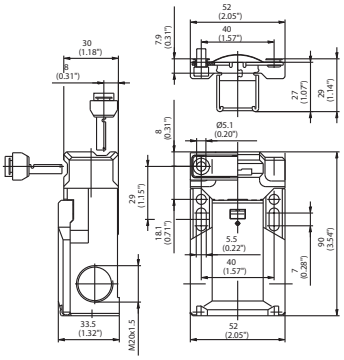
- Replacement actuator for:
  Standard **3112850340**
  High actuating force **3112850340**
  Radius actuation **3911452058**

SKC



Standard	High actuating force	Radius actuation
6016169039 SKC-A1Z M	**6116169016** SKC-A1Z F30 M	**6016169087** SKC-A1Z MRU

SK



Standard	High actuating force	Radius actuation
6016119016 SK-U1Z M	**6116119109** SK-U1Z F30 M	**6016119084** SK-U1Z MRU
6016169036 SK-A2Z M	**6016169053** SK-A2Z F30 M	**6016169085** SK-A2Z MRU
6016169026 SK-UV15Z M	**6016169061** SK-UV15Z F30 M	**6016169086** SK-UV15Z MRU

Special features / variants
(on request)

- 50 N and 100 N actuating force on request
- Replacement actuator for:
  Standard **3911452116**
  High actuating force **3911451914**
  Radius actuation **3911452058**

Special features / variants
(on request)

- 100 N actuating force on request
- Replacement actuator for:
  Standard **3911452116**
  High actuating force **3911451914**
  Radius actuation **3911452058**

Safety Switches with Separate Actuator

Switch with VTW, VTU, VT actuator

ENM-VTW

ENK-VTU

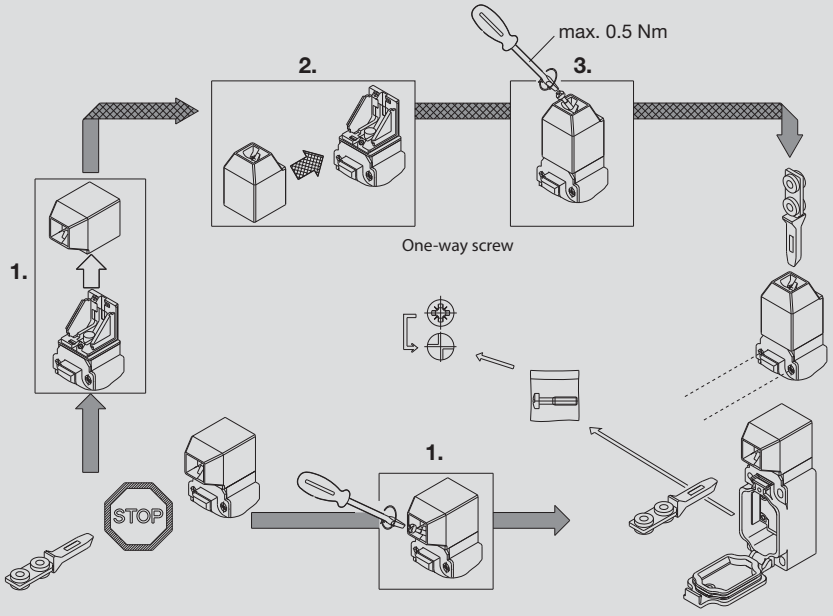
These position switches of the tried-and-tested switch families I88, ENK, ENM2 and GC correspond to Type 2.

This means that you can use Type 1 and Type 2 position switches corresponding to your applications while using one family of switches.

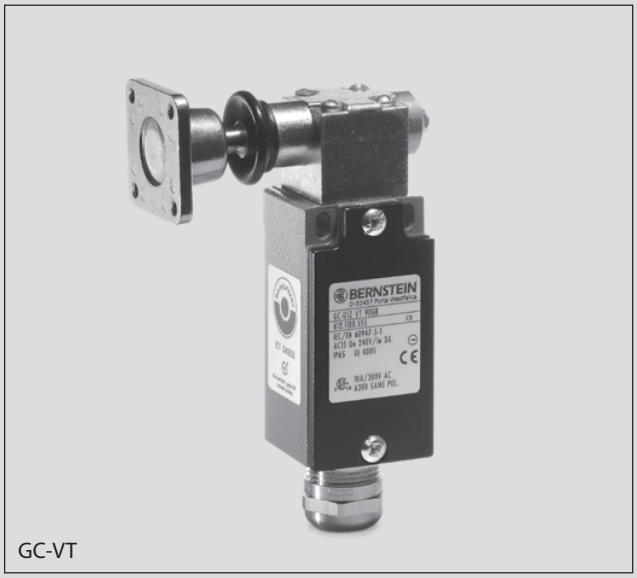
This results in many advantages:

- **Standardisation:**
  Switches of one family have the same mounting dimensions and the same electrical properties.
- **Reduced costs:**
  II88, ENK, ENM2 and GC are used in large quantities. This not only reflects the quality of the products but also means lower prices compared to special designs used in small quantities.

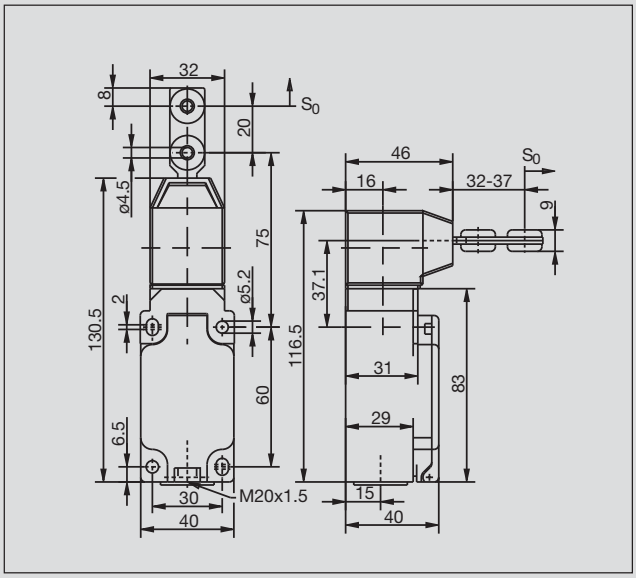
Variable VTU head



Repositioning the actuator head either in horizontal or vertical direction results in 8 approach actuator directions.



GC-VT

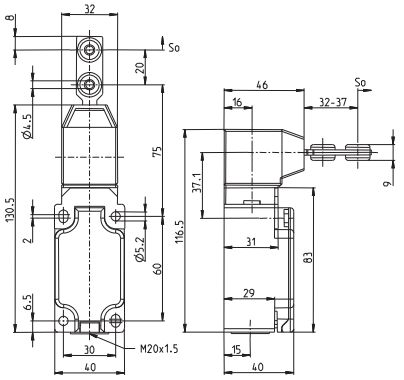
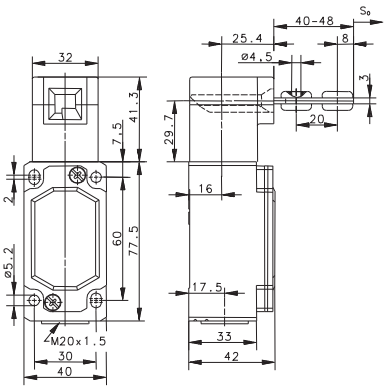


