



**We make
safety happen.**

Safety switch with
separate actuator
SK Series



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1 Intended use



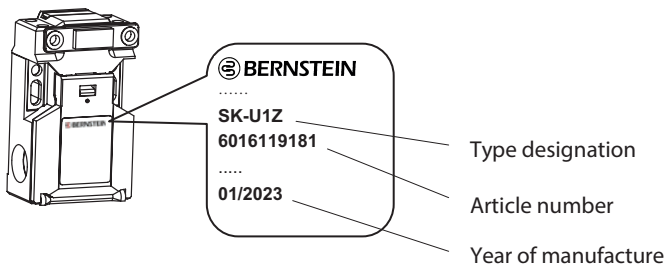
The SK encapsulated safety switches with separate actuator are suitable for mounting on safety facilities. They are used for the purpose of initiating switching and control operations. SK safety switches are type 2 limit switches with lowlevel coding according to DIN EN ISO 14119.

2 Function

When the safety guard is opened, the safety switches ensure the safe state of the machine. For this purpose, the contacts act on the safety logic.

3 Identifying

Position of the label: on the cover or on one of the enclosure sides.



3.1 Identification by article number

The article number of the safety switch can be found below the designation on the label. Please quote this number for correspondence and orders with BERNSTEIN AG.

3.2 Identification by type designation

The type designation consists of 6 blocks. Hyphens separate blocks 1 and 2. All other blocks are separated by a space.

Block	1	2	3	4	5	6
Example	SK	- U1Z	F30	M	M12	X

Block 1 - Series

SK = Safety switch, insulation material encapsulated

Block 2 - Contact configuration

	NO contact	NC contact	Slow-action function	Positive opening action	Delayed NC contact when closing	Type
U1Z	1 x	1 x	•	•		Zb
UV1Z	1 x	1 x	•	•	•	Zb
A2Z		2 x	•	•		Zb
UV15Z	1 x	2 x	•	•	•	Zb

Block 3 - Extraction force

Fxy The number given (xy) corresponds to the force in newtons.
(example: F30 = pull-out force 30 N)

no specification: pull-out force = 10 N (standard)

Block 4 - Actuator

M 1 Actuator M1 - Standard cast stainless steel actuator with actuator cap
M 2 Actuator M2 - Press-bend actuator - straight
M 3 Actuator M3 - Press-bend actuator - angled
M 4 Actuator M4 - Press-bend actuator with actuator cap
M 5 Actuator M5 - Press-bend actuator (short) without actuator cap
M 6 Actuator M6 - Radius actuator universal
M Actuator M - Standard cast stainless steel actuator with actuator cap
MRU Actuator MRU - Radius actuator universal
not specified: without actuator

Block 5 - Connection

M12 M12x1 connector plug

No specification: Housing with M20x1,5 cable entry (standard).

Block 6 - Special features (customer-specific)

X Special features, general

Alphanumeric characters as abbreviation for special features.

Example „SK-U1Z“

Safety switch, insulation material encapsulated,
1 NC contact, 1 NO contact, slow-action function, positively opening, type Zb,
Enclosure with M20x1,5 cable entry,
no special features

4 Warning and safety instructions



Warnung:

Improper installation or tampering with the safety switches will result in loss of the personal protection function and may cause serious or fatal injury.

