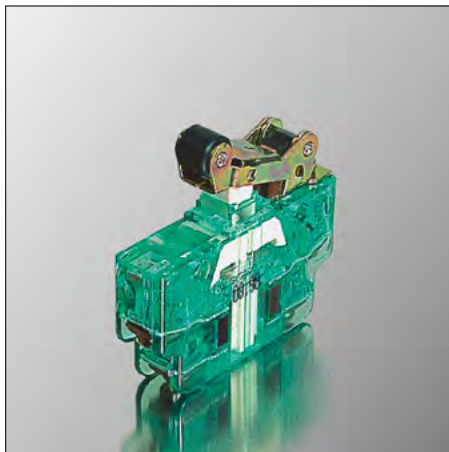
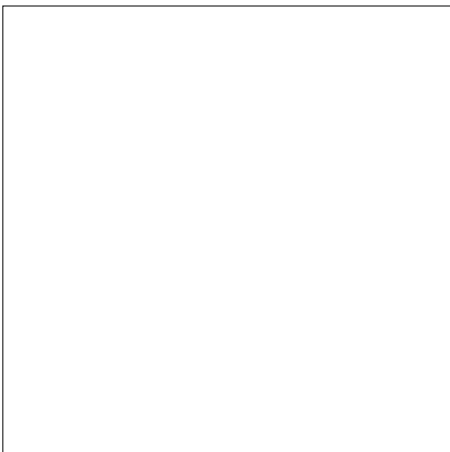
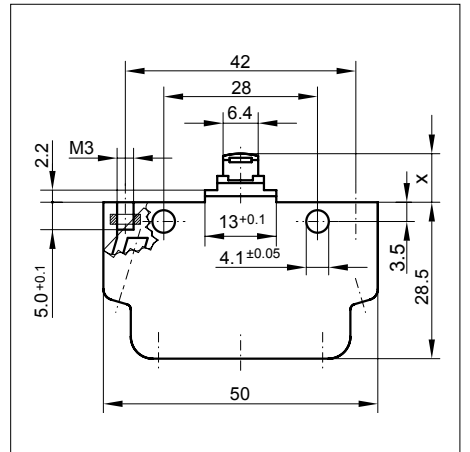
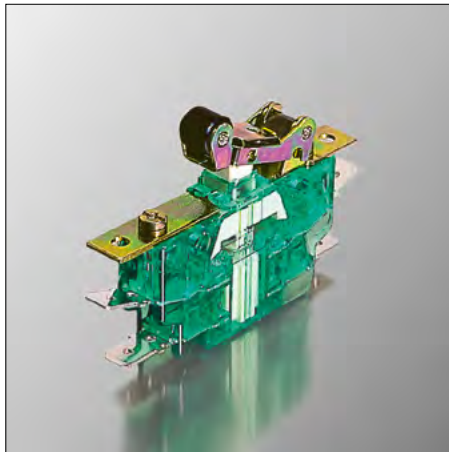
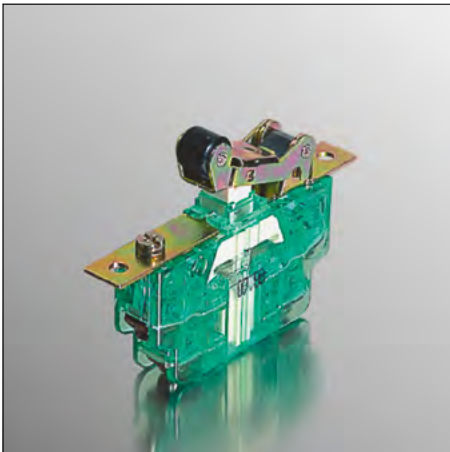
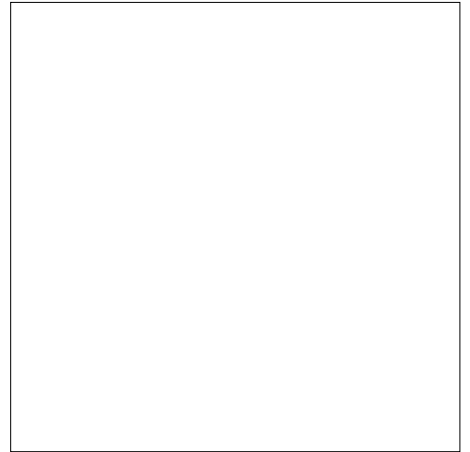
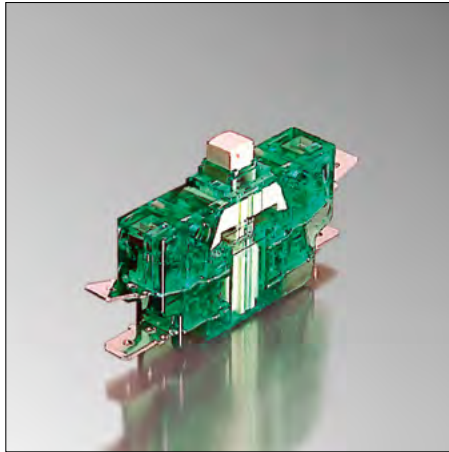