Technical data

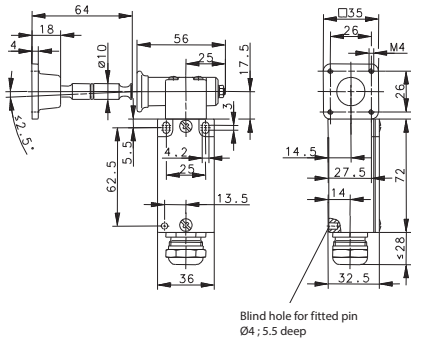
		I88	ENK	ENM2	GC
Electrical data					
Rated insulation voltage	U_i	250 V AC	400 V AC	400 V AC	400 V AC
Conventional thermal current (up to) ①	I_{the}	10 A	10 A	10 A	10 A
Rated operating voltage	U_e	240 V	240 V	240 V	240 V
Utilization category (up to) ①		AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A	AC-15, U_e/I_e 240 V / 3 A	AC-15, U_e /I_e 240 V / 3 A
Forced disconnection	⊖	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection (up to) ①		Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG	Fuse 10 A gL/gG
Protection class		II, Insulated	II, Insulated	I	I
Mechanical data					
Enclosure		Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced	Aluminium pressure die-casting	Aluminium pressure die-casting
Cover		Thermoplastic, glass fibre-reinforced (UL 94-V0)	Thermoplastic, glass fibre-reinforced	Sheet aluminium	Sheet aluminium
Actuation		Separate actuator, Thermoplastic	Separate actuator, (St/PA), Actuator (PA6 GV/Zn-GD)	Separate actuator,(St / PA)	Separate actuator
Ambient temperature		–30°C to + 80°C	–30°C to + 80°C	–30°C to + 80°C	–30°C to + 80°C
Mechanical service life		1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles	1 x 10^6 switching cycles
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Switching frequency		≤ 50/min.	max. 30/min.	≤ 50/min.	≤ 10/min.
Mounting		2 x M4	4 x M5	4 x M5	2 x M4
Type of connection		Screw connections	Screw connections	Screw connections	Screw connections
Conductor cross sections		Single-wire 0.5 – 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2	Single-wire 0.5 – 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2	Single-wire 0.5 – 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2	Single-wire 0.5 – 1.5 mm^2 or Stranded wire with ferrule 0.5 – 1.5 mm^2
Cable entry		1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5	1 x M20 x 1.5
Weight		≈ 0.09 kg	≈ 0.23 kg	≈ 0.33 kg	≈ 0.32 kg
Installation position		Any	Any	Any	Any
Protection class		IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529	IP65 conforming to EN 60529
Standards					
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1					

① Depending on switching system. See Table on Pages 72 – 75.

Safety Switches with Separate Actuator

	ENK VTU			ENM2 VTW		
						
Switching operation	**Standard**	**High actuating force**	**Radius actuation**	**Standard**	**High actuating force**	**Radius actuation**
1 NC / 1 NO contact	**6016619132** ENK-U1Z VTU			**6016219100** ENM2-U1Z VTW		
2 NC contacts	**6016669133** ENK-A2Z VTU			**6016269105** ENM2-A2Z VTW		
1 NC / 1 NO contact **Overlapping**	**6016669154** ENK-UV15Z VTU					
Approvals						
	Replacement actuator: 3911702228			**Replacement actuator: 3911702228**		
	Special features / variants (on request) ● All actuators specified under "Safety Switches with Separate Actuator and Latching Device (SLK)" can be used for these switches			**Special features / variants** (on request) ● All actuators specified under "Safety Switches with Separate Actuator and Latching Device (SLK)" can be used for these switches		

GC VT



Standard **High actuating force**

6121100555
GC-U1Z VT 90GR

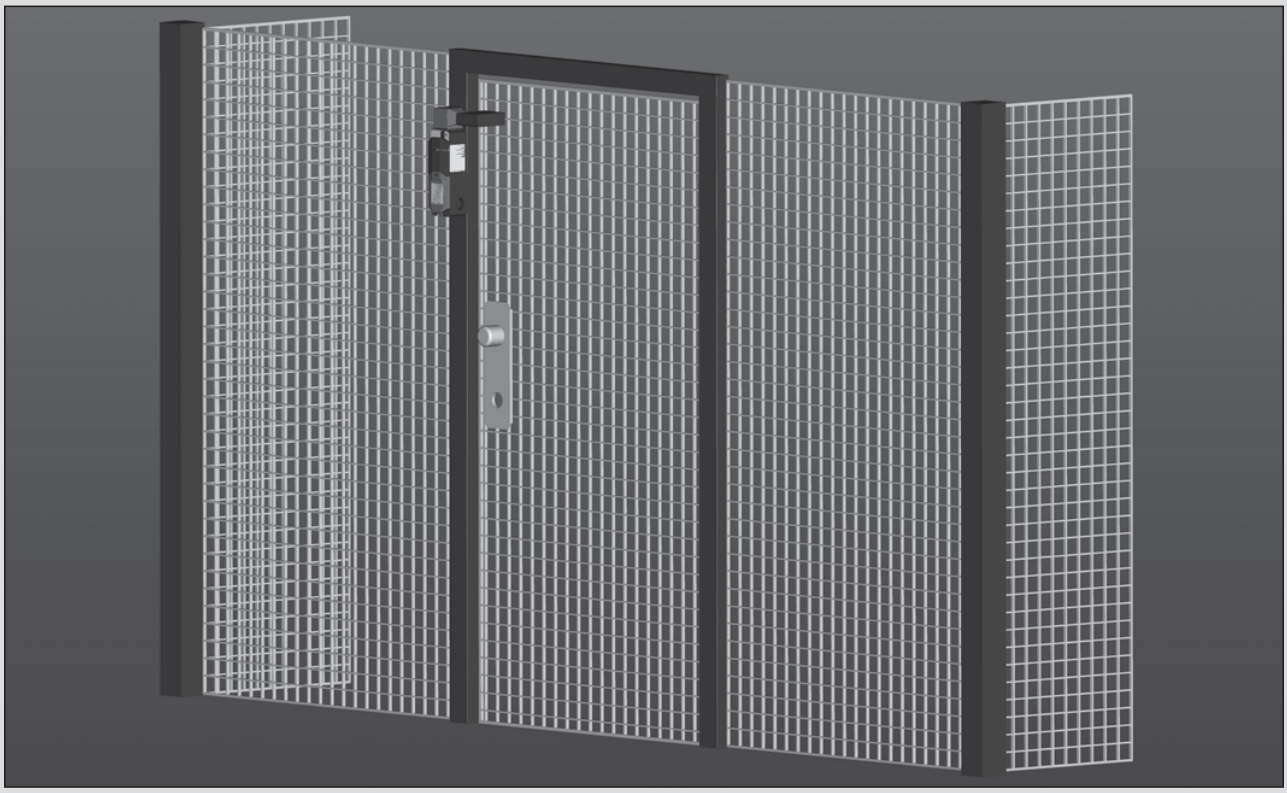
6116769064
GC-A2Z VT 90GR

Replacement actuator: 3912001275

Special features / variants
(on request)

Safety Switches with Separate Actuator and Interlock

SLK



Machines that continue running after being switched off are often part of automated production processes. Safety guards prevent operator access and must therefore be kept closed until the hazards posed by machine movement have ceased.

Safety position switches with interlock function ensure that safety gates, safety doors and other protective guards remain closed for as long as a hazardous situation exists.

In production processes safety position switches have three main tasks:

- Enabling the machine / process when the safety guard is closed and interlocked
- Disabling the machine / process when the safety guard is opened
- Position monitoring of the safety guard and interlock

The SLK safety position switches with separate actuators and interlock enable the user to realise locking systems conforming to EN 1088, EN ISO 12100-1, 12100-2 and since 29.12.2009 to the compulsory Machinery Directive 2006/42/EC.

System description

SLK safety position switches with interlock function are available in versions with spring force locking action and magnetic force locking action. The separate actuator is connected formfit with the safety guard. It transfers the locking force to the safety guard and monitors its position. Thanks to its triple coding, the separate actuator ensures a high degree of antitamper security. The interlock facility in association with the SLK safety position switches is integrated in the switch enclosure. To lock the actuator in connection with a switching mechanism, the required interlock is achieved by means of a spring mechanism in the spring force locked version and by an electromagnet in the magnetic force locked version.

Locking principle

Spring force (closed-circuit current)

The interlock is activated when the actuator is fully inserted. The interlock is released by energising the electromagnet, allowing the safety guard to be opened.

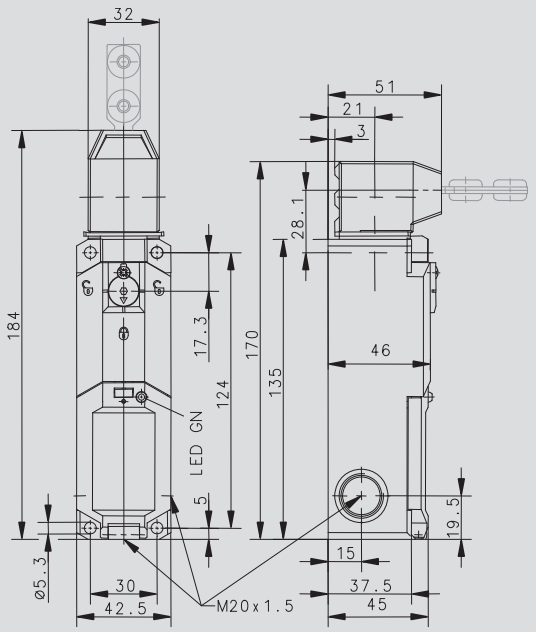
Magnetic force (working current)

The interlock is deactivated when the electromagnet is de-energised in the event of a power failure. This allows the safety guard to be opened.