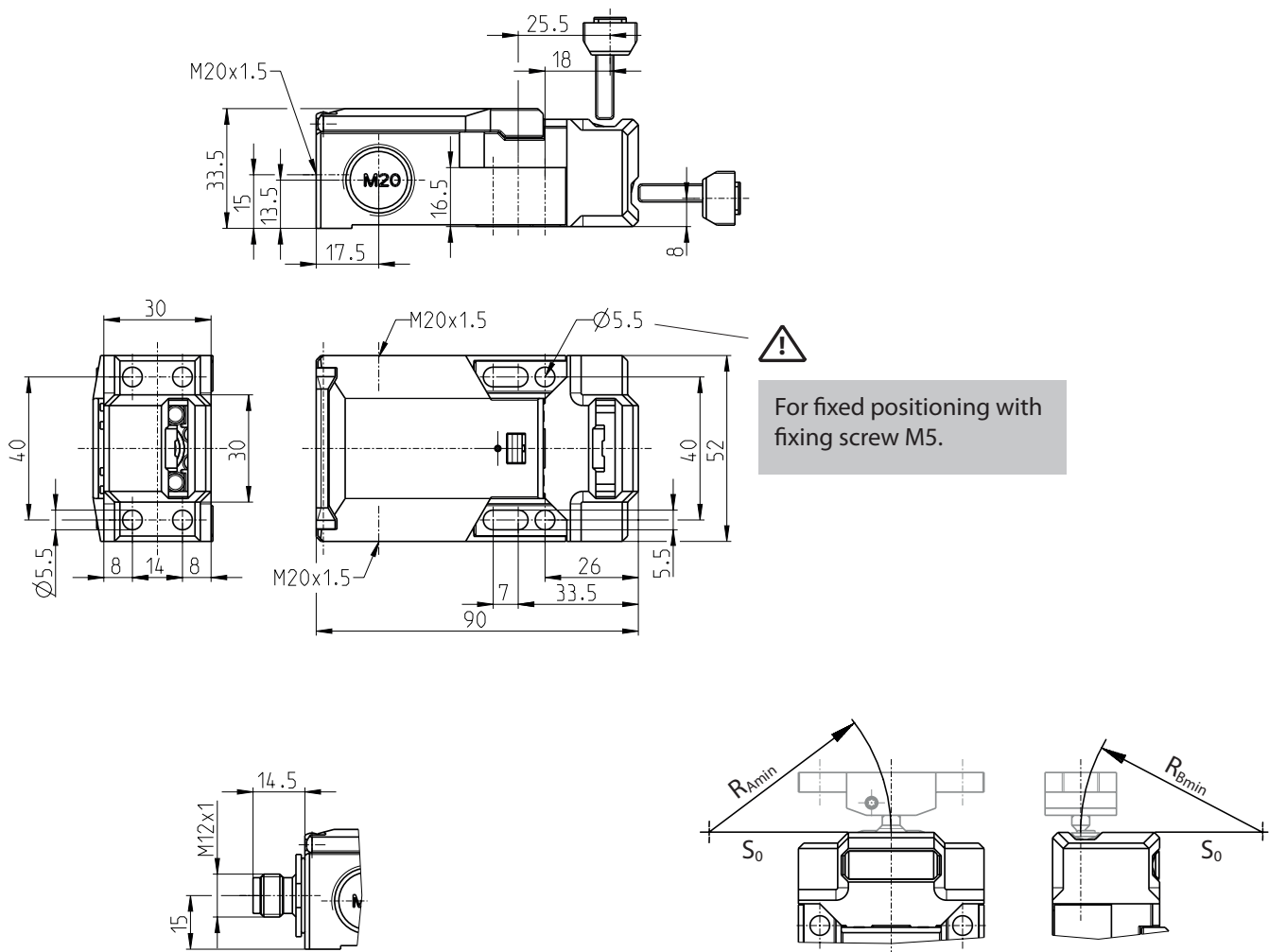
The safety switch must not be used as a mechanical stop

To maintain the safety level, the safety switches should only be ordered and installed as a unit together with the corresponding actuator.

The availability of replacement actuators and keys ensures a simple handling of safety guards. Therefore, replacement actuators and keys have to be securely monitored.

5 Dimensions

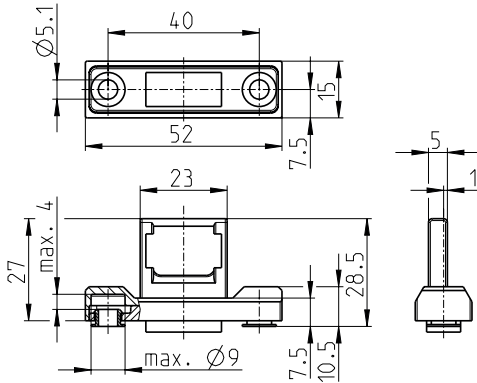
5.1 SK (Safety switch)



Version with connector M12x1

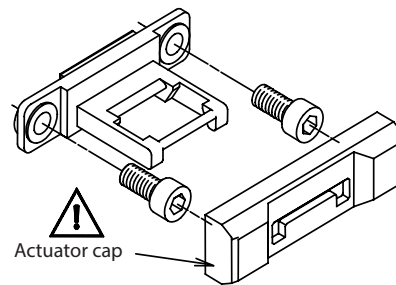
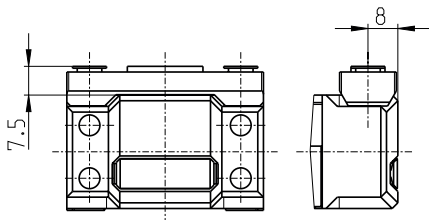
R_{Amin} and R_{Bmin} depend on the actuator.
 R_{Amin} and R_{Bmin} apply to a pivot point on the level of the upper edge of the enclosure S_0 .
 Applies accordingly also to lateral retraction directions.