**Snap-action switches
with positive opening
operation and self-
cleaning double-break
contacts
Sealed to IP40
S826 Series**



S826 Series snap-action switches





Features

- Transparent green housing allows for easy inspection of contact condition and internal mechanism
- Practical terminals and accessories:
 - Flat quick-connect terminals according to DIN 46247-3
 - Screw-type terminals
 - Auxiliary actuators
 - Protective cover
- Enhanced DC breaking capacity thanks to magnetic blowout
- Contacts
 - hard silver contacts for high breaking capacity
 - gold-plated contacts with low contact resistance for switching low currents and voltages

Standards

- Performance according to IEC 60947-5-1, VDE 0660 part 200
- Positive opening operation. Mechanical form-locking feature according to IEC 60947-5-1 annex K, VDE 0660 part 200 annex K
- Protection degree IP40 according to IEC 60529, VDE 0470 part 1, DIN 40050-9
- Fire retardant according to UL 94V-0
- Dimensions according to DIN 41636-6, type F
- Flat quick-connect terminals according to DIN 46247-3

Specifications

Specification*1	
Conventional thermal current I_{th}	10 A
Rated insulation voltage U_i	400 V
Pollution degree	PD3 *4
Rated impulse withstand voltage U_{imp}	4 kV
Overvoltage category	III
Contact material	Hard silver (AgCu3), Gold alloy (AuAg26Ni3)
Contact gap, typical	2 x 0.85 mm
Contact force, typical	0.40 N
Contact resistance, typical, without leads connected	100 mΩ
Utilization category (for hard silver contacts)*2	AC 15 230 VAC / 1.0 A DC 13 110 VDC / 0.5 A
Positive opening force*3	20 N
Actuator travel for positive opening	see page 8
Maximum actuator travel*3	3.2 mm
Actuating speed	1 m/s max. 0.5 mm/s min.
Vibration resistance (EN 60068-2-6) 10 ... 500 Hz all directions (at 10 μs maximum opening time)	10 g
Shock resistance (EN 60068-2-27) (at 10 μs maximum opening time)	30 g
Short-circuit protection	6 A gG (IEC 60269-2)
Max. frequency of operation	465 cycles / minute
Actuating force	see page 8
Release force	see page 8
Mechanical endurance	10 million cycles min.
Operating temperature range	-40°C ... +85°C
Weight per switch, without wires	20 ... 40 g, according to type
Approvals	   

*1 Data valid for new switches under laboratory conditions and at room temperature, unless otherwise mentioned.

*2 Gold upon request *3 measured next to actuator *4 for all terminals except «screw with saddle clamp»: 250 V: PD3 / 400 V: PD2

Design characteristics

The positive opening operation of S826 Series snap-action switches guarantees the forced disconnection of contacts even when stuck or welded due to overload currents, or in the unlikely event of a failure of the snap-action mechanism. S826 Series switches are, therefore, especially suited for safety-related applications.

A characteristic feature of the switch is the rapid motion of its contact bridge induced by the force of a pretensioned spring to the effect that the speed at which the moving contact member transfers from one position to another is essentially independent of the actuator speed. This allows the handling of high electric loads at low actuating speeds with a switch of compact design that will fit in the most confined spaces.

The wiping, double-break contacts ensure high reliability even at low electric loads. Switches with gold contacts are particularly suitable for low currents and voltages. Since the contact bridges of S826 Series switches are galvanically isolated, two separate load circuits with independent voltage levels can be controlled simultaneously.

Applications

- Limit switch for use on machine, door and plant controls
- Auxiliary switch in e.g. cam switches and control devices
- Electromechanical switching element for automation tasks with separate electric loads
- Sensor for NC, PLC and computer controls
- Safety limit switch in control panels and electrical installations
- Assemblies subject to high shock and vibration

Ordering code

Example: **S826 b 10/20/40 L**

Series / Contact type

S826 SPDT-DB (form Z circuitry)

Auxiliary actuator options:

a	roller lever with mounting brackets
as	roller lever and mounting brackets with slotted holes
b	pushbutton
c	mounting brackets
cs	mounting brackets with slotted holes
d	roller lever with angled mounting brackets
e	roller lever only

Contact material:

No number	hard silver (AgCu3)
10	gold alloy (AuAg26Ni3)

Terminals:

No number	screw with saddle clamp
20	flat quick-connect terminals 6.3 x 0.8 mm
24	flat quick-connect terminals 6.3 x 0.8 mm, 90° angled
30	screw with spring washer

Actuating and Release Forces:

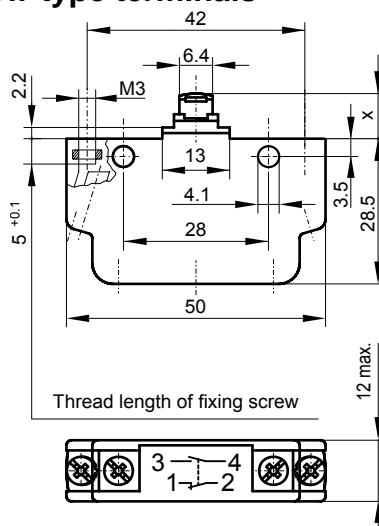
No number	standard (3.3 N max. / 0.2 N min.)
40	stronger reset coil spring (5.5 N max. / 2.9 N min.)