Product advantages

- Two independent safety circuits ensure reliable integration
  - With two contacts, circuit 1 monitors the actuator
  - With two contacts, circuit 2 monitors the interlock

  The contact configuration is variable and may deviate from the selection table if required.
- Two different operating voltages for universal integration:
  - 24 V AC / DC
  - 110 V / 230 V AC
- Rotary actuating head (4x 90°) as well as horizontal and vertical actuation ensure complete flexibility in use
- Compact design with short overall size of only 170 mm
- Innovative installation with spring-loaded terminals
- Function conforming to GS ET 19, EN 60 204-1, EN 60 947-1 and EN 60 947-5-1



The actuator is not included and must be ordered separately.

Safe operation

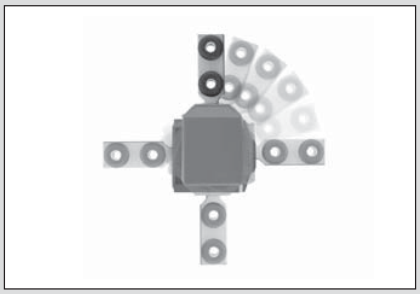
The stainless steel actuator ensures safe and reliable operation. Its coding prevents tampering and bypassing the system "in an easier way". The radius actuator is ideal for monitoring smaller safety gates. It can be preset horizontally or vertically and is also made from stainless steel.

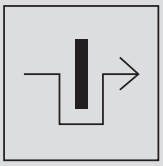
Flexible in use

The SLK safety switch can be actuated in a horizontal and vertical direction. Prior to installation it is preset by simply repositioning the head section. This flexibility in installation is achieved by positioning the actuator head in steps of 4 x 90°.

New symbol according to ISO 14119 for the interlocking contact:

Contacts labelled with this symbol in the switching travel diagram in the operating and installation instructions are safely positively driven contacts which monitor the interlocking position.





Innovative installation

The SLK is electrically connected safely and reliably by means of terminals. Spring loaded terminals are used, into which the wires with ferrules can be inserted without the need for tools. The fact that the connection compartment is separate from the functional parts contributes to ensuring secure and reliable connection. The connection compartment conforms to protection class IP67.

IMPORTANT: The actuator for the SLK must be ordered separately. You will find a corresponding overview on Pages 92 – 93.

Safety Switches with Separate Actuator and Interlock

SLK

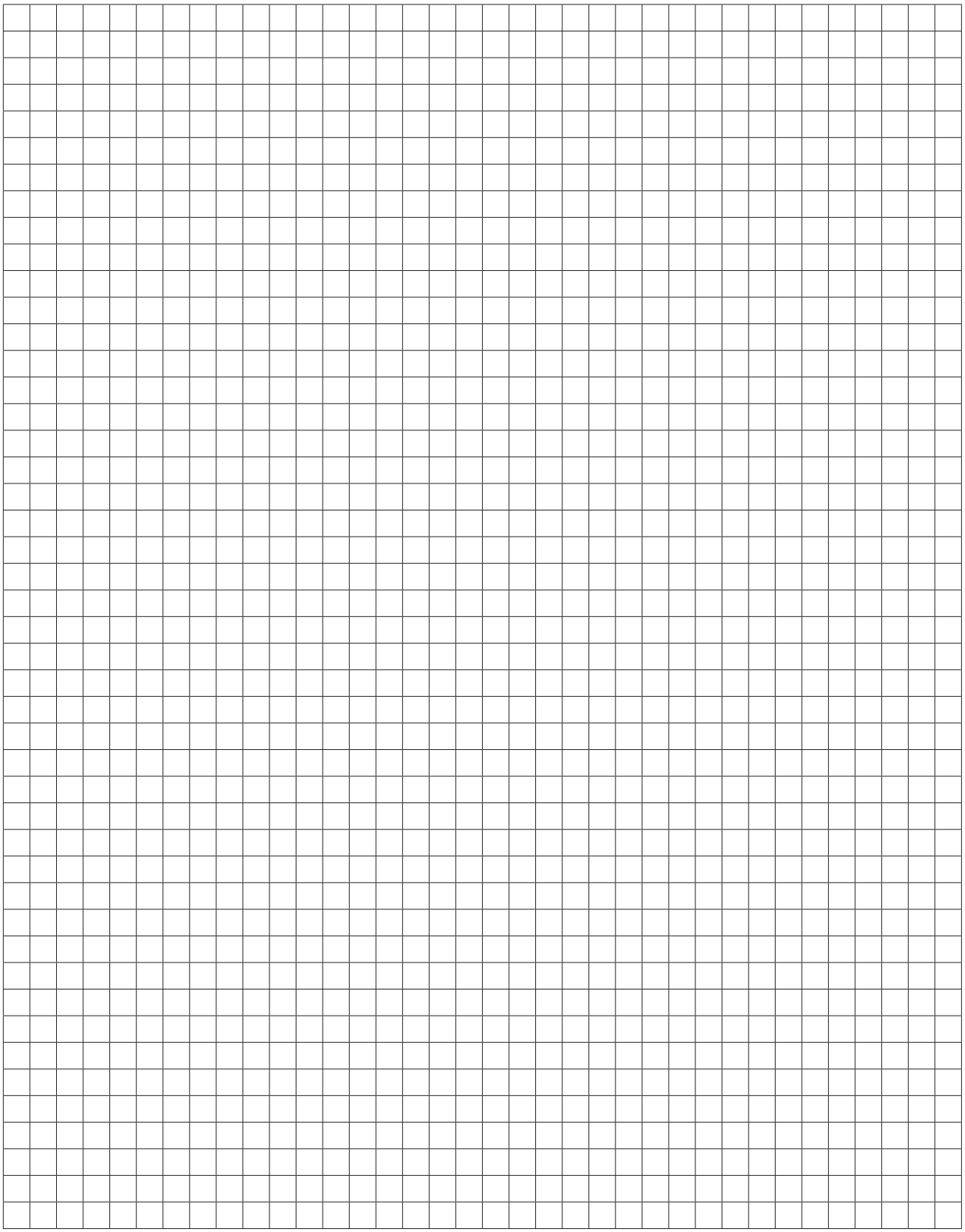
Product selection

Article number	Designation	Locking action	Supply voltage	Contacts Actuator	Interlock	Additional function
6018119045	SLK-F-UC-55-R1-A0-L0-0	Spring	24 Volt AC / DC	1NC / 1NO	1NC / 1NO	Auxiliary release
6018119066	SLK-F-UC-55-R1-A0-L1-0	Spring	24 Volt AC / DC	1NC / 1NO	1NC / 1NO	Auxiliary release, LED
6018169054	SLK-F-UC-22-R1-A0-L0-0	Spring	24 Volt AC / DC	2 NC	2 NC	Auxiliary release
6018169050	SLK-F-UC-25-R1-A0-L0-0	Spring	24 Volt AC / DC	2 NC	1NC / 1NO	Auxiliary release
6018169068	SLK-F-UC-25-R1-A0-L1-0	Spring	24 Volt AC / DC	2 NC	1NC / 1NO	Auxiliary release, LED
6018119061	SLK-F-UC-55-R2-A0-L0-0	Spring	24 Volt AC / DC	1NC / 1NO	1NC / 1NO	Emergency release
6018169055	SLK-F-NC-22-R1-A0-L0-0	Spring	110 / 230 AC	2 NC	2 NC	Auxiliary release
6018119046	SLK-F-NC-55-R1-A0-L0-0	Spring	110 / 230 AC	1NC / 1NO	1NC / 1NO	Auxiliary release
6018119067	SLK-F-NC-55-R1-A0-L1-0	Spring	110 / 230 AC	1NC / 1NO	1NC / 1NO	Auxiliary release, LED
6018169051	SLK-F-NC-25-R1-A0-L0-0	Spring	110 / 230 AC	2 NC	1NC / 1NO	Auxiliary release
6018169069	SLK-F-NC-25-R1-A0-L1-0	Spring	110 / 230 AC	2 NC	1NC / 1NO	Auxiliary release, LED
6018119047	SLK-M-UC-55-R0-A0-L0-0	Magnet	24 Volt AC / DC	1NC / 1NO	1NC / 1NO	
6018169052	SLK-M-UC-25-R0-A0-L0-0	Magnet	24 Volt AC / DC	2 NC	1NC / 1NO	
6018169056	SLK-M-UC-22-R0-A0-L0-0	Magnet	24 Volt AC / DC	2 NC	2 NC	
6018119048	SLK-M-NC-55-R0-A0-L0-0	Magnet	110 / 230 AC	1NC / 1NO	1NC / 1NO	
6018169053	SLK-M-NC-25-R0-A0-L0-0	Magnet	110 / 230 AC	2 NC	1NC / 1NO	
6018169057	SLK-M-NC-22-R0-A0-L0-0	Magnet	110 / 230 AC	2 NC	2 NC	