5.2 Actuator M1 (identical with SK-BET.KPL.M.KAP.)
(to be ordered individually under article number 6016999190)

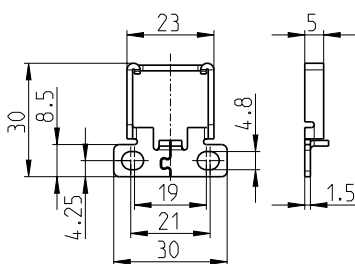


Component	Material
Actuator	Stainless steel
Actuator cap	Polyamide PA66/6 FR
Socket	Stainless steel
Foam	Cell-PE

$R_{Amin} = 250 \text{ mm}$, $R_{Bmin} = 400 \text{ mm}$
Extraction forces: up to 50 N

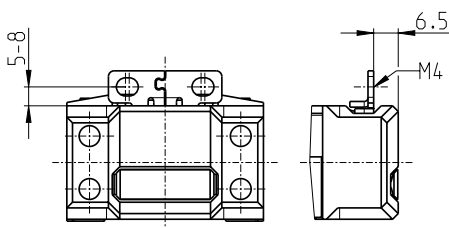


5.3 Actuator M2
(to be ordered individually under article number 6016999191)



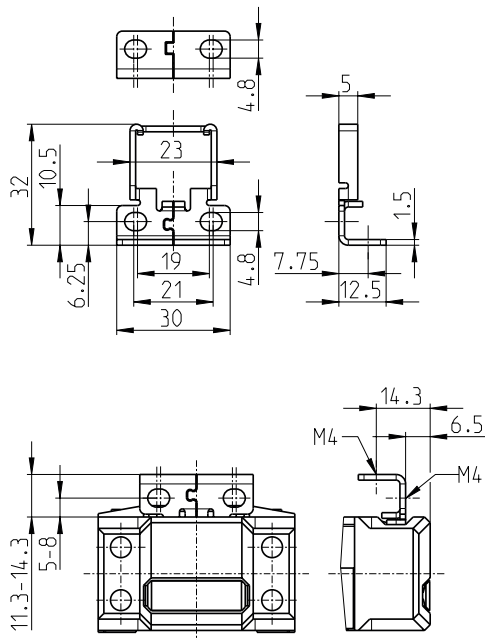
Component	Material
Actuator	Stainless steel

$R_{Amin} = 400 \text{ mm}$, $R_{Bmin} = 1000 \text{ mm}$
Extraction forces: up to 50 N



5.4 Actuator M3

(to be ordered individually under article number 6016999192)

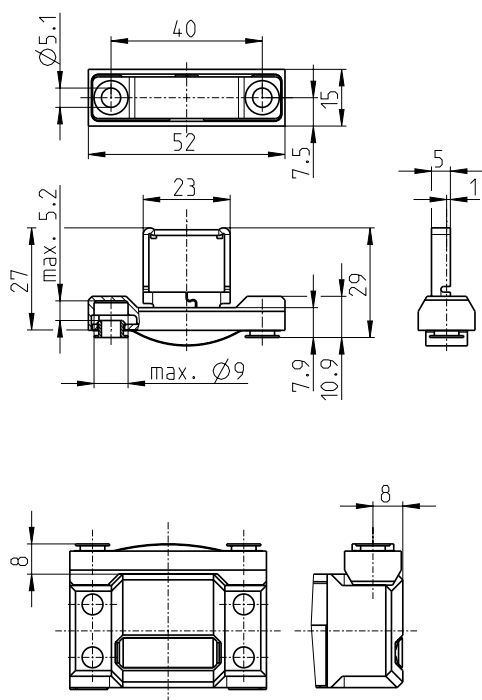


Component	Material
Actuator	Stainless steel

$R_{Amin} = 400 \text{ mm}$, $R_{Bmin} = 1000 \text{ mm}$
 Extraction forces: up to 50 N

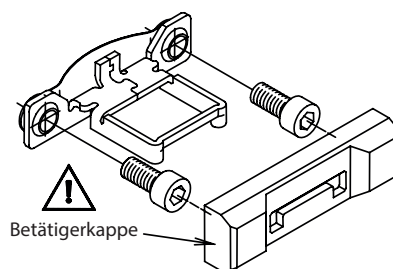
5.5 Actuator M4

(to be ordered individually under article number 6016999193)



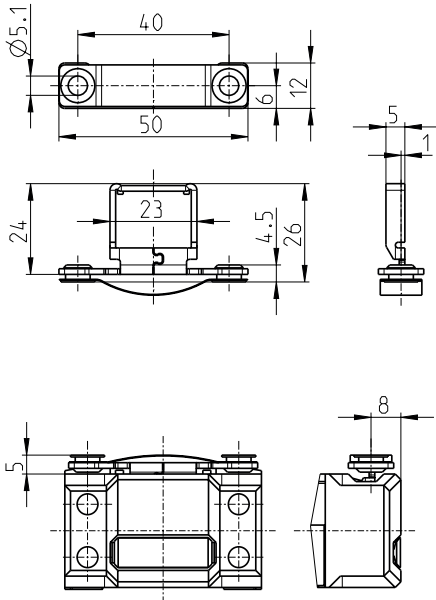
Component	Material
Actuator	Stainless steel
Actuorkappe	Polyamide PA66/6 FR
Socket	Stainless steel
Leaf spring	Stainless steel

$R_{Amin} = 250 \text{ mm}$, $R_{Bmin} = 400 \text{ mm}$
 Extraction forces: up to 10 N



5.6 Actuator M5

(to be ordered individually under article number 6016999194)

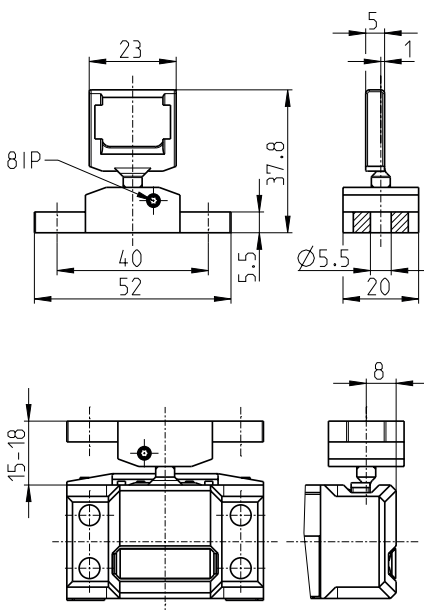


Component	Material
Actuator	Stainless steel
Actuatorekappe	Polyamide PA66/6 FR
Socket	Stainless steel
Leaf spring	Stainless steel

$R_{Amin} = 250 \text{ mm}$, $R_{Bmin} = 400 \text{ mm}$
 Extraction forces: up to 10 N

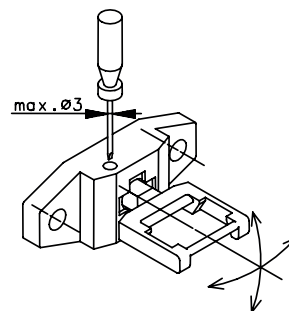
5.7 Actuator M6 (identical with SK-BETÄTIGER MRU KPL.)

(to be ordered individually under article number 6016999195)

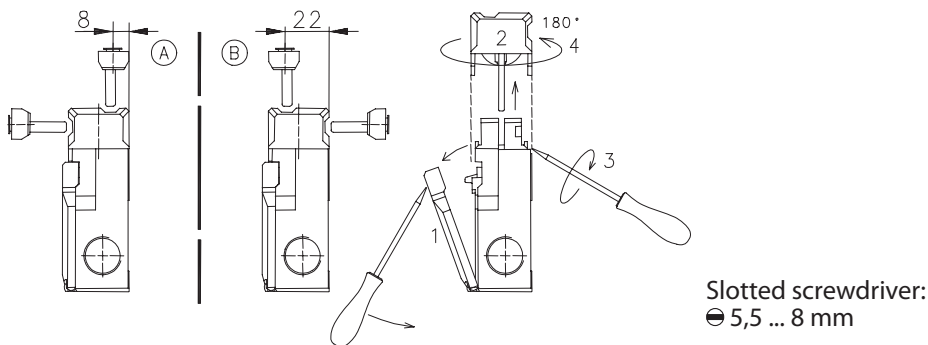


Component	Material
Actuator	Stainless steel
Enclosure	Stainless steel
Cam	Stainless steel

R_{Amin} , R_{Bmin}
 in adjustment directions = 150 mm
 Extraction forces: up to 30 N



6 Engagement options



4 actuating positions by repositioning the cap (position A and B)

Cover (1) must be opened before repositioning cap (2).

Insert tip of screwdriver in gap between cap and enclosure and turn (cap releases) (3).

Remove cap and turn through 180° as illustrated (4), fit in enclosure and close cover.

The actuator slot that is not used must be closed by the cover.

7 Installation

Installation may only be carried out by authorised specialist personnel.

Make sure that no voltage is applied during installation.

Foreign bodies must not be able to enter the actuator slot.



Installation must be carried out in accordance with EN ISO 12100, DIN EN ISO 14120 and DIN EN ISO 14119. Particular attention must be paid to measures designed to reduce the possibilities of bypassing the system.

The arrangement and fastening of the safety switches and actuators must be carried out in accordance with DIN EN ISO 14119.

Fasten the safety switch and actuator with 2 screws each (see dimensional drawings on pages 5 to 8).

Self-loosening must be prevented.

For tamper-proof fastening of the safety switch and actuator, see DIN EN ISO 14119.

Safety switch and the actuator must be aligned during mounting so that no transverse forces act on the actuating head during actuation.

The minimum radii apply to a pivot point at the height of the top edge of the enclosure S_0 (see page 5).

With radius actuation (see above), the mechanical service life may be reduced.

The installation position is arbitrary, but should allow inspection and, if necessary, replacement by qualified personnel.

The actuator slot that is not used must be closed by the cover.

Safety switches and actuators must not be used as a mechanical stop.

Safety switches and actuators must be designed according to the forces to be expected.



If the actuator used is fitted with a cap, this must be snapped on.

8 Electrical connection

Electrical connection should only be carried out by authorised technical personnel.
Make sure that no voltage is applied during installation.

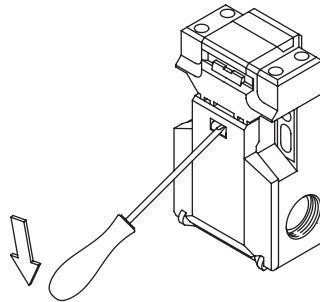
8.1 Opening the cover

The safety switch is opened by unlatching the cover with a screwdriver.

slotted screwdriver

⌀ 5,5 ... 8 mm

Insert tip of screwdriver in gap between cap and enclosure and turn



8.2 Remove press-out blank

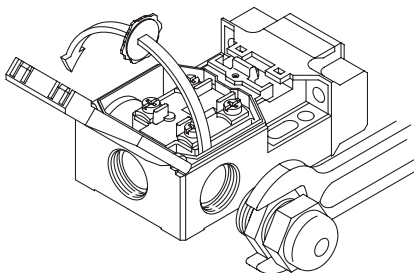
At least one of the 3 press-out blanks must be removed in order to feed in a cable.

Screw in the required screw connection (M20x1,5).

In so doing the press-out blank is separated and pressed into the enclosure.

Open the cover with a screwdriver.

Remove the press-out blank. It must not be left in the enclosure.



8.3 Electrical connection by means of cable

The electrical contacts of the contact elements U1Z, UV1Z and A2Z have four M3.5 screw connections.

Tightening torque $M = 0,8 \text{ Nm}$.

The electrical contacts of the contact elements UV15Z have 6 screw connections M3. Tightening torque $M = 0,6 \text{ Nm}$.

See "Circuit Symbols and Circuit Diagram" for contact assignments.

The connection must be made as a stranded conductor with ferrule or solid with conductor cross-sections of $0,5 - 1,5 \text{ mm}^2$.

Stripping length: 7 - 8 mm

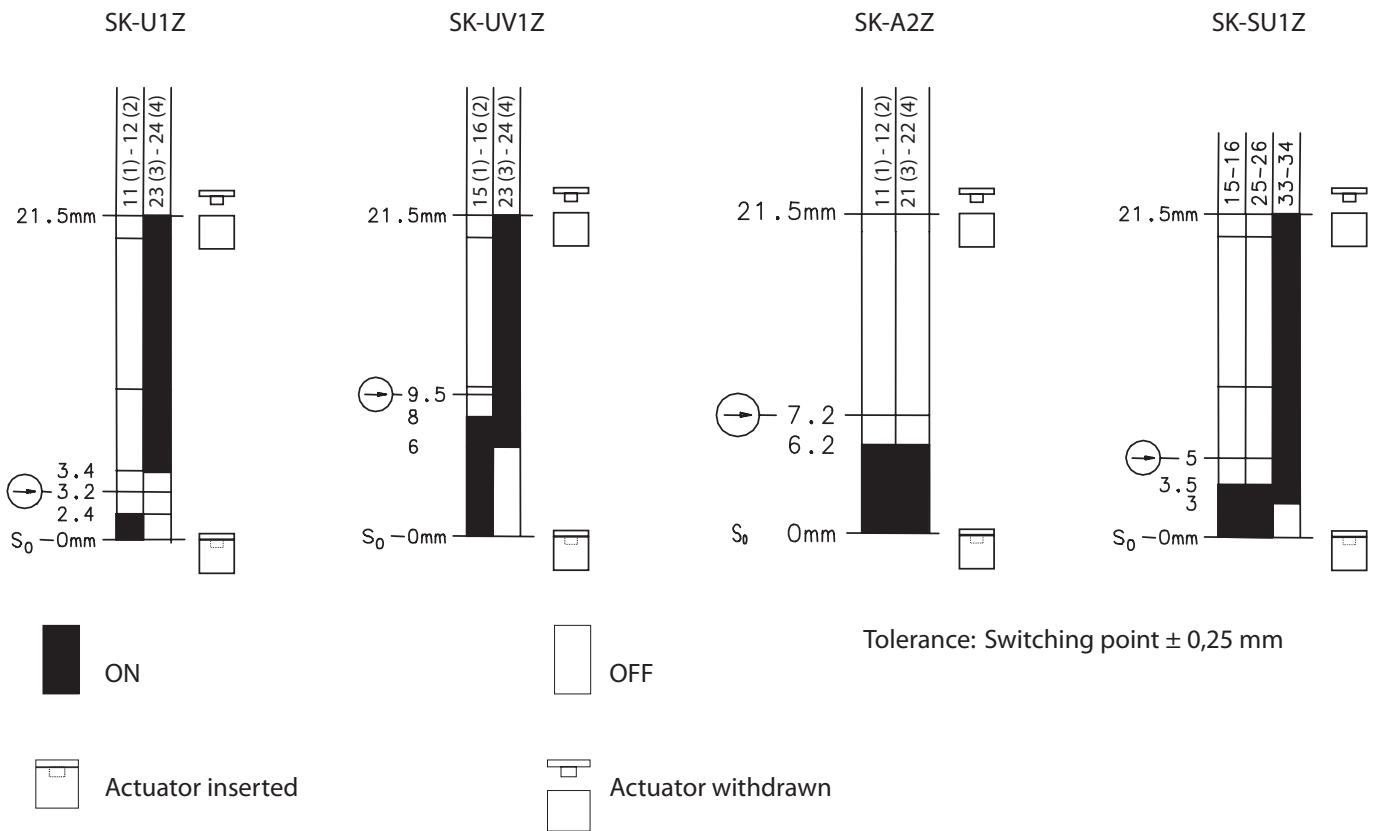
8.4 Electrical connection by means of M12x1 plug

The alignment of the plug contacts to the enclosure of the safety switch is not fixed.

Secure the cable coupling against self-loosening!

9 Switching symbols and diagrams



	SK-U1Z	SK-UV1Z	SK-A2Z	SK-UV15Z
Contact type	1 NO/1 NC (Zb)	1 NO/1 NC (Zb)	2 NC (Zb)	1 NO/2 NC (Zb)
Operating symbol	 			



10 Function test

1. Check for correct insertion of the actuator into the safety switch.
2. Undamaged cable entry or M12x1 connection.
3. Correct connection of the conductors to the screw terminals or tight fit of the M12x1 coupling.
4. Check the safety switch and actuator for tight fit and damage.
5. Check the switching function when opening and closing the safety guard.
6. Check the entire safety function in which the safety switch is integrated.

