Snap-Action Switches

S880 series

Snap-action switches with positive opening operation and self-cleaning contacts

Catalogue D80.en
Snap-action switches, S850 series

The world’s smallest snap-action switch with self-cleaning contacts and positive opening operation

Schaltbau subminiature S880 snap-action switches feature self-cleaning contacts and a positive opening function. Minimum size in combination with maximum reliability make the V4 snap-action switch ideally suited for a host of applications: as a safety limit switch in medical engineering, as a limit switch for machine, door and system control or in driver’s desks of locomotives. Risks resulting from contact welding or spring failure are reduced by the positive opening operation of the switch. Thanks to its snap mechanism it is highly resistant to shock and vibration. Self-cleaning contacts (silver) and IP60/IP67 protection against dust, humidity and pollutants all contribute to the high reliability of the switch, even at low currents. The switch is operated by a standard push button, but plain levers, roller levers and simulated roller levers are also available as auxiliary actuators.

Features

**Precision switch:** High switching accuracy and high resistance to shock and vibration.

**V4**

Subminiature switch, dimensions to DIN 41636, type B.

**Sealed to:** IP40, IP60 or IP67 in accordance with IEC 60529

**Contact finish:** Silver or gold

**Wiping contacts:** Continuous low contact resistance ensures high contact reliability over the entire design life of the switch.

Design and function

- **Actuator**
  - Standard: pushbutton
  - Aux. actuator: plain lever, roller, simulated roller

- **Contact area**
  - Positive opening operation
  - Self-cleaning contacts
  - Contact material: silver / gold

- **Degree of protection**
  - Contacts: IP40 / IP60 / IP67
  - Terminals: IP00 / IP67

- **Terminals**
  - Solder
  - Leads
  - PCB (straight / 90° angled)
  - Flat tabs, 90° angled

Competence

The success of a product is owed to its quality

The Schaltbau product line is clearly defined and keeps up with the technological requirements of today's markets. Behind every individual snap-action switch you will find decades of experience in engineering and manufacturing. Snap-action switches are designed with a snap mechanism that allows extremely fast switching, practically regardless of the duration of actuation. This reproduces the operating position precisely, and controls the arc more efficiently. In Schaltbau’s snap-action switches the safety function can be seen – with their transparent-green housing, they are known all over the world.

Applications

The S880 is suitable for all safety-related applications, such as:

- Safety limit switch in medical engineering
- Limit switch for machine and system control, product engineering, elevator technology and material handling
- Safety limit switch in access locking systems, door and barrier control
- Control switch in heating, ventilating, and air-conditioning systems
- Switches for driver’s cab of rail vehicles, control panels in cranes and on the bridges of ships.
## Ordering code

### S880 series

**Example:**

**S880 W1G6a Z**

**Special design, optional**

<table>
<thead>
<tr>
<th>Actuator</th>
<th>Z</th>
<th>S</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator, rear-mounted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning pin, RH-side</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning pin, LH-side</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pushbutton (standard)**

- Plain lever, long
- Roller lever, long
- Roller lever, short
- Simulated roller lever, medium