Technical data		**Spring 24 Volt AC / DC**	**Spring 110 / 230 AC**	**Magnet 24 Volt AC / DC**	**Magnet 110 / 230 AC**
Electrical data					
Rated insulation voltage	U_i	250 V	250 V	250 V	250 V
Utilization category		AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A	AC-15, U_e /I_e 230 V / 2.5 A
Conventional thermal current	I_{the}	5 A	5 A	5 A	5 A
Short-circuit protection		4 A gL	4 A gL	4 A gL	4 A gL
Protection class		II, Insulated	II, Insulated	II, Insulated	II, Insulated
Electromagnet					
Duty factor		100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)	100 % ED (an E1; E2)
Thermal class		F (155 °C)	F (155 °C)	F (155 °C)	F (155 °C)
Switch-on power		12 VA (0.2 s)	65 VA (0.1 s)	12 VA (0.2 s)	65 VA (0.1 s)
Continuous power		4.4 VA	8 VA	4.4 VA	8 VA
Mechanical data					
Enclosure		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Cover		Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)	Thermoplastic GV (UL94-V0)
Actuator		Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD	Thermoplastic GV / Zn-GD
Ambient temperature		–25 °C to + 70 °C	–25 °C to + 70 °C	–25 °C to + 70 °C	–25 °C to + 70 °C
Switching function		2 NC contacts, 2 NO contacts	2 NC contacts, 2 NO contacts	4 NC contacts	2 NC contacts, 2 NO contacts
Switching principle		4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts	4 Slow-action contacts
Mechanical service life		1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)	1 x 10^6 switching cycles (max. 600 switching cycles / h)
B10d		2 mill.	2 mill.	2 mill.	2 mill.
Minimum actuating radius	R_{min}	See datasheet, actuator	See datasheet, actuator	See datasheet, actuator	See datasheet, actuator
Approach speed	V_{max}	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$	0.5 $^m/_s$
Mounting		4 x M5	4 x M5	4 x M5	4 x M5
Cross sections		0.5 – 1.5 mm^2	0.5 – 1.5 mm^2	0.5 – 1.5 mm^2	0.5 – 1.5 mm^2
Type of connection		Cage clamp terminal	Cage clamp terminal	Cage clamp terminal	Cage clamp terminal
Cable entry		3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5	3 x M20 x 1.5
Weight		≈ 0.34 kg	≈ 0.30 kg	≈ 0.30 kg	≈ 0.35 kg
Protection class		IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529	IP67 conforming to IEC/EN 60529
Installation position		Any	Any	Any	Any
Locking principle		Spring force	Spring force	Magnetic force	Magnetic force
Latching force	FZh	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19	≤ 1500 N to GS-ET-19

Approvals:

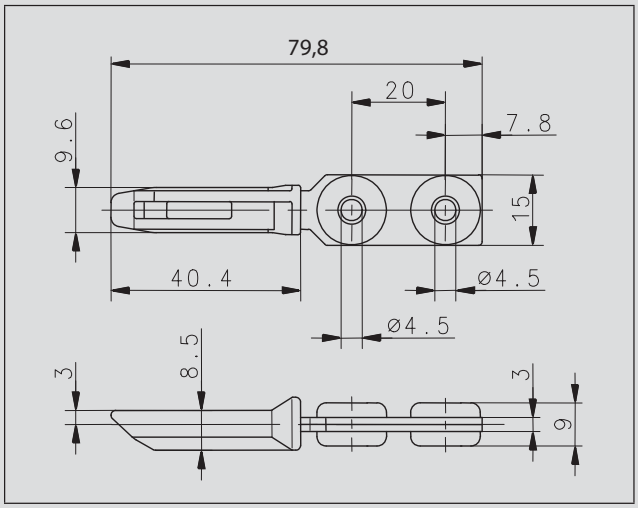
Notes



Safety Switches with Separate Actuator and Interlock

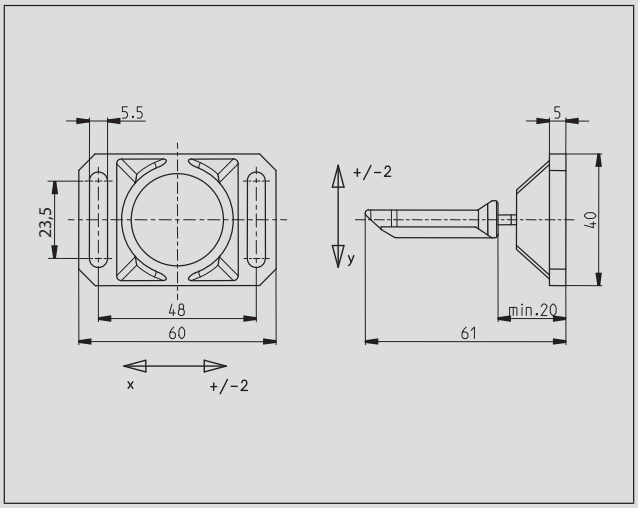
Product selection SLK, ENK-VTU, ENM2-VTW

Article number	Designation
3911702228	Actuator A1



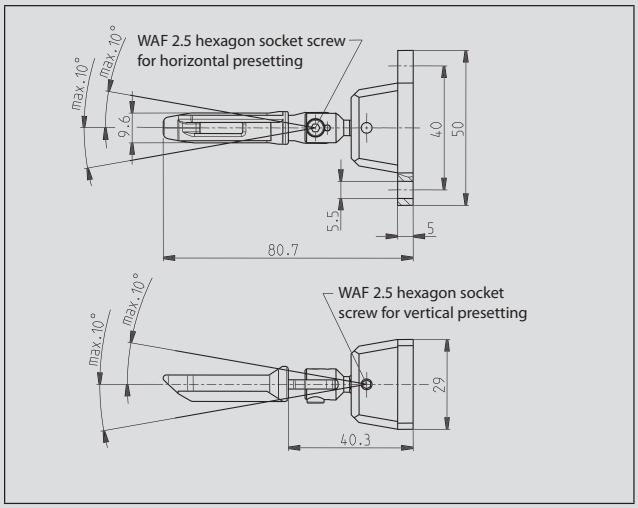
Mechanical data		
Actuator		Steel/PA
Minimum actuating radius	R_{min}	400 mm

Article number	Designation
3911702231	Actuator A4



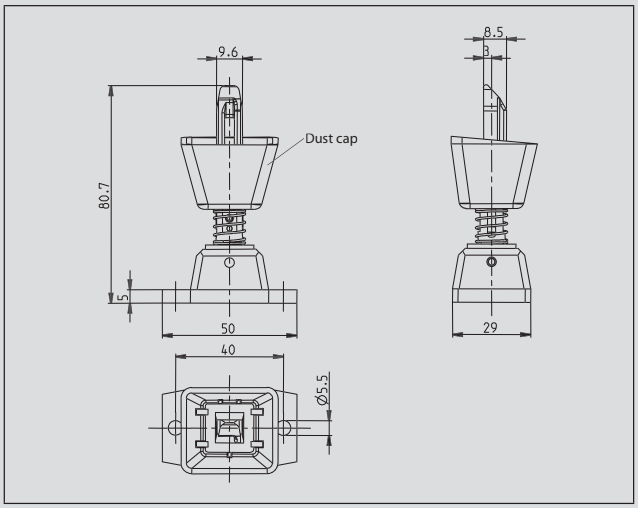
Mechanical data		
Actuator		Steel/PA
Enclosure		GD-Zn
Minimum actuating radius	R_{min}	350 mm
Repositioning of spring-mounted actuator by 4 x 90° in mounted state.		