11 Electrical Data

Contact elements		U1Z	UV1Z	A2Z	UV15Z
Rated isolation voltage	U_i		250 V _{AC}		400 V _{AC}
Rated impulse withstand voltage	U_{imp}		2,5 kV		
Conventional thermal current	I_{the}		10 A		5 A
Utilization category	U_e / I_e		AC-15 240 V / 3 A		AC-15 240 V / 1,5 A
Direct opening action			acc. to IEC/EN 60947-5-1, Annex K		
Rated conditional short-circuit current			1000 A		
Short circuit protection		10 A gG			6 A gG
Protection class			II		

12 Mechanical Data

Enclosure	Polyamide PA6 GF FR (UL94-V0)
Cover	Polyamide PA66/6 GF FR (UL94-V0)
Actuator head	Polyamide PA66/6 GF FR (UL94-V0)
Operation	Separate actuator
Approach speed	≤ 0,2 m/s
Ambient air temperature	-30 °C to +80 °C
Storage temperature	-30 °C to +80 °C
I. Shock	
Test standard	DIN EN 60068-2-27
Shock amplitude	30 g
Shock duration	11 ms
Number of shocks	3
II. Permanent	
Test standard	DIN EN 60068-2-27
Shock amplitude	10 g
Shock duration	16 ms
Number of shocks	1000
Mechanical life	1 x 10 ⁶ switching cycles (Extraction forces ≤ 10 N) 1 x 10 ⁵ switching cycles (Extraction forces > 10 N)
Switching frequency	≤ 30 / min.
Connection	Screw connections or connector M12x1, A-Coding
Conductor cross-sections	0,5 – 1,5 mm ² (Solid or stranded wire with ferrules)
Protection type	IP 65 acc. to IEC/EN 60529 ¹⁾
Pollution degree	3

¹⁾ The specified type of protection (IP code) of the safety switches applies only with the cover closed and using a cable gland of at least equivalent quality specification with corresponding cable.

13 Characteristics for functional safety

B10d (electrical und mechanical)

2 x 10⁶ switching cycles (@ DC-13; 24 V; I_{e2} = 0,1 A; Extraction forces ≤ 10 N)

2 x 10⁵ switching cycles (@ DC-13; 24 V; I_{e2} = 0,1 A; Extraction forces > 10 N)

14 Standards

DIN EN 60947-5-1

DIN EN ISO 13849-1

DIN EN ISO 14119

15 EU Conformity



2006/42/EG (Safety-of-Machinery-Directive)



2012/19/EU (EU-WEEE II);

WEEE-Reg.-Nr. DE 50560927

16 UK Conformity



Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597

17 Standards

(Valid approvals: see label or technical data sheet.)

TÜV Rheinland, Product Safety

cCSAus

CCC

18 Notes

The required PL / SIL for the safety function of the protective device must be determined by the risk analysis and implemented

in accordance with DIN EN ISO 13849-1 or DIN EN 62061. The overall concept of the control system in which the safety switch is

integrated must be validated in accordance with DIN EN ISO 13849-2. If safety switches are connected in series, the performance level according to DIN EN 13849-1 (SIL according to EN 61062) may be reduced. The reason for this is reduced fault detection (see DIN EN ISO 14119).

19 Maintenance / Service

The safety switch is maintenance free.

To assure a failure-free and long service life the following checks have to be carried out in regular intervals:

- correct insertion of the actuator into the switch
- firm fit of all components
- condition of all seals
- heavy wear and tear

In case that a failure is detected the whole switching device must be replaced.

The actuator opening must be protected to prevent the penetration and accumulation of foreign particles (e.g. metal chips, dust, ...).


20 Liability Disclaimer

By breach of the given instructions (concerning the intended use, the safety instructions, the installation and connection through qualified personnel and the testing of the safety function) manufacturer's liability expires.


21 Original operating and installation instructions

The original operating and installation instructions are the German language version. Other languages are a translation of the original operating and installation instructions.

22 Declaration of Conformity



EU/UK-Konformitätserklärung / EU/UK-Declaration of Conformity / UE/UK-Déclaration de conformité

<p>Diese Konformitätserklärung entspricht der europäischen Norm DIN EN ISO/IEC 17050-1: Konformitätsbewertung – Konformitätserklärung von Anbietern – Teil 1: Allgemeine Anforderungen. Die Grundlage der Kriterien sind internationale Dokumente, insbesondere ISO/IEC-Leitfaden 22, 1982, Informations on manufacturer's declaration of conformity with standards or other technical specifications. Die deutsche Sprachfassung ist die Originalkonformitätserklärung. Bei anderen Sprachen handelt es sich um die Übersetzung der Originalkonformitätserklärung.</p> <p>This Declaration of Conformity is suitable to the European Standard EN ISO/IEC 17050-1: Conformity assessment – Supplier's declaration of conformity – Part 1: General requirements. The basis for the criteria has been found in international documentation, particularly in: ISO/IEC Guide 22, 1982, Informations on manufacturer's declaration of conformity with standards or other technical specifications. The original Declaration of Conformity is the German language version. Other languages are a translation of the original Declaration of Conformity.</p> <p>Cette déclaration de conformité correspond au Norme Européenne EN ISO/IEC 17050-1: Évaluation de la conformité – Déclaration de conformité du fournisseur – Partie 1: Exigences générales. La base des directives sont des documents internationaux répondant à ISO/IEC-Guide 22, 1982, Informations on manufacturer's declaration of conformity with standards or other technical specifications. La version allemande est la langue d'origine de la déclaration de conformité. Les autres langues ne sont qu'une traduction de la déclaration de conformité en langue allemande.</p>	<p>Wir / We / Nous</p>	<p>BERNSTEIN AG <small>(Name des Anbieters) / (Supplier's name) / (Nom du fournisseur)</small></p> <hr/> <p>Hans-Bernstein-Straße 1 D-32457 Porta Westfalica <small>(Anschrift) / (Address) / (Adresse)</small></p> <hr/> <p>erklären in alleiniger Verantwortung, dass das (die) Produkt(e): declare under our sole responsibility that the product(s): déclarons sous notre seule responsabilité que le(s) produit(s):</p> <p>Isolierstoffgekapselter Sicherheitsschalter / Encapsulated safety switch / Interrupteurs de sécurité à boîtier isolant:</p> <p>Typ / Type / Type: SK-...; SKC-...;</p> <p><small>(Bezeichnung, Typ oder Modell, Los-, Chargen- oder Serien-Nr., möglichst Herkunft und Stückzahl) (Name, type or model, batch or serial number, possibly sources and number of items) (Nom, type ou modèle, n° de lot, d'échantillon ou de série, éventuellement les sources et le nombre d'exemplaires)</small></p> <hr/> <p>mit folgenden Richtlinien übereinstimmt (übereinstimmen): is (are) in conformity with the following directives: est (sont) conforme(s) aux directives européennes:</p> <p>EU Richtlinie / EU Directive / UE Directive Maschinenrichtlinie / Safety-of-Machinery-Directive 2006/42/EC</p> <p>UK Richtlinie / UK Directive / UE Directive Supply of Machinery (Safety) Regulations 2008: 2008 No. 1597</p> <hr/> <p>Dies wird nachgewiesen durch die Einhaltung folgender Norm(en): This is documented by the accordance with the following standard(s): Notre justification est l'observation de la (des) norme(s) suivante(s):</p> <p>EN 60947-5-1:2017/AC:2020-05 EN ISO 14119:2014-03</p> <hr/> <p>Name und Anschrift Bevollmächtigter Dokumentation: Name and address of authorized agent documentation: Nom et adresse de la documentation autorisée:</p> <p>Herr Wolfgang Vogt D-32457 Porta Westfalica, Hans-Bernstein-Straße 1</p>
<p>Porta Westfalica, 2023-03-22 <small>(Ort und Datum der Ausstellung) (Place and date of issue) (Date et lieu)</small></p>	<p style="text-align: center;">  i. V. Wolfgang Vogt Compliance Officer Product <small>(Name, Position, Unterschrift) (Name, status, signature) (Nom, fonction, signature)</small> </p>	



**DETECT****We make
safety happen.****PROTECT****We keep safe
your visions.**

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