

# Safety Switches for Hinged Protective Equipment

## Safety Hinge Switch – SHS

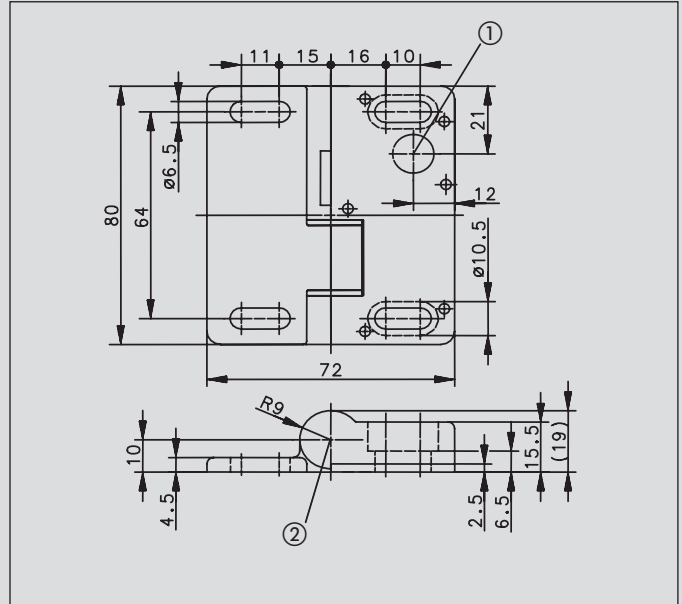


Illustration showing fixed pin and shearing bolt sheared off

- ☒ Position of connection variant 2, 5 and 6.
- ☒ 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.

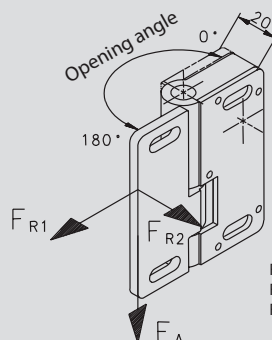
The design of the SHS safety hinge switch has been optimised to allow its effective use on aluminium section systems. Its shallow depth, even when fully opened, makes it ideally suited for use in constricted installation conditions on machines. Safety switches with separate actuators are often subjected 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 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



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

### 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:

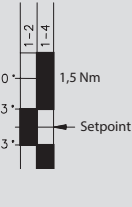
- A pressure die-cast zinc enclosure allows versatile use of the SHS switch in varied applications
- When used as a load bearing hinge, the SHS takes up loads of up to 750 N in axial direction and 1000 N in radial direction after the switching point has been finally set
- The protection rating is IP67

### Switching diagram

1 NC contact  
(Type B)



1 Changeover contact  
(Type C)

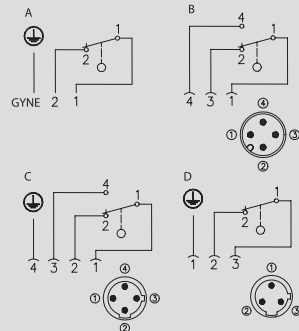


Setting point freely selectable  
in range from 0°... 225°

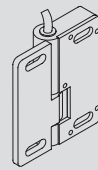
Tolerances:  
Switching angle (opening) +2.0°/-1.5°  
Positive opening torque 10 %  
Positive opening angle +0.5°/-3°

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

### Connection drawing

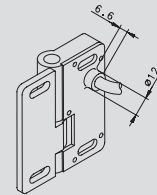


### Connection variant 1



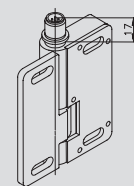
Cable, PVC

### Connection variant 2



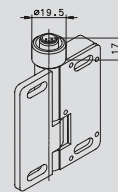
Cable, PVC

### Connection variant 3



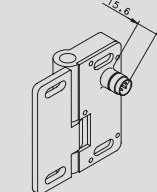
Connector M12 x 1,  
metal thread

### Connection variant 4



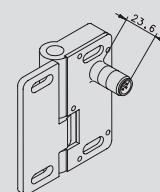
Connector M12 x 1,  
metal thread with  
anti-tamper facility