Article number	Designation
3911702229	Actuator A2



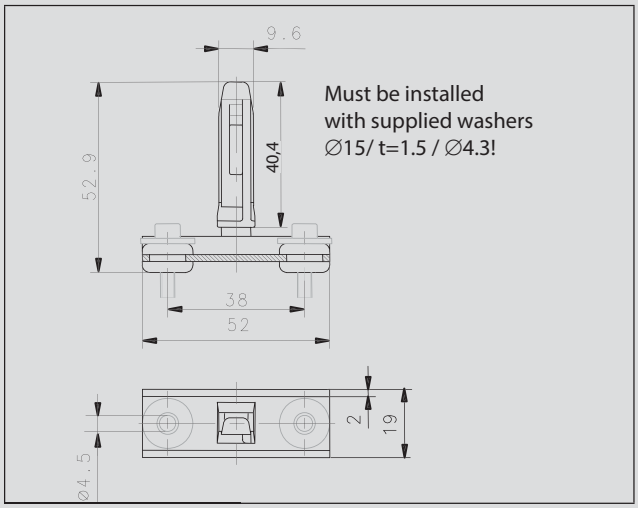
Mechanical data		
Enclosure / Actuator		Steel/PA
Minimum actuating radius	R_{min}	150 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		
WAF 2.5 Allen key, supplied		

Article number	Designation
3911702230	Actuator A3



Mechanical data		
Enclosure / Actuator		Steel/PA
Dust cap		Elastomer CR
Minimum actuating radius	R_{min}	400 mm
Repositioning of spring-mounted actuator by 4 x 90° in not mounted state.		

Article number	Designation
3911702234	Actuator A7



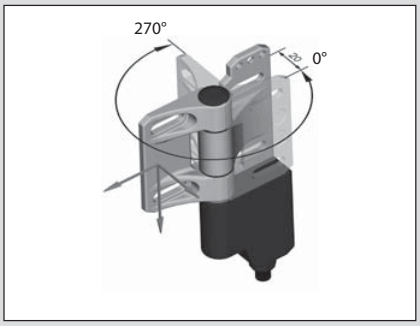
Mechanical data		
Actuator		Steel/PA
U-section		Steel
Minimum actuating radius	R_{min}	400 mm

Safety Switches for Hinged Protective Equipment

Safety Hinge Switch – SHS3

With the SHS3 safety hinge switch we present the logical further development of the SHS series and a solution that makes it unnecessary to replace the safety hinge switch when equipment such as safety gates are damaged as the result of mechanical stress, such as after being bumped by a forklift truck for instance. Even after the switching point has been set, if need be, the user can now correct the hinge setting with the aid of the integrated fine adjustment system. The SHS3 hinge switch is reusable even when the entire system needs to be converted: With the aid of a change kit, the user can redefine the switching point without using the high protection rating of IP67 / IP69 K.

The SHS3 has a swivel range from 0° to 270°. The switching point is also freely selectable within this range.



The SHS3 hinge switch has virtually no limits in terms of its installation flexibility. Not only does the SHS3 enable front and interior installation, right-hinged or left-hinged mounting or freely selectable direction of electric connection, but thanks to the switching point which can be set in an angle range of 270°, this hinge switch can also be installed in places that were previously not possible.

Safe:

With suitable system layout, the switch can be used up to performance level e. Following variants are available:

- 2 positive opening safety contacts
- 2 positive opening safety contacts with additional normally-open signalling contact
- With integrated AS interface Safety at Work.

Flexible:

- Freely and repeatedly adjustable switching point
- Switching point freely adjustable by user over a range of 270°
- Uncomplicated re-adjustment even of set switching point by ±1.5° thanks to integrated fine adjustment system
- Slots for mounting on sections and welded structures
- In addition to the plug connection version, an SHS with fixed cable connection at the rear is also available
- Right and left hinged systems possible for optimum cable routing
- Mounting between sections while maintaining the required finger guard gap

Fast:

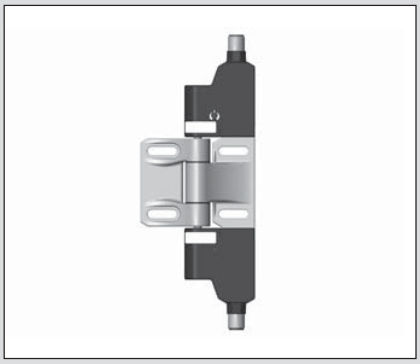
To connect the SHS3 even more efficiently, the two contacts are designed as normally-closed contacts with Ultra-Lock technology, thus enabling connection with an M12 cable.

Reliable:

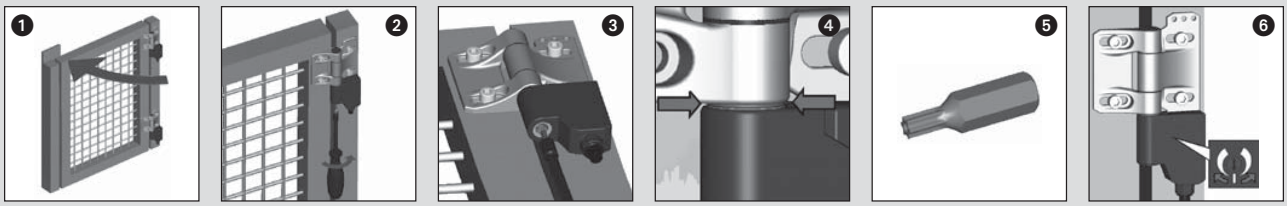
- The protection rating is IP67 / IP69 K
- The load-bearing hinge is made from stainless steel while the switching system is housed in a high quality plastic enclosure

Double hinge

Thanks to its two switching elements on one hinge, the BG (occupational health and safety)-approved variant of the SHS3 provides two independently adjustable switching points. This arrangement not only makes it possible to monitor the opening of a safety guard but also the direction of opening of swing doors.



SHS3 – Setting the switching point



On delivery, the SHS3 hinge switch allows for all possible settings. With your specific application you define and lock the safe status of the hinged safety equipment (the closed position) (Fig. 1).

The adjusting screw located in axial direction in the switching system is then tightened with the special bit supplied with the hinge switch. The arrangement of the adjusting screw makes it possible to adjust the switching point in all installation positions (Fig. 2+3)

After establishing a form-fit connection, a green ring in the gap between the stainless steel hinge and switch enclosure indicates that the switching point has been set correctly at a min. torque of 2 Nm/+10% (Fig. 4).

A red ring at this point additionally indicates wear, e.g. caused by abrasive substances. With the same special bit you can not only freely adjust the switching point to suit your application but you can also change the mounting arrangement of your safety equipment from right-hinged to left-hinged (Fig. 5).

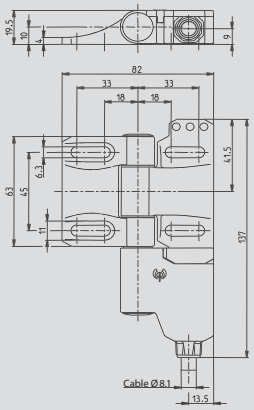
Fine adjustment

The set switching point can be subsequently varied by up to ±1.5% by turning the adjusting screw in the corresponding direction (Fig. 6).

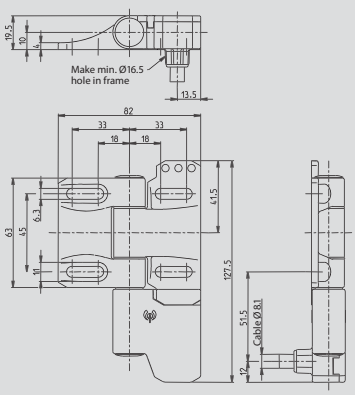
In many cases this fine adjustment makes it unnecessary to replace the switch or readjust the switching point due to mechanical deformation of the safety guard. The switching angle should generally be selected as small as possible.