**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.

### Table: Protection contacts / terminals

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Code</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection contacts / terminals</td>
<td></td>
<td>S8800 W1G6a Z</td>
</tr>
<tr>
<td><strong>Actuator</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pushbutton (standard)</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>Plain lever</td>
<td>k</td>
<td></td>
</tr>
<tr>
<td>Roller lever</td>
<td>t/t</td>
<td></td>
</tr>
<tr>
<td>Simulated roller lever</td>
<td>v</td>
<td></td>
</tr>
<tr>
<td>Actuator, rear-mounted</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>Plain lever</td>
<td>k</td>
<td></td>
</tr>
<tr>
<td>Roller lever</td>
<td>t/t</td>
<td></td>
</tr>
<tr>
<td>Simulated roller lever</td>
<td>v</td>
<td></td>
</tr>
<tr>
<td><strong>Series</strong></td>
<td>S880</td>
<td></td>
</tr>
<tr>
<td><strong>Contact configuration</strong></td>
<td>W</td>
<td></td>
</tr>
<tr>
<td><strong>Contact finish</strong></td>
<td>4/6</td>
<td></td>
</tr>
<tr>
<td><strong>Terminals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leads opposite actuator, length 500 mm</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>PCB terminals, 180°</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Solder terminals, 180°</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>Leads on actuator side, length 500 mm</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>PCB, positioning pins, terminals 90° angled left-/right side</td>
<td>J/T/P/S</td>
<td></td>
</tr>
<tr>
<td>Flat tabs 2.8 x 0.5 mm, 90° angled right-/left side</td>
<td>O/R</td>
<td></td>
</tr>
<tr>
<td>Specifications</td>
<td>S880 series</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td><strong>Series</strong></td>
<td><strong>Standard</strong></td>
<td><strong>S880</strong></td>
</tr>
<tr>
<td><strong>Version</strong></td>
<td></td>
<td>IP40/00</td>
</tr>
<tr>
<td>Contact configuration</td>
<td>IEC 60947</td>
<td>1 Form C SPDT, single break</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact element with 3 terminals</td>
</tr>
<tr>
<td>Conventional thermal current $I_0$</td>
<td>IEC 60947</td>
<td>6 A at $T = 85^\circ$ C</td>
</tr>
<tr>
<td></td>
<td>UL 508</td>
<td>6 A at $T = 85^\circ$ C</td>
</tr>
<tr>
<td>Rated insulation voltage $U_i$</td>
<td>IEC 60947</td>
<td>IP40/00: 250 V at PD2 or 125 V at PD3</td>
</tr>
<tr>
<td></td>
<td>UL 508</td>
<td>300 V</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>IEC 60947</td>
<td>PD2 or PD3</td>
</tr>
<tr>
<td>Rated impulse withstand voltage $U_{imp}$</td>
<td>IEC 60947</td>
<td>2.5 kV</td>
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<tr>
<td>Overvoltage category</td>
<td>IEC 60947</td>
<td>OV2</td>
</tr>
<tr>
<td>Utilization category</td>
<td>IEC 60947</td>
<td>AC-15, 230 V AC / 1.0 A</td>
</tr>
<tr>
<td>for silver contacts *2</td>
<td>UL 508 *3</td>
<td>AC 240 V / 1.0 A</td>
</tr>
<tr>
<td>Contact gap, typ.</td>
<td>---</td>
<td>1.1 mm</td>
</tr>
<tr>
<td>Contact force, typ.</td>
<td>---</td>
<td>0.2 N</td>
</tr>
<tr>
<td>Contact resistance, typ., without leads connected</td>
<td>---</td>
<td>100 mΩ</td>
</tr>
<tr>
<td>Positive opening force *4</td>
<td>IEC 60947</td>
<td>21 N</td>
</tr>
<tr>
<td>Actuator travel for positive opening operation</td>
<td>IEC 60947</td>
<td>see pages 6, 7</td>
</tr>
<tr>
<td>Maximum actuator travel *4</td>
<td>IEC 60947</td>
<td>1.95 mm</td>
</tr>
<tr>
<td>Actuation speed</td>
<td>IEC 60947</td>
<td>1.0 m/s max. 0.5 mm/s min.</td>
</tr>
<tr>
<td>Vibration resistance, 10 … 500 Hz all directions (without aux. actuator at 0.1 ms max. opening time)</td>
<td>IEC 60068-2-6</td>
<td>50 g</td>
</tr>
<tr>
<td>Shock resistance (without aux. actuator at 0.1 ms max. opening time)</td>
<td>IEC 60068-2-27</td>
<td>50 g, half sinus</td>
</tr>
<tr>
<td>Short-circuit protection for silver contacts *2</td>
<td>IEC 60269-2</td>
<td>2 A gG</td>
</tr>
<tr>
<td>Maximum operating frequency</td>
<td>IEC 60947</td>
<td>200 cycles/minute</td>
</tr>
<tr>
<td>Actuation force *4</td>
<td>IEC 60947</td>
<td>2 N max.</td>
</tr>
<tr>
<td>Release force *4</td>
<td>IEC 60947</td>
<td>0.15 N min.</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IEC 60947</td>
<td>IP40 / IP60</td>
</tr>
<tr>
<td>Contacts</td>
<td>IEC 60529</td>
<td>IP00</td>
</tr>
<tr>
<td>Terminals</td>
<td>IEC 60529</td>
<td>IP00</td>
</tr>
<tr>
<td>Solder</td>
<td>IEC 60529</td>
<td>---</td>
</tr>
<tr>
<td>PCB</td>
<td>IEC 60529</td>
<td>---</td>
</tr>
<tr>
<td>Leads</td>
<td>IEC 60529</td>
<td>---</td>
</tr>
<tr>
<td>Mechanical endurance</td>
<td>IEC 60947</td>
<td>1.5 million cycles min.</td>
</tr>
<tr>
<td>Temperature range</td>
<td>IEC 60947</td>
<td>-40 °C … +85 °C</td>
</tr>
<tr>
<td>Material</td>
<td>IEC 60947</td>
<td>Silver (Ag/AgSnO₂) or Gold (AuNi3Ag26)</td>
</tr>
<tr>
<td>Contacts</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Terminals</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Seal</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Housing upper part</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Housing lower part</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Leads</td>
<td>UL/CSA</td>
<td>---</td>
</tr>
<tr>
<td>Mounting position</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Weight, without leads connected</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Approvals</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

**Notes:**
- *1 Observe safety instructions p. 11
- *2 Data for gold contacts upon request
- *3 General Purpose
- *4 Measured next to push button
- Data valid for new switches under laboratory conditions and at room temperature, unless otherwise mentioned.

Subject to change
### Actuator options, actuator positions

#### Dimensions S880 WxXx

*Pushbutton (standard)*

- **Actuator position**
  - **Pushbutton (standard)**
    - **Travel** in mm
      - **Free position**: 9.10 ± 0.15
      - **Operating position**: 8.40 ± 0.20
      - **Release position**: 8.55 ± 0.20
      - **Total positive opening travel**: 7.35
      - **Total travel position**: 7.15
      - **Movement differential** (between operating and release position): 0.15 (typical)

*Note:* 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 pushed beyond total travel position. Data is valid for new switches.

#### Dimensions S880 WxXx

*Plain lever, short*

- **Actuator position**
  - **Plain lever**
    - **Travel** in mm
      - **Length of lever**: 10.70
      - **Free position**: 13.70 ± 0.80
      - **Operating position**: 11.60 ± 0.80
      - **Release position**: 12.00 ± 0.80
      - **Total positive opening travel**: 7.50
      - **Total travel position**: 7.30
      - **Movement differential** (between operating and release position): 0.40 (typical)

*Note:* 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 pushed beyond total travel position. Data is valid for new switches.

#### Dimensions S880 WxXx / S880 WxXx

*Roller lever, short / long*

- **Actuator position**
  - **Roller lever**
    - **Travel** in mm
      - **Length of lever**: 8.25
      - **Free position**: 18.30 ± 0.80
      - **Operating position**: 16.50 ± 0.80
      - **Release position**: 16.90 ± 0.80
      - **Total positive opening travel**: 12.75
      - **Total travel position**: 12.55
      - **Movement differential** (between operating and release position): 0.40 (typical)

*Note:* 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 pushed beyond total travel position. Data is valid for new switches.

#### Dimensions S880 WxXx

*Simulated roller lever*

- **Actuator position**
  - **Simulated roller lever**
    - **Travel** in mm
      - **Length of lever**: 12.65
      - **Free position**: 16.40 ± 0.80
      - **Operating position**: 14.40 ± 0.80
      - **Release position**: 14.80 ± 0.80
      - **Total positive opening travel**: 10.00
      - **Total travel position**: 9.80
      - **Movement differential** (between operating and release position): 0.40 (typical)

*Note:* 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 pushed beyond total travel position. Data is valid for new switches.

* Lever upon request

---

**Dimensions in mm / Subject to change**
Rear-mounted actuators, actuator positions

- **Dimensions S880 WxXx[k\(\text{Z}\)]** Plain lever, short

  - **Dimensions S880 WxXx[t\(\text{Z}\)] / S880 WxXx[r\(\text{Z}\)]** Roller lever, short / long

  - **Dimensions S880 WxXx[v\(\text{Z}\)]** Simulated roller lever

<table>
<thead>
<tr>
<th>Actuator position (rear-mounted [Z])</th>
<th>Plain lever [K](\text{Z}) Travel in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of lever (\varphi)</td>
<td>6.20</td>
</tr>
<tr>
<td>Free position</td>
<td>11.00 ± 0.70</td>
</tr>
<tr>
<td>Operating position</td>
<td>9.90 ± 0.70</td>
</tr>
<tr>
<td>Release position</td>
<td>10.15 ± 0.70</td>
</tr>
<tr>
<td>Total positive opening travel</td>
<td>8.20</td>
</tr>
<tr>
<td>Total travel position</td>
<td>7.90</td>
</tr>
<tr>
<td>Movement differential (between operating and release position)</td>
<td>0.25 (typical)</td>
</tr>
</tbody>
</table>

**Note:** 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 pushed beyond total travel position. Data is valid for new switches.

<table>
<thead>
<tr>
<th>Actuator position (rear-mounted [Z])</th>
<th>Roller lever [T](\text{Z}) Travel in mm</th>
<th>Roller lever [T](\text{Z}) Travel in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of lever (\varphi)</td>
<td>4.00</td>
<td>6.60</td>
</tr>
<tr>
<td>Free position</td>
<td>16.00 ± 0.70</td>
<td>15.30 ± 0.70</td>
</tr>
<tr>
<td>Operating position</td>
<td>15.00 ± 0.70</td>
<td>14.00 ± 0.70</td>
</tr>
<tr>
<td>Release position</td>
<td>15.25 ± 0.70</td>
<td>14.30 ± 0.70</td>
</tr>
<tr>
<td>Total positive opening travel</td>
<td>13.30 ± 0.70</td>
<td>13.40 ± 0.70</td>
</tr>
<tr>
<td>Total travel position</td>
<td>13.10 ± 0.70</td>
<td>13.10 ± 0.70</td>
</tr>
<tr>
<td>Movement differential (between operating and release position)</td>
<td>0.25 (typical)</td>
<td>0.25 (typical)</td>
</tr>
</tbody>
</table>

**Note:** 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 pushed beyond total travel position. Data is valid for new switches.

<table>
<thead>
<tr>
<th>Actuator position (rear-mounted [Z])</th>
<th>Simulated roller lever [V](\text{Z}) Travel in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of lever (\varphi)</td>
<td>8.2</td>
</tr>
<tr>
<td>Free position</td>
<td>14.00 ± 0.70</td>
</tr>
<tr>
<td>Operating position</td>
<td>12.60 ± 0.70</td>
</tr>
<tr>
<td>Release position</td>
<td>12.90 ± 0.70</td>
</tr>
<tr>
<td>Total positive opening travel</td>
<td>10.50</td>
</tr>
<tr>
<td>Total travel position</td>
<td>10.30</td>
</tr>
<tr>
<td>Movement differential (between operating and release position)</td>
<td>0.30 (typical)</td>
</tr>
</tbody>
</table>

**Note:** 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 pushed beyond total travel position. Data is valid for new switches.

Subject to change / Dimensions in mm
**Terminals**

**Dimensions S880 WxB xx**  Leads opposite actuator

Note:
- Terminals: Leads AWG 24
- Length: 500 mm
- Connection:
<table>
<thead>
<tr>
<th>Terminal</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>grey</td>
</tr>
<tr>
<td>4</td>
<td>blue</td>
</tr>
<tr>
<td>1</td>
<td>black</td>
</tr>
</tbody>
</table>

**Dimensions S880 WxF xx**  PCB terminals, straight

Note:
- Hand soldering:
  - Soldering apparatus: Hand-held soldering iron
  - Solder: Flux-filled solder wire, lead-free
  - Temperature/duration: 350 °C 3 s * max.
- Selective soldering:
  - Soldering apparatus: Selective soldering station
  - Solder: Lead-free solder for selective and wave soldering
  - Temperature/duration: 300 °C 1.5 s; 3 mm wave distance; Flux time 0.2 s
- Wave soldering:
  - Soldering apparatus: Wave soldering station, 1 wave (Wörthmann wave)
  - Solder: Lead-free solder for selective and wave soldering
  - Temperature/duration: 261 °C 3 s; wave width 66 mm; conveyor speed 1.3 m/min; preheating approx. 70 s at 110...130 °C (typical)

**Dimensions S880 WxG xx**  Solder terminals, straight

Note:
- Hand soldering:
  - Soldering apparatus: Hand-held soldering iron
  - Solder: Flux-filled solder wire, lead-free
  - Temperature/duration: 370 °C 2 s max., leads pre-tinned
**Terminals (continued)**

- **Dimensions S880 WxHxx** Leads on actuator side

![Diagram of S880 WxHxx](image1)

- **Dimensions S880 WxJxx** PCB terminals, 90° angled left side **J** + locating pins **T**
- **Dimensions S880 WxPxx** PCB terminals, 90° angled right side **P** + locating pins **S**

![Diagram of S880 WxJxx](image2)

- **Dimensