Snap-action switches

S826, S926 Series

Dual changeover switches with positive opening operation and wiping contacts

Catalogue D26.en
Snap-action switches S826 Series

Dual changeover switches with positive opening operation and wiping, double-break contacts

Schaltbau S826/S926 series dual changeover switches feature positive opening operation which guarantees the forced disconnection of contacts even when they have become welded together due to a short-circuit.

The contact bridges of the snap-action switches are galvanically isolated allowing two separate load circuits with independent voltage levels to be controlled simultaneously. Wiping, double-break contacts ensure high reliability even at low electrical loads. Versions with optional gold contacts are particularly suitable for handling low currents and voltages. A defined and repeatable switching action is possible thanks to the snap mechanism whose switching speed is virtually independent of the speed of the button or actuator. That is why snap-action switches are preferred in applications with slow actuation speeds in which they are used, for instance, as motor switches, position switches, or gear limit switches.

Features

- **Variants for extreme conditions**: Ruggedized housing made from polyetherimide (PEI). Designed for use in harsh environments. Improved resistance to chemicals, impact and extremes of temperature.
- **Positive opening operation**: Reliable breaking of the normally closed (NC) circuit even if the contacts have become welded together, in compliance with IEC 60947-5-1, Annex K.
- **Dual changeover switch**: Changeover switch with galvanically isolated contact bridges for double-break NC and NO contacts. Thus two separate load circuits can be controlled simultaneously.

Ingress protection rating (IP code): Degrees of protection against dust, humidity, contaminants, or access to hazardous parts to IEC 60529:
- Contacts: IP40 / Terminals: IP00

Wiping, double-break contacts: Continuous low contact resistance ensures high contact reliability over the life of the switch.

Contact material: Silver or gold

Switch design and function

- **Actuator**
  - Standard: push button
  - Auxiliary actuator: roller lever
- **Mounting**
  - Front mount
  - Side mount (ganging)
- **Contact area**
  - Dual changeover switch, galvanically isolated
  - Positive opening operation and self-cleaning contacts
  - Contact material: silver or gold
- **Terminals**
  - M3 screws with saddle clamp
  - Flat tabs 6.3 x 0.8
  - M3 screws with spring washer

Applications

S926 switches are typically used with systems and components that require a high degree of safety and reliability, such as:
- Limit switches for machine, door and plant control systems
- Control switches for the driver's desk of rail vehicles or crane consoles
- Switching elements for automation
- Safety limit switches for control systems and plant controls

* dependent on version Specifications subject to alterations!
### Ordering code

**Example:**

![Image](S826 b10/20/40 L)

#### Series, contact configuration

<table>
<thead>
<tr>
<th>Series</th>
<th>Contact configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>S826</td>
<td>Dual changeover switch, wiping double-break contacts, positive opening operation, galvanically isolated contact bridges</td>
</tr>
<tr>
<td>S926</td>
<td>Same as S826 with improved resistance to chemicals, impact and extremes of temperature</td>
</tr>
</tbody>
</table>

#### Actuator styles

<table>
<thead>
<tr>
<th>Actuator</th>
<th>Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>Push button, no mounting plates</td>
</tr>
<tr>
<td>c</td>
<td>Push button, mounting plates</td>
</tr>
<tr>
<td>cs</td>
<td>Push button, mounting plates, slotted</td>
</tr>
<tr>
<td>e</td>
<td>Roller lever, no mounting plates</td>
</tr>
<tr>
<td>a</td>
<td>Roller lever, mounting plates</td>
</tr>
<tr>
<td>as</td>
<td>Roller lever, mounting plates, slotted</td>
</tr>
<tr>
<td>d</td>
<td>Roller lever, mounting plates, one angled</td>
</tr>
</tbody>
</table>

#### Contact material

| *+ | Silver |
| 10 | Gold |

#### Terminal styles

<table>
<thead>
<tr>
<th></th>
<th>Identification</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IP rating: contacts / terminals</td>
<td>IP40/20</td>
</tr>
<tr>
<td>Actuator styles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Push button (standard), no mounting plates</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>Push button, mounting plates</td>
<td>c</td>
<td></td>
</tr>
<tr>
<td>Push button, mounting plates, slotted</td>
<td>cs</td>
<td></td>
</tr>
<tr>
<td>Roller lever, no mounting plates</td>
<td>e</td>
<td></td>
</tr>
<tr>
<td>Roller lever, mounting plates</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>Roller lever, mounting plates, slotted</td>
<td>as</td>
<td></td>
</tr>
<tr>
<td>Roller lever, mounting plates, slotted, one angled</td>
<td>d</td>
<td></td>
</tr>
<tr>
<td>Series</td>
<td>S826</td>
<td></td>
</tr>
<tr>
<td>Contact material</td>
<td>*+ / 10</td>
<td></td>
</tr>
<tr>
<td>Actuating and release force</td>
<td>standard</td>
<td></td>
</tr>
<tr>
<td>Magnetic blowout (special design)</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>Terminal styles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M3 screws with saddle clamp</td>
<td>... *</td>
<td></td>
</tr>
<tr>
<td>Flat tabs 6.3x0.8</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Flat tabs 6.3x0.8, angled 90°</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>M3 screws with spring washer</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**Note:**

This product catalogue comprises only stock items. For some variants minimum quantities apply. Please ask for conditions.

**Special variants:**

If you need a special variant of the switch, please do not hesitate to contact us. Maybe the type of switch you are looking for is among our many special designs. If not, we can also supply customized designs. In this case minimum quantities apply.

* No index

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**S826 b / S926 b**

Push button (standard), silver contacts and M3 screws with saddle clamp

**S826 c / S926 c**

Push button (standard), mounting brackets, silver contacts and M3 screws with saddle clamp

**S826 b20 / S926 b20**

Push button (standard), silver contacts and flat tabs 6.3 x 0.8

**S826 a / S926 a**

Roller lever, mounting brackets, silver contacts and M3 screws with saddle clamp

**S826 e20 / S926 e20**

Roller lever, silver contacts and flat tabs 6.3 x 0.8

**S826 a L / S926 a L**

Roller lever, silver contacts, M3 screws with saddle clamp, and magnetic blowout
## Specifications