Accessories:

No number	no magnetic blowout
L	standard magnetic blowout

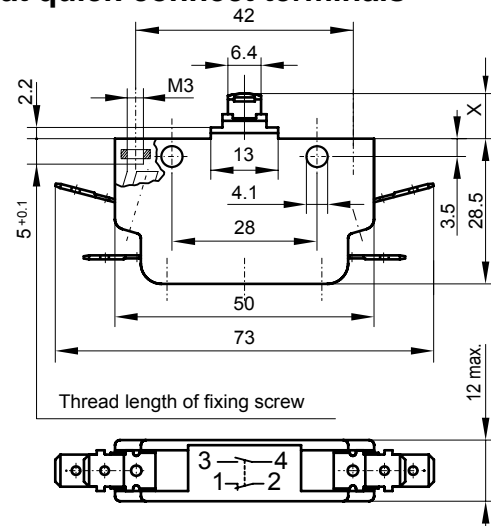
Dimensions

● Screw-type terminals



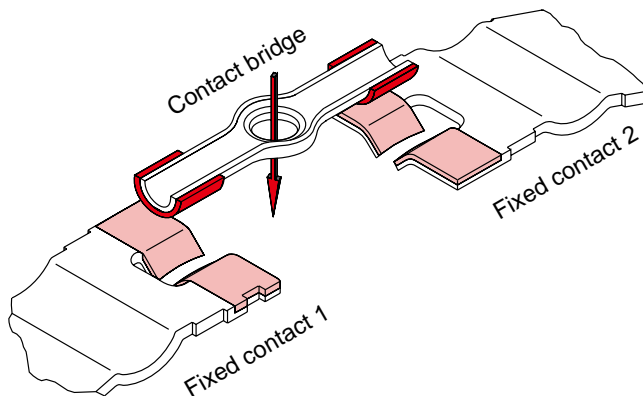
Design with retainer ring and saddle clamps

● Flat quick-connect terminals



Wiping double-break contacts

● Contact Arrangement

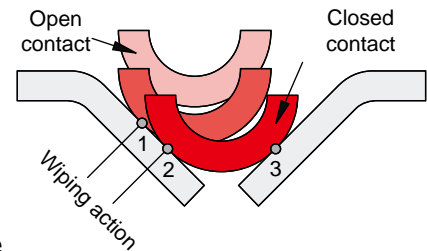


● Self-cleaning of contacts

Being loosely supported by the plunger inside the switch, the contact bridge initially meets the V-shaped fixed contacts at one point only (1) when making contact, before it is straightened between them by the coaxial pressure of the snap spring. The contact bridge slides thereby against the fixed contacts from position 1 to position 2 and thus creates a defined friction.

During each operation this wiping action results in self-cleaning of the contacts on one side.

In total travel position contact is closed on either side of the V-shaped fixed contact (at 2 and 3). The wiping action helps clean the contacts of contamination and keeps contact resistance low.



Accessories

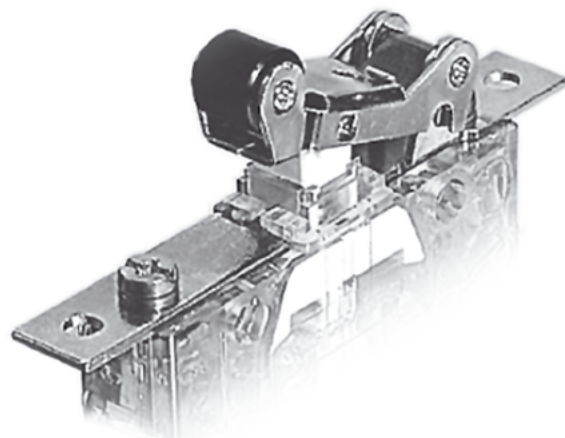
● Auxiliary actuators

● Field of application

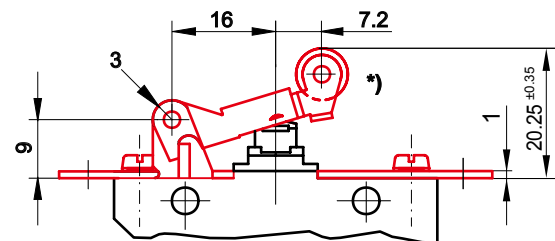
- if direction of actuation deviates more than $\pm 15^\circ$ from the perpendicular line
- if transverse actuators such as cam disks, switch rods or push rods are to be applied
- if maximum actuating speed of transverse actuator ≤ 1.0 m/s.