Dimensioned drawings

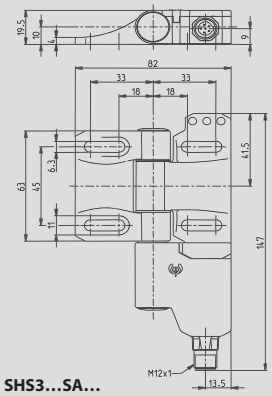
SHS3…KA…



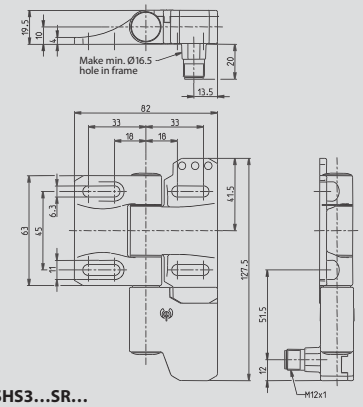
SHS3…KR…



SHS3…SA…

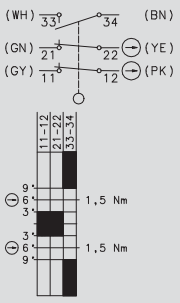


SHS3…SR…

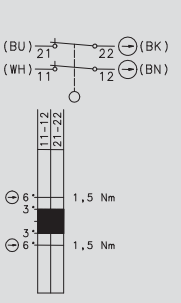


Switching diagram

U15Z
2 NC contacts,
1 NO contacts (Zb)



A2Z
2 NC contacts (Zb)



Setting point freely selectable in range from 0°... 270° and 0°…180°

Tolerances:

Switching angle (opening) ± 1.5°
Positive opening torque 10 %
Positive opening angle ± 1.5°

Safety Switches for Hinged Protective Equipment

Product selection for die-cast zinc version

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling / type	Mounting
					radial	axial		
6019490050	SHS3Z-U15Z-KA5 R	2NC/1NO	230 V	AC/DC		Cable		Right
6019490051	SHS3Z-U15Z-KA5 L	2NC/1NO	230 V	AC/DC		Cable		Left
6019490052	SHS3Z-U15Z-KR5 R	2NC/1NO	230 V	AC/DC	Cable			Right
6019490053	SHS3Z-U15Z-KR5 L	2NC/1NO	230 V	AC/DC	Cable			Left
6019490054	SHS3Z-U15Z-SA R	2NC/1NO	230 V	AC/DC		M12	D	Right
6019490055	SHS3Z-U15Z-SA L	2NC/1NO	230 V	AC/DC		M12	D	Left
6019490056	SHS3Z-U15Z-SR R	2NC/1NO	230 V	AC/DC	M12		D	Right
6019490063	SHS3Z-U15Z-SR L	2NC/1NO	230 V	AC/DC	M12		D	Left
6019490057	SHS3Z-U1Z-SA R	1NC/1NO	230 V	AC/DC		M12	E	Right
6019490058	SHS3Z-U1Z-SA L	1NC/1NO	230 V	AC/DC		M12	E	Left
6019490059	SHS3Z-U1Z-SR R	1NC/1NO	230 V	AC/DC	M12		E	Right
6019490060	SHS3Z-A2Z-SA R	2NC	230 V	AC/DC		M12	E	Right
6019490061	SHS3Z-A2Z-SA L	2NC	230 V	AC/DC		M12	E	Left
6019490062	SHS3Z-A2Z-SR R	2NC	230 V	AC/DC	M12		E	Right
6019490049	SHS3Z-HINGE							

Product selection for stainless steel version

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling / type	Mounting
					radial	axial		
6019390023	SHS3-U15Z-KA 5 L	2NC/1NO	230 V	AC/DC		Cable		Left
6019390022	SHS3-U15Z-KA 5 R	2NC/1NO	230 V	AC/DC		Cable		Right
6019390025	SHS3-U15Z-KR 5 L	2NC/1NO	230 V	AC/DC	Cable			Left
6019390024	SHS3-U15Z-KR 5 R	2NC/1NO	230 V	AC/DC	Cable			Right
6019390035	SHS3-U15Z-SA L	2NC/1NO	230 V	AC/DC		M12	D	Left
6019390034	SHS3-U15Z-SA R	2NC/1NO	230 V	AC/DC		M12	D	Right
6019390037	SHS3-U15Z-SR L	2NC/1NO	230 V	AC/DC	M12		D	Left
6019390036	SHS3-U15Z-SR R	2NC/1NO	230 V	AC/DC	M12		D	Right
6019390040	SHS3-A2Z-SA-R	2NC	230 V	AC/DC		M12	E	Right
6019390041	SHS3-A2Z-SA-L	2NC	230 V	AC/DC		M12	E	Left
6019390044	SHS3-A2Z-SR-R	2NC	230 V	AC/DC	M12		E	Right
6019390042	SHS3-U1Z-SA-R	1NC/1NO	230 V	AC/DC		M12	E	Right
6019390043	SHS3-U1Z-SA-L	1NC/1NO	230 V	AC/DC		M12	E	Left
6019390045	SHS3-U1Z-SR-R	1NC/1NO	230 V	AC/DC	M12		E	Right
6019390046	SHS3-2-SA/2-SA	2 x 2NC	230 V	AC/DC		M12	2 x E	Both sides
6019390047	SHS3-5-SA/5-SA	2 x 1NC/1NO	230 V	AC/DC		M12	2 x E	Both sides
6019390048	SHS3-7-KA5/7-KA5	2 x 2NC/1NO	230 V	AC/DC		Cable		Both sides
6019390039	SHS3-7-SA/7-SA	2 x 2NC/1NO	230 V	AC/DC		M12	2 x D	Both sides
6019390038	SHS3-HINGE (blank hinge)							Both sides

Product selection for stainless steel version in IP69

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Type of connection and direction		Required cable coupling / type	Mounting
					radial	axial		
6019390064	SHS3-U15Z-KA5-R-IPX	2NC/1NO	230 V	AC/DC		Cable		Right
6019390065	SHS3-U15Z-KA5-L-IPX	2NC/1NO	230 V	AC/DC		Cable		Left
6019390066	SHS3-U15Z-KR5-R-IPX	2NC/1NO	230 V	AC/DC	Cable			Right
6019390067	SHS3-U15Z-KR5-L-IPX	2NC/1NO	230 V	AC/DC	Cable			Left
6019390068	SHS3-7-KA5-IPX/7-KA5-IPX	2 x 2NC/1NO	230 V	AC/DC		Cable		Both sides

Technical data SHS3

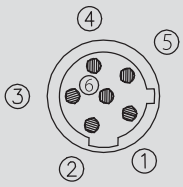
Electrical data		
Rated insulation voltage	U_i max.	250 V
Rated operating voltage	U_e max.	230 V AC; 24 V DC
Conventional thermal current	I_{the}	5 A
Utilization category	U_e /I_e	AC-15, U_e /I_e 230 V / 3 A; DC-13 U_e /I_e 24 V/1A
Short-circuit protection		4 A gL/gG
Protection class		II, Insulated
Mechanical data		
Switch		PBT / Hinge G-X22 Cr Ni 17
Ambient temperature		–25°C to + 70°C (Connection cable installed)
Mechanical service life		10^6 switching cycles
Switching frequency max.		max. 300 switching cycles/hour
Mounting		4 x M6 Screws DIN EN ISO 7984
B10d		2 mill.
Type of connection		Fixed connection cable, 6 x 0.75 mm², minimum bending radius = 60 mm
Weight		approx. 0.7 kg (cable variant)
Installation position		Any
Protection class		IP67 conforming to IEC/EN 60529
Switching angle		± 3° from setting point
Positive opening angle		± 6° + 2
Positive opening torque		1.5 Nm
Mechanical load		F_{R1} = max. 1800 N, F_{R2} = max. 750 N, F_A = max. 1800 N
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

Safety Switches for Hinged Protective Equipment

SHS3 Cable Type D

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251006291	AN-KAB.SHS3 2M STRAIGHT	2 m	Straight	6	M12 BG version
3251006292	AN-KAB.SHS3 5M STRAIGHT	5 m	Straight	6	M12 BG version
3251006293	AN-KAB.SHS3 10M STRAIGHT	10 m	Straight	6	M12 BG version
3251006294	AN-KAB.SHS3 2M ELBOW	2 m	Elbow	6	M12 BG version
3251006295	AN-KAB.SHS3 5M ELBOW	5 m	Elbow	6	M12 BG version
3251006296	AN-KAB.SHS3 10M ELBOW	10 m	Elbow	6	M12 BG version

Contact assignments, AC/DC versions



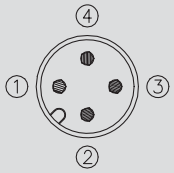
1 = White
2 = Brown
3 = Green
4 = Yellow
5 = Grey
6 = Pink

Core insulation/sheathing material:	PVC (∅ 5.6 mm)
Moulding/contact carrier material:	PUR Elastollan R3000
Max. rated voltage:	250 V AC
Max. current carrying capacity:	2.5 A (at 70 °C)
Min./max. temperature range:	–5 °C to + 105 °C (moved)
	–40 °C to + 105 °C (moved firmly)
Cable configuration mm^2:	LiYwUL2517 6 x 0.34
Protection class when assembled:	IP68

SHS3 Cable Type E

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004310	AN-KAB.SHS3 4P 2M STRAIGHT	2 m	Straight	4	M12 BG version
3251004311	AN-KAB.SHS3 4P 5M STRAIGHT	5 m	Straight	4	M12 BG version
3251004312	AN-KAB.SHS3 4P 10M STRAIGHT	10 m	Straight	4	M12 BG version
3251004313	AN-KAB.SHS3 4P 2M ELBOW	2 m	Elbow	4	M12 BG version
3251004314	AN-KAB.SHS3 4P 5M ELBOW	5 m	Elbow	4	M12 BG version
3251004315	AN-KAB.SHS3 4P 10M ELBOW	10 m	Elbow	4	M12 BG version
3251004316	AN-KAB.SHS3 4P U.L. 2M STRAIGHT	2 m	Straight	4	Ultra Lock BG version
3251004317	AN-KAB.SHS3 4P U.L. 5M STRAIGHT	5 m	Straight	4	Ultra Lock BG version
3251004318	AN-KAB.SHS3 4P U.L. 10M STRAIGHT	10 m	Straight	4	Ultra Lock BG version
3251004319	AN-KAB.SHS3 4P U.L. 2M ELBOW	2 m	Elbow	4	Ultra Lock BG version
3251004320	AN-KAB.SHS3 4P U.L. 5M ELBOW	5 m	Elbow	4	Ultra Lock BG version
3251004321	AN-KAB.SHS3 4P U.L. 10M ELBOW	10 m	Elbow	4	Ultra Lock BG version

Contact assignments, AC/DC versions



1 = Brown
2 = White
3 = Blue
4 = Black

Core insulation / sheathing material:	Heat resistant PVC UL 1731 / UL 2517 black
Moulding/contact carrier material:	APEX 7500-85 / R3000 Elastollan R3000 neutral
Max. rated voltage:	250 V
Max. current carrying capacity:	4 A
Min. / max. temperature range:	At rest –25 °C to + 105 °C
	Moved –5 °C to + 105 °C
Protection class when assembled:	IP68

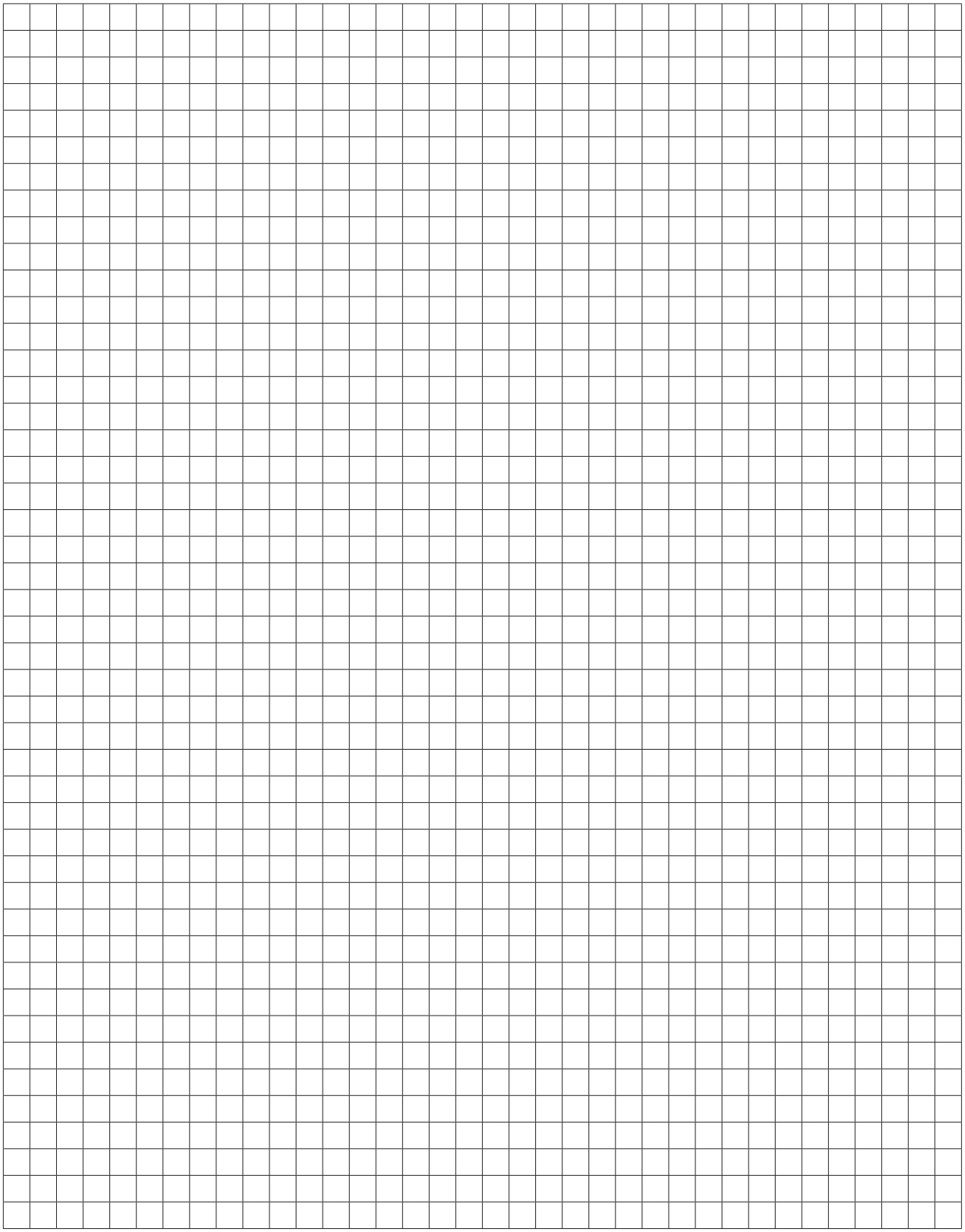
Change kit for re-adjusting switching point

Article number	Designation
3991990161	SHS3 change kit
Containing:	
2 replacement caps	
1 special bit	
1 plastic ring	

Installation tool

Article number	Designation
1910000005	Bit holder 1/4" flexible stem

Notes



Safety Switches for Hinged Protective Equipment

Safety Hinge Switch – SHS

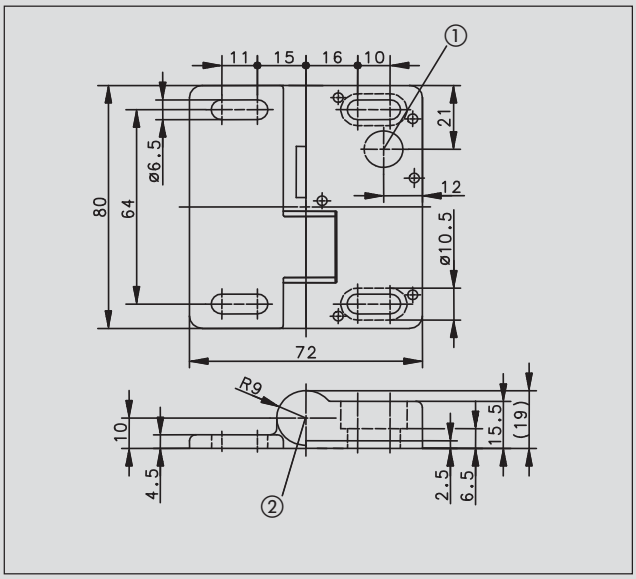


Illustration showing fixed pin and shearing bolt sheared off

① Position of connection variant 2, 5 and 6.

② Position of connection variant 1, 3 and 4.

Protective hoods and safety guards on machines such as gates in safety gate systems are often pivot mounted with hinges.

Since BERNSTEIN presented the world's first safety hinge switch SHS in 2002 it is hard to imagine modern production installations without it. It combines a hinge and safety switch in one single functional unit.

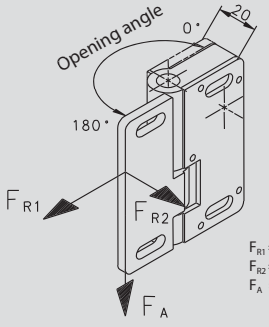
The design of the SHS safety hinge switch has been optimised to allow its effective use on aluminium section systems. Its shallow depth, even when fully opened, makes it ideally suited for use in constricted installation conditions on machines. Safety switches with separate actuators are often subjected to high mechanical stresses, especially when they are mounted on closing edges. The SHS hinge switch sets new standards. The safety guard is monitored directly in the hinge.

The concealed arrangement of the safety switch provides a high degree of protection against tampering. One or several SHS switches are be used depending on control requirements.

In many applications the conventional load bearing hinge can be replaced by a blank hinge with identical design features as the safety hinge. This has significant rationalisation benefits. The only parameter you need to take into account is the maximum extension of the hinged safety equipment that results from the switching angle and the permissible safe opening in the area of the closing edges. The SHS hinge switch provides maximum anti-tamper protection as, once set, the switching point can no longer be changed.