### Series S826 / S926

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Standard (IEC 60947)</th>
<th>S826 / S926 (UL 508)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact configuration</strong></td>
<td>Form Zb SPDT-DB, 2 galvanically isolated contact bridges, 4 terminals</td>
<td></td>
</tr>
<tr>
<td><strong>Conventional thermal current $i_{th}$</strong></td>
<td>IEC 60947, UL 508</td>
<td>10 A at $T = 85^\circ$ C / 5 A at $T = 85^\circ$ C</td>
</tr>
<tr>
<td><strong>Rated insulation voltage $U_i$</strong></td>
<td>IEC 60947, UL 508</td>
<td>400 V $^*$1 / 300 V</td>
</tr>
<tr>
<td><strong>Pollution degree</strong></td>
<td>IEC 60947, UL 508</td>
<td>PD3 $^*$1 / S826: PD3 / S926: PD2</td>
</tr>
<tr>
<td><strong>Rated impulse withstand voltage $U_{imp}$</strong></td>
<td>IEC 60947, UL 508</td>
<td>4 kV</td>
</tr>
<tr>
<td><strong>Overvoltage category</strong></td>
<td>IEC 60947, UL 508</td>
<td>OV3</td>
</tr>
<tr>
<td><strong>Utilization category for silver contacts $^2$</strong></td>
<td>IEC 60947, UL 508 $^*$3</td>
<td>AC-15: 230 V AC / 1.0 A AC / DC-13: 110 V DC / 0.5 A AC / 240 V / 1 A</td>
</tr>
<tr>
<td><strong>Contact gap, typ.</strong></td>
<td>IEC 60947</td>
<td>2x 0.85 mm</td>
</tr>
<tr>
<td><strong>Contact force, typ.</strong></td>
<td>IEC 60947</td>
<td>0.4 N min.</td>
</tr>
<tr>
<td><strong>Contact resistance, typ. without leads connected</strong></td>
<td>IEC 60947</td>
<td>100 mΩ</td>
</tr>
<tr>
<td><strong>Positive opening force $^4$</strong></td>
<td>IEC 60947</td>
<td>20 N</td>
</tr>
<tr>
<td><strong>Actuator travel for positive opening operation</strong></td>
<td>IEC 60947</td>
<td>see page 5</td>
</tr>
<tr>
<td><strong>Maximum actuator travel $^4$</strong></td>
<td>IEC 60947</td>
<td>3.2 mm</td>
</tr>
<tr>
<td><strong>Actuating speed</strong></td>
<td>IEC 60947</td>
<td>1 m/s max. / 0.5 mm/s min.</td>
</tr>
<tr>
<td><strong>Vibration resistance, 10 … 500 Hz all directions (without aux. actuator at 0.1 ms max. opening time)</strong></td>
<td>IEC 60068-2-6</td>
<td>10 g</td>
</tr>
<tr>
<td><strong>Shock resistance (without aux. actuator at 0.1 ms max. opening time)</strong></td>
<td>IEC 60068-2-27</td>
<td>30 g, half sinus</td>
</tr>
<tr>
<td><strong>Short-circuit protection for silver contacts $^2$</strong></td>
<td>IEC 60269-2</td>
<td>6 A gR</td>
</tr>
<tr>
<td><strong>Max. operating frequency</strong></td>
<td>IEC 60947</td>
<td>465 cycles/minute</td>
</tr>
<tr>
<td><strong>Actuating force $^4$</strong></td>
<td>IEC 60947</td>
<td>3.6 N / 5.5 N</td>
</tr>
<tr>
<td><strong>Release force $^4$</strong></td>
<td>IEC 60947</td>
<td>0.2 N / 2.0 N</td>
</tr>
<tr>
<td><strong>Ingress protection rating (IP code)</strong></td>
<td>IEC 60529</td>
<td>IP40</td>
</tr>
<tr>
<td><strong>Contacts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Terminals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mechanical endurance</strong></td>
<td>IEC 60947</td>
<td>10 million cycles, min.</td>
</tr>
<tr>
<td><strong>Ambient temperature range</strong></td>
<td>IEC 60947</td>
<td>S826: -40 °C … +85 °C / S926: -55 °C … +85 °C</td>
</tr>
<tr>
<td><strong>Material</strong></td>
<td>---</td>
<td>Hard silver (AgCu3) or gold (AuAg26Ni3) / Brass, silver-plated or gold plated / S826: PC, green, transparent / S926: PEI, amber, transparent</td>
</tr>
<tr>
<td><strong>Mounting position</strong></td>
<td>---</td>
<td>any</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>---</td>
<td>approx. 18 g</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- $^*$1 Valid for flat tab terminal styles. Values for M3 screw terminal styles are: 250 V: PD3 / 400V: PD2
- $^*$2 Data for gold contacts upon request
- $^*$3 General Purpose
- $^*$4 Measured next to push button

Specifications are subject to alteration without prior notice.
**Actuator styles, actuator positions**

- **S826 / S926, Push button (standard)** 
  - Push button (standard) [b] / [c] / [cs]

- **S826 / S926, Roller lever** 
  - Roller lever [e] / [a] / [as] / [d]

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**Notes:**

- To ensure proper operation of the positive opening function, it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be pushed beyond total travel position.
- Data is valid for new switches.

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**Specifications are subject to alteration without prior notice / Dimensions in mm**
Mounting  Front mount, Ganging

Front mount
- **No mounting brackets (standard):** Fastening by way of the retainer nuts (M3) which are fixed in the housing of the switch. Tightening torque 0.9 Nm max.
- **With mounting brackets:** Mounting brackets are available for all actuator options. Tightening torque 0.9 Nm max.
- **Push button (standard) no mounting brackets**  style [b]

Ganging (side mount)
- **Through the two transversal holes in the body of the switch by means of a collar screw or threaded bolt. Tightening torque 1.0 Nm max.**
- **Alternatively, DUO-Clips or retaining rings can be used.**

Roller lever without mounting brackets  style [c]

Roller lever and mounting brackets  style [a]

Roller lever and mounting brackets, slotted  style [d]

Push button and mounting brackets  style [e]

Push button and mounting brackets, slotted  style [f]

Push button and mounting brackets, slotted  style [g]

Terminals  M3 screws, flat tabs 6,3x0,8

- **M3 Screws with saddle clamp (standard)**  style [x]

- **M3 Screws with spring washer**  style [x]

- **Flat tab 6.3x0.8**  style [x]

- **Flat tab 6.3x0.8, angled 90°**  style [x]