### 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			Required cable coupling / type	Remarks
					radial	number	axial		
6019261011	SHS-A1Z-KA 5	1NC	230 V	AC/DC		1	Cable		BG approval
6019261014	SHS-A1Z-KR 5	1NC	230 V	AC/DC		2	Cable		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		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-OZ								Blank hinge

### Technical data

Electrical data		
Rated insulation voltage	U <sub>i</sub>	250 V
Rated surge voltage strength	U <sub>imp</sub>	2.5 kV
Thermal current	I <sub>the</sub>	3 A
Rated operating voltage	U <sub>e</sub>	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 <sup>6</sup> 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 <sup>2</sup> 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 <sub>R1</sub> = max. 1000 N, F <sub>R2</sub> = max. 500 N, F <sub>A</sub> = 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		

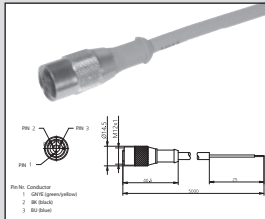
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## SHS Cable Type A

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251103234	AN-KAB.SH5 5M AC STRAIGHT	5 m	Straight	3	AC/DC BG version
3251103236	AN-KAB.SH5 5M AC ELBOW	5 m	Elbow	3	AC/DC BG version

### Contact assignments, AC/DC versions

- 1 = Green/yellow
- 2 = Black
- 3 = Blue



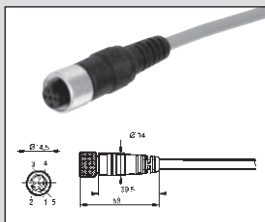
Core insulation / sheathing material:	PVC (UL)/PVC (UL)
Moulding / contact carrier material:	PUR (UL)/PUR (UL)
Max. rated voltage:	300 V AC
Max. current carrying capacity:	3 A
Min. / max. temperature range:	-25 °C / +70 °C
	-13 °F / +158 °F
Cable configuration mm <sup>2</sup> :	3 x 0.5
Protection class when assembled:	IP67

## SHS Cable Type B

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251003221	AN-KAB.SH5 2M DC STRAIGHT	2 m	Straight	3	DC approval
3251003222	AN-KAB.SH5 5M DC STRAIGHT	5 m	Straight	3	DC approval
3251003223	AN-KAB.SH5 10M DC STRAIGHT	10 m	Straight	3	DC approval
3251003224	AN-KAB.SH5 2M DC ELBOW	2 m	Elbow	3	DC approval
3251003225	AN-KAB.SH5 5M DC ELBOW	5 m	Elbow	3	DC approval
3251003226	AN-KAB.SH5 10M DC ELBOW	10 m	Elbow	3	DC approval

### Contact assignments, DC versions

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



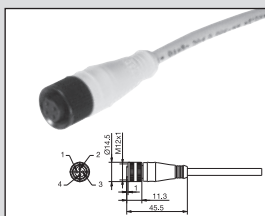
Core insulation / sheathing material:	PVC/PVC
Moulding / contact carrier material:	PUR/PUR
Max. rated voltage:	60 V AC/75 V DC
Max. current carrying capacity:	1.5 A
Min. / max. temperature range:	-25 °C / +70 °C
	-13 °F / +158 °F
Cable configuration mm <sup>2</sup> :	3 x 0.34
Protection class when assembled:	IP67

## SHS Cable Type C

Article number	Designation	Cable length	Connector type	Number of pins	Special feature
3251004219	AN-KAB.SH5 5M AC STRAIGHT	5 m	Straight	4	AC/DC-approval
3251004220	AN-KAB.SH5 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 mm <sup>2</sup> :	4 x 0.34
Protection class when assembled:	IP68