Safe:

- 2 SHS hinge switches, each equipped with a positively opening safety contact, allows you to configure a system up to performance level e



F_{R1} = max. 1000 N
F_{R2} = max. 500 N
F_A = max. 750 N

Flexible:

- The angle range extends from 0 to 225°
- A safety device ensures positive locking after the switch has been set
- In addition to the plug connection version, an SHS with fixed cable connection at the rear is also available

Fast:

- Plug connector and fixed cable connections are available for axial and radial (rear) connection
- An AC/DC version (up to 250 V) or a DC version (up to 60 V) is available, depending on the configuration of the safety circuit

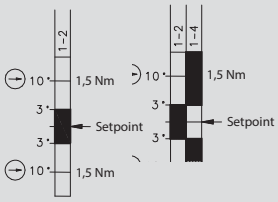
Reliable:

- A pressure die-cast zinc enclosure allows versatile use of the SHS switch in varied applications
- When used as a load bearing hinge, the SHS takes up loads of up to 750 N in axial direction and 1000 N in radial direction after the switching point has been finally set
- The protection rating is IP67

Switching diagram

1 NC contact (Type B)

1 Changeover contact (Type C)

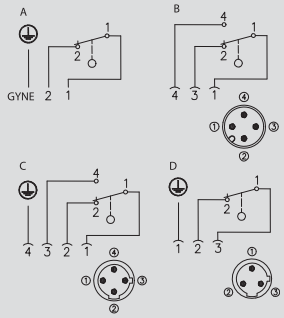


Setting point freely selectable in range from 0°... 225°

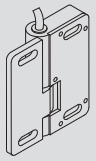
Tolerances:
Switching angle (opening) +2.0°/–1.5°
Positive opening torque 10 %
Positive opening angle +0.5°/–3°

Switching angle hysteresis (closing of normally-closed contact –1.0°) from typical hinge switch-off point

Connection drawing

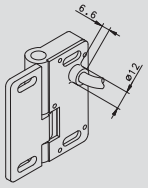


Connection variant 1



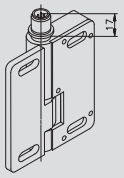
Cable, PVC

Connection variant 2



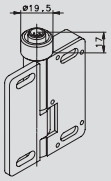
Cable, PVC

Connection variant 3



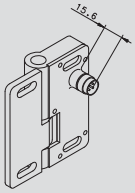
Connector M12 x 1, metal thread

Connection variant 4



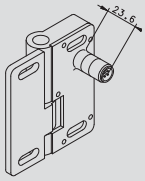
Connector M12 x 1, metal thread with anti-tamper facility

Connection variant 5



Connector M12 x 1

Connection variant 6



Connector M12 x 1

Product selection

Article number	Designation	Switching contact	Max. switching voltage	Type of voltage	Connection variant radial	number	axial	Required cable coupling / type	Remarks
6019261011	SHS-A1Z-KA 5	1NC	230 V	AC/DC		1	Cable		BG approval
6019261014	SHS-A1Z-KR 5	1NC	230 V	AC/DC	Cable	2			BG approval
6019261017	SHS-A1Z-SA-BG	1NC	230 V	AC/DC		4	M12	A	BG approval
6019261018	SHS-A1Z-SR-BG	1NC	230 V	AC/DC	M12	6		A	BG approval
6019261009	SHS-A1Z-SA	1 Changeover contact	230 V	AC/DC		3	M12	C	
6019261010	SHS-A1Z-SR	1 Changeover contact	60 V	DC	M12	5		B	
6019261015	SHS-A1Z-SA	1 Changeover contact	60 V	DC		3	M12	B	
6019261016	SHS-A1Z-SR	1 Changeover contact	230 V	AC/DC	M12	6		C	
6019291013	SHS-0Z								Blank hinge

Technical data

Electrical data		
Rated insulation voltage	U_i	250 V
Rated surge voltage strength	U_{imp}	2.5 kV
Thermal current	I_{the}	3 A
Rated operating voltage	U_e	230 V AC; 60 V DC
Utilization category		AC-15, 230 V AC/1.5 A;
Positive opening	⊖	conforming to IEC/EN 60947-5-1, Addendum K
Short-circuit protection		Fuse 4 A gL/gG
Mechanical data		
Switch		GD-Zn
Ambient temperature		–25°C to + 70°C (Connection cable installed)
Mechanical service life		10^6 switching cycles
B10d		2 mill.
Switching frequency		max. 1200 switching cycles/hour
Mounting		4x M6 screws DIN 7984 or DIN 6912
Type of connection		Fixed connection cable, 3 x 0.5 mm^2 x 5 m (AWG20), minimum bending radius = 25 mm
Weight		approx. 0.7 kg (cable variant) approx. 0.4 kg (connector and blank hinge variant)
Installation position		Any
Protection class		IP67 as per IEC/EN 60529
Switching angle		± 3° from setting point
Positive opening angle		± 10° from setting point
Positive opening torque		1.5 Nm
Mechanical load		F_{R1}= max. 1000 N, F_{R2}= max. 500 N, F_A = max. 750 N
Standards		
VDE 0660 T100, DIN EN 60947-1, IEC 60947-1 VDE 0660 T200, DIN EN 60947-5-1, IEC 60947-5-1		

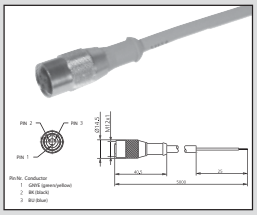
Safety Switches for Hinged Protective Equipment

SHS Cable Type A

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251103234	AN-KAB.SHS 5M AC STRAIGHT	5 m	Straight	3	AC/DC BG version
3251103236	AN-KAB.SHS 5M AC ELBOW	5 m	Elbow	3	AC/DC BG version

Contact assignments, AC/DC versions

1 = Green/yellow
2 = Black
3 = Blue



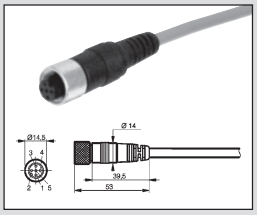
Core insulation / sheathing material:	PVC (UL)/PVC (UL)
Moulding / contact carrier material:	PUR (UL)/PUR (UL)
Max. rated voltage:	300 V AC
Max. current carrying capacity:	3 A
Min. / max. temperature range:	–25 °C / +70 °C
	–13 °F / +158 °F
Cable configuration mm²:	3 x 0.5
Protection class when assembled:	IP67

SHS Cable Type B

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251003221	AN-KAB.SHS 2M DC STRAIGHT	2 m	Straight	3	DC approval
3251003222	AN-KAB.SHS 5M DC STRAIGHT	5 m	Straight	3	DC approval
3251003223	AN-KAB.SHS 10M DC STRAIGHT	10 m	Straight	3	DC approval
3251003224	AN-KAB.SHS 2M DC ELBOW	2 m	Elbow	3	DC approval
3251003225	AN-KAB.SHS 5M DC ELBOW	5 m	Elbow	3	DC approval
3251003226	AN-KAB.SHS 10M DC ELBOW	10 m	Elbow	3	DC approval

Contact assignments, DC versions

1 = Brown
2 = –
3 = Blue
4 = Black



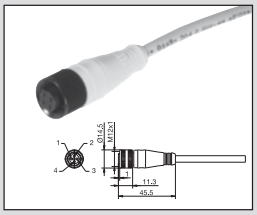
Core insulation / sheathing material:	PVC/PVC
Moulding / contact carrier material:	PUR/PUR
Max. rated voltage:	60 V AC/75 V DC
Max. current carrying capacity:	1.5 A
Min. / max. temperature range:	–25 °C / +70 °C
	–13 °F / +158 °F
Cable configuration mm²:	3 x 0.34
Protection class when assembled:	IP67

SHS Cable Type C

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004219	AN-KAB.SHS 5M AC STRAIGHT	5 m	Straight	4	AC/DC-approval
3251004220	AN-KAB.SHS 5M AC ELBOW	5 m	Elbow	4	AC/DC-approval

Contact assignments, AC/DC versions

1 = Brown
2 = Black
3 = Blue
4 = Green/yellow



Core insulation / sheathing material:	PVC/PVC
Moulding / contact carrier material:	PUR/Nylon 6.6
Max. rated voltage:	300 V AC
Max. current carrying capacity:	4.0 A
Min. / max. temperature range:	–5 °C / +70 °C
	–13 °F / +158 °F
Cable configuration mm²:	4 x 0.34
Protection class when assembled:	IP68