**Note:**
- Screw terminals for single and multiple-wire conductors:
  - No ferrules AWG 18...12 (0.75 mm²...2.5 mm²), with ferrules: AWG 14 (1.5 mm² max.).
  - Max. 2 conductors with the same wire gauge can be clamped per terminal.
  - Tightening torque of terminal screws should be 0.9 Nm max.
- Ingress protection rating (IP code): contacts IP40 / terminals IP00

Dimensions in mm / Specifications are subject to alteration without prior notice
Mounting Use of roller levers

Snap-action switches are designed for actuation with and without a roller lever. A roller lever is required if the direction of actuation deviates more than ±15° from the plunger axis.

- **Switch with roller lever actuated by cam disc**

  ![Diagram of switch with roller lever actuated by cam disc]

<table>
<thead>
<tr>
<th>Disc (mm)</th>
<th>Distance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>3.6</td>
</tr>
<tr>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>100 (max)</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Switch with roller lever actuated by linear cam**

  ![Diagram of switch with roller lever actuated by linear cam]

Mounting and safety instructions, environmental conditions

**Mounting instructions:**
- Snap-action switches should be mounted by qualified professional staff only.
- Observe the required clearance and creepage distances. This is also applicable for connected wires.
- It is necessary to use insulating plates when ganging or mounting switches on uninsulated surfaces.
- The switches can be mounted in any orientation.
- When mounting the switches make sure to use 2 fastening elements (e.g. screws).
- Only use adequate fastening elements such as cylinder head or collar screws or DUO-clips, including washers. When fastening make sure not to exceed the maximum tightening torque.
- When affixing switches with mounting brackets make sure that the mounting surface is level.
- Avoid tilting the screw when mounting to prevent mechanical tension on the housing.
- The actuator should not be pre-tensioned when in the free position. When actuated, the actuator should travel beyond the operating position, for at least 50% of the predefined overtravel, all the way to total travel position.
- To ensure the proper function of the positive opening operation it is necessary to depress the plunger to the total travel position.
- To prevent mechanical destruction of the switch, make sure that actuation of the switch does not exceed the specified total travel position. Avoid using the switch as a mechanical end stop.
- High-impact actuation of the switch can have a negative effect on its mechanical life.
- When securing stripped wire ends in the terminal clamp, make sure the wire insulation is flush with the clamp.
- Prevent a transfer of forces to the switch terminals, and ensure that connected leads have a functioning strain relief.
- When using versions with blowout magnets observe the right polarity, see circuit diagram on the bottom of the switch.

**Non-permissible environmental conditions:**
- Cleaning agents, adhesives, solvents, or screw-retaining varnish must be compatible with polycarbonate (S826) or polyetherimide (S926) respectively. Never use chemicals not compatible with polycarbonate for S826 Series switches or not compatible with polyetherimide for S926 Series snap-action switches.
- Using such chemicals can result in cracks, deformation, breakage and dissolution of the housing or complete destruction of the respective switch.

**Safety instructions:**
- Be sure to make regular visual inspections.
- Improper handling of the switch, e.g. when hitting the floor with some impact, can result in breakage, visible cracks and deformation.
- The switch suitability has to be confirmed by the customer for the specific application, and under application conditions.

**Defective parts must be replaced immediately!**

For a detailed list of all safety, installation and maintenance instructions see here: [schaltbau.info/download2en](http://schaltbau.info/download2en)

**Standards**

- **IEC 60947-1**: Low-voltage switchgear and controlgear, Part 1: General rules
- **IEC 60947-5-1, Annex K**: Special requirements for control switches with direct opening action
- **UL508**: Industrial control equipment
- **IEC 60529**: Degrees of protection provided by enclosures (IP Code)
- **UL 94V-0**: Flammability Standard
- **DIN 41636-6**: Sensitive switches for communication technology; dimensions, type F
- **ISO 13849-1**: Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
- **IEC 60068-2-6**: Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)
- **IEC 60068-2-27**: Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock

Specifications are subject to alteration without prior notice / Dimensions in mm
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 disconnect 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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e-Mail contact@schaltbau.de

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
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- High-voltage heaters
- High-voltage roof equipment
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We reserve the right to make technical alterations without prior notice.
For updated product information visit www.schaltbau-gmbh.com

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