● Roller lever characteristics

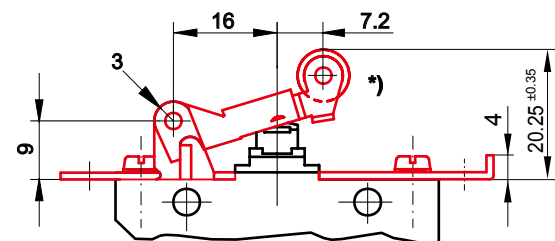
- The roller itself is manufactured from wear-resistant and smooth-running thermoplastic
- Integral part of ordered switch type (see "Ordering code", p. 3)



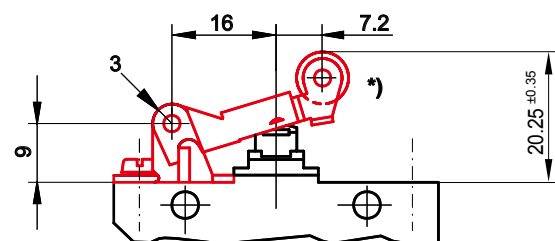
● Auxiliary actuator options



Type a



Type d



Type e

*) Roller diameter: 8.0
Roller width: 6.8

For other dimensions please refer to "Notes on project planning", p. 8 and 9.

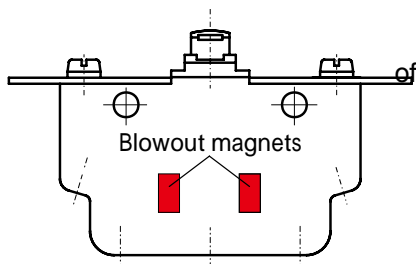
Magnetic blowout

● Mode of action

To increase the breaking capacity and the permissible breaking current under DC loads, integral magnetic blowouts are available. Permanent magnets create a field across the switching contacts, forcing the arc out of the contact area.

The blowout magnets are mounted in the cut-outs the contact area, the effect being independent of the terminal polarity.

The switches can be ganged together, maintaining the normal pitch of 12.5 mm.



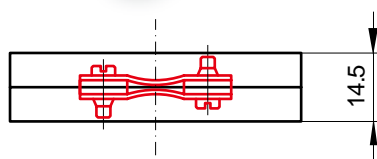
● Maximum breaking capacity

The maximum breaking capacity values are based on 20 operations at which value the arc is still quenched. In determining the electrical rating and operating life of a switch its maximum breaking capacity is reflected. However increased numbers of operations apply (see p. 6).

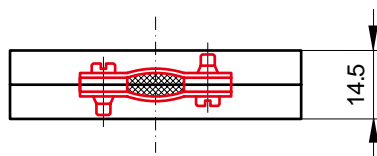
S286 Series - Maximum breaking capacity									
Switching voltage (U)	24 V DC		80 V DC		110 V DC		220 V DC		
	Blowout	no	yes	no	yes	no	yes	no	yes
Time constant L/R	5 ms	>16A	>16A	6.5A	13.5A	4A	7A	0.6A	0.8A
	10 ms	>16A	>16A	5.5A	12A	3A	5.5A	0.4A	0.6A
	20 ms	15A	>16A	4A	9A	1.7A	4A	0.3A	0.5A
	30 ms	12A	>16A	2.5A	7A	1A	3A	0.2A	0.4A
	40 ms	10A	>16A	1.5A	5A	0.6A	2A	—	—
	50 ms	8A	>16A	1.2A	4A	0.4A	1.5A	—	—

Protective housing / cover

● Protective Housing SK-100 complete with strain relief



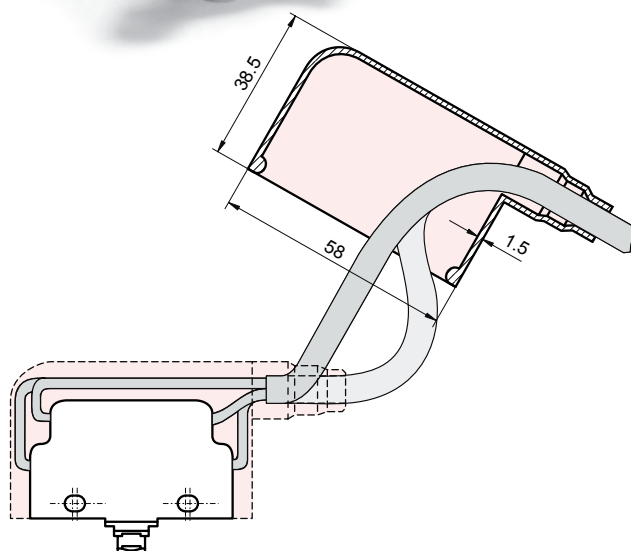
Clamp for cables, 5 ... 8 mm in diameter
Minimum retention force: 80 N



Clamp for cables, 8 ... 10.9 mm in diameter
Minimum retention force: 80 N

- Half shells made of impact resistant fiber glass reinforced PC
- Suitable for switches with screw-type terminals
- Terminals protected against direct contact (IP40)
- Rear strain relief, retention force > 80 N for cable diameter 5 to 8 mm or 8 to 10.9 mm

● Flexible Protective Cover SK-200



- Protective cover made of permanently flexible soft PVC
- Suitable for switches with screw-type terminals
- Finger protected screw terminals (IP40: protection against direct contact)
- Lateral cable outlet with stepped sleeve for supporting outer cable jackets ranging from 6.9 up to 10.9 mm in diameter

Electrical rating and operating life

● Electrical life

is a measure of contact life depending on external conditions such as:

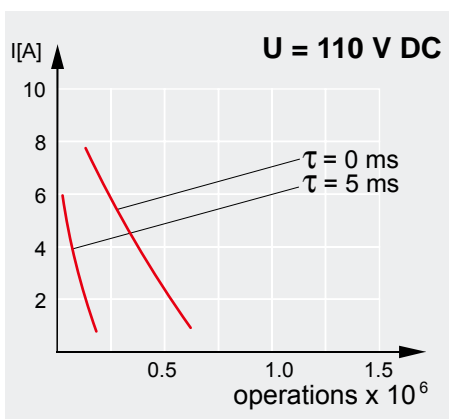
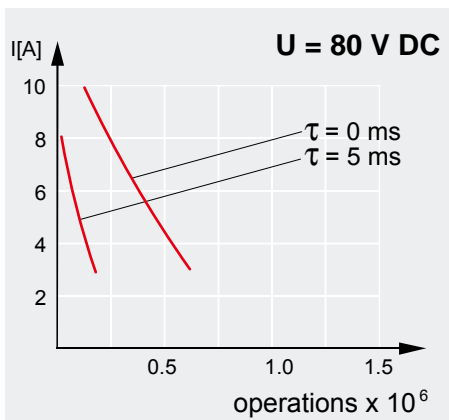
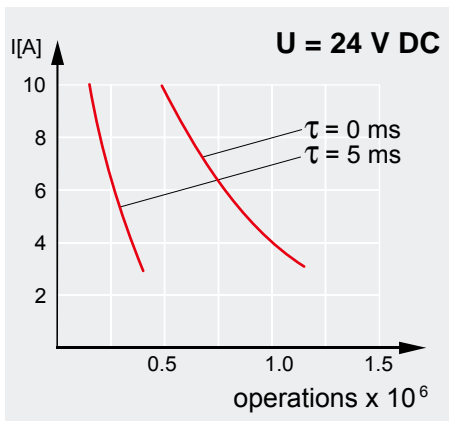
- rated voltage and rated current
- type of load (inductive / capacitive / resistive)
- frequency of operation (operations / minute)
- arc quenching characteristics / capacity (especially in DC applications)
- pollution, e.g. dust, harmful substances, noxious gases and vapours

Note:

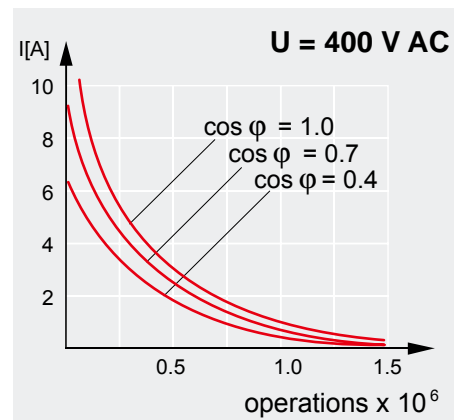
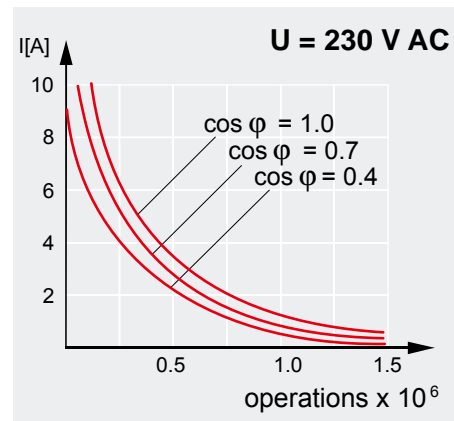
These curves are based on the results of electrical life tests carried out under laboratory conditions. The values shown in the diagrams are representative.

We reserve the right to make technical alterations without prior notice.

● DC electrical rating



● AC electrical rating



Notes on project planning

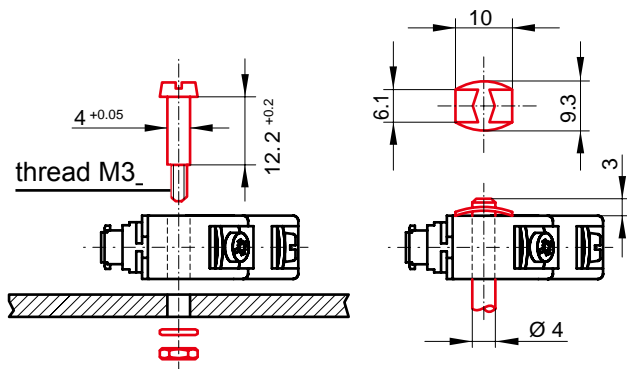
● Mechanical Fastening

- Ganging or lateral mounting through the two transversal bore-holes with 4 mm screws or bolts (tightening torque 1.3 Nm max.).

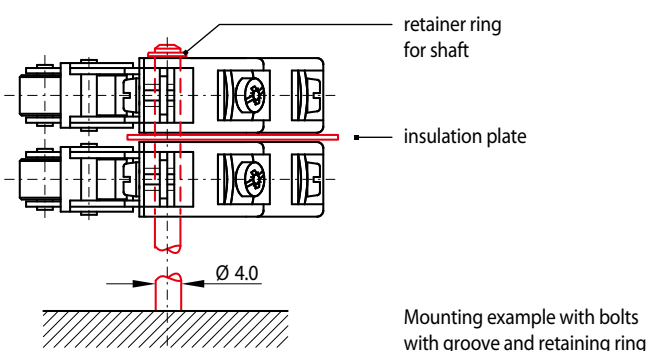
Alternatively, DUO-Clips or retaining rings can be used.

- Manner of fastening:

Bolts	DUO-Clips
Cylinder head bolts, thread length 10 mm BS-ZK	
Hexagonal head bolts, thread length 10 mm BS-SK	DC-800 to put on bolts BS-ZK



- Front mounting of S826 switches:
 - with auxiliary actuator type a, c, d by way of the mounting brackets that come with the roller lever
 - with standard pushbutton (type b) by nut retainers inserted in the housing of the switch
- During mechanical mounting please make sure to have 2 fixing points.
- In order to safeguard clearance and creepage distances it is necessary to use insulating plates when ganging S826 switches with screw-type or flat quick-connect terminals or when mounting them on uninsulated surfaces.

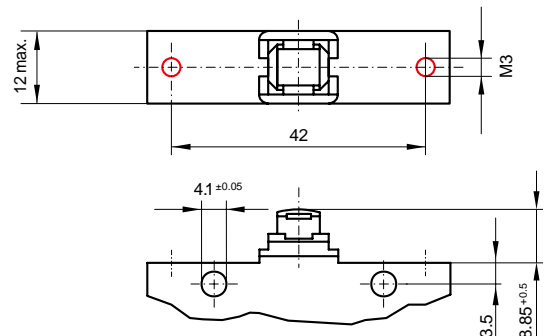


Dimensions in mm

● Auxiliary actuator type b (pushbutton)

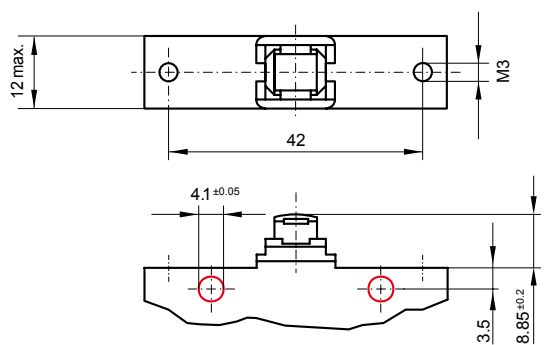
● Front mounting

(tightening torque 0.7 Nm max.)

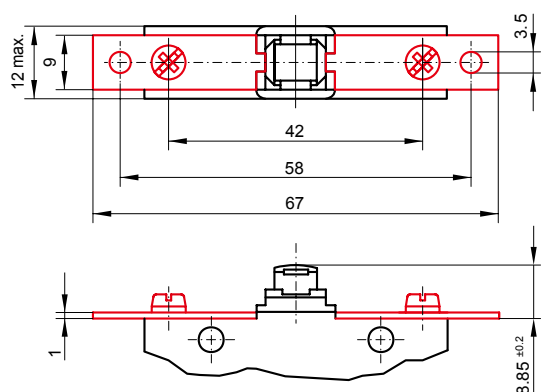


● Lateral mounting / ganging

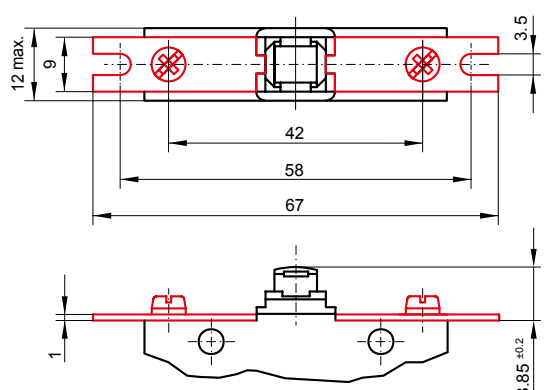
(tightening torque 1.3 Nm max.)



● Auxiliary actuator type a, c, d



● Auxiliary actuator type as, cs



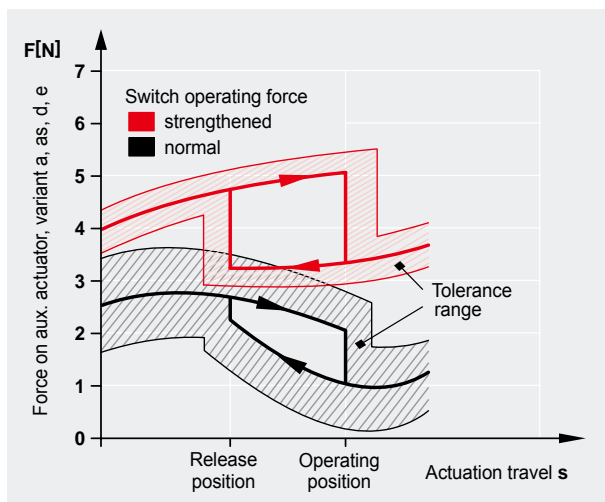
Notes on project planning

● Actuating force / Release force

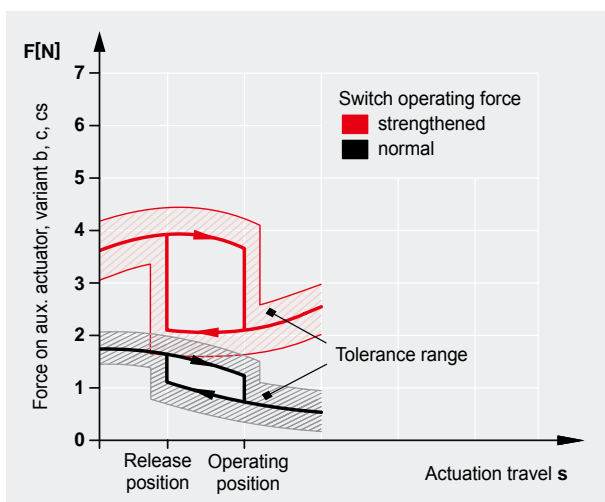
In some applications the mechanism actuating the snap-action switch may be found wanting a somewhat stronger release force.

In these cases snap-action switches with a strengthened reset spring are being used.

Snap-action switch	Maximum actuating force		Minimum release force	
Type	normal	strengthened	normal	strengthened
S826 b S826 c S826 cs	3.6 N	5.5 N	0.2 N	2.9 N
S826 a S826 as S826 d S826 e	2.1 N	4.4 N	0.15 N	1.6 N



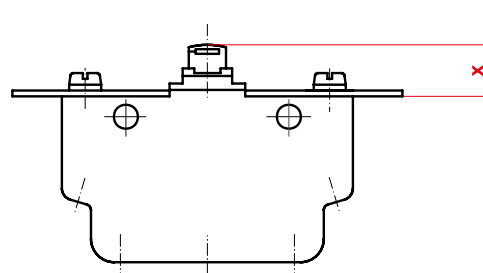
Force / travel diagram of actuator (pushbutton), style S826 b, S826 c, S826 cs



Force / travel diagram of auxiliary actuator, style S826 a, S826 as, S826 d, S826 e

● Actuator travel

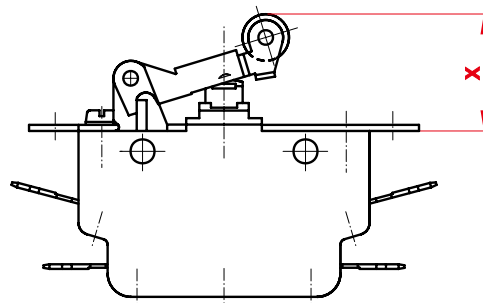
● Pushbutton



Dimension x (mm)	Actuator position
8.85 ±0.20	Free position
6.60 ±0.35	Operating position
5.85	Total travel position for positive opening operation
5.65	Total travel position
7.80 ±0.35	Release position

The differential movement between operating and release position is 1.2 mm (typical).

● Actuator with roller lever



Dimension x (mm)	Actuator position
20.25 ±0.35	Free position
16.60 ±0.50	Operating position
13.60	Total travel position for positive opening operation
13.30	Total travel position
18.40 ±0.50	Release position

The differential movement between operating and release position is 2.2 mm (typical).

Note: The stated dimensions of actuator positions apply to all corresponding actuator styles.

Notes on project planning

Snap-action switches are designed for actuation with and without roller lever.

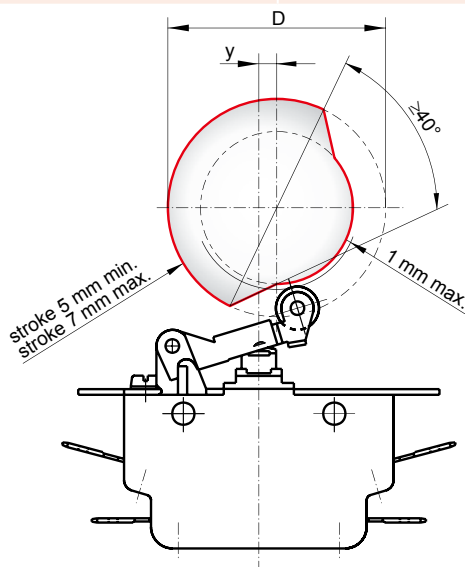
A roller lever is required if direction of actuation deviates more than $\pm 15^\circ$ from the perpendicular line or actuating is carried out by means of transverse actuators such as cam disks, switch rods or push rods.

To ensure the proper working of the positive opening operation it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be squeezed beyond total travel position, since that may cause mechanical destruction (see "Actuator travel", p. 8).

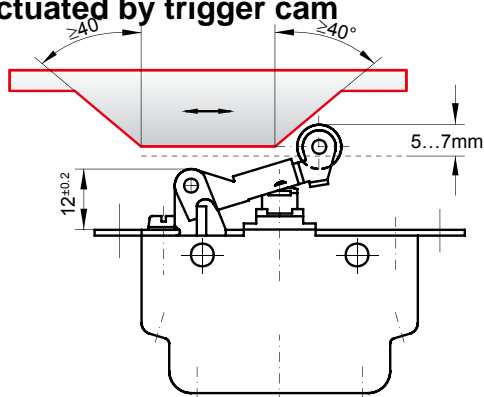
The actuator may not be pre-tensioned when in the free position. When actuated, the actuator should travel well beyond the operating position, for at least 50% of the predefined overtravel, all the way to total travel position.

● Switch with roller lever actuated by cam disk

Disk diameter D (mm)	Distance y (mm)
40	3.6
60	0
100 max.	0



● Switch with roller lever actuated by trigger cam



● Screw-type terminals

- Single- and multiple-wire conductors with wire gauges AWG 18 ... 13 (0.75 ... 2.5 mm²) can be clamped without wire end ferrules. If ferrule is used the maximum wire gauge is AWG 15 (1.5 mm²).
- 2 conductors max. with same wire gauge can be clamped per terminal
- Wire insulation must be flush with the clamping unit
- Tightening torque of terminal screws should be 0.5 Nm min. and 0.7 Nm max.
- Wire end ferrules according to DIN 46228.

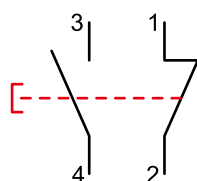
● Flat quick-connect terminals

- Flat tabs (6.3 x 0.8 mm) according to DIN 46247, sheet 3, preferably with insulated cable sleeves.
- After mounting the switch and making wiring connections, the insulation distance between ground and each terminal should be confirmed as sufficient.
- The flat quick-connect terminals are provided with a forming point where the flat tab can be angled by $< 90^\circ$, if necessary.

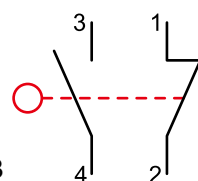
Note: Make sure that strain-relief of the connected cable works.

● Circuit diagram

● Actuator (pushbutton)



● Auxiliary actuator (roller lever)



SPDT-DB
(Form Z circuitry)

● Degree of protection

The contacts of S826 Series switches are sealed to IP40, and the terminals to IP00.

However terminals of switches used with protective housing SK-100 and protective cap SK-200 respectively are finger protected to IP40.

Instruction: Cleaning agents, adhesives, solvents, or screw-retaining varnish must be compatible with polycarbonate. Never use chemicals not compatible with polycarbonate.



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Electrical Components and Systems for Railway Engineering and Industrial Applications

Connectors

- Connectors manufactured to industry standards
- Connectors to suit the special requirements of communications engineering (MIL connectors)
- Charging connectors for battery-powered machines and systems
- Connectors for railway engineering, including UIC connectors
- Special connectors to suit customer requirements

Snap-action switches

- Snap-action switches with positive opening operation
- Snap-action switches with self-cleaning contacts
- Enabling switches
- Special switches to suit customer requirements

Contactors

- Single and multi-pole DC contactors
- High-voltage AC/DC contactors
- Contactors for battery powered vehicles and power supplies
- Contactors for railway applications
- Terminal bolts and fuse holders
- DC emergency stop switches
- Special contactors to suit customer requirements

Electrics for rolling stock

- Equipment for driver's cab
- Equipment for passenger use
- High-voltage switchgear
- High-voltage heaters
- High-voltage roof equipment
- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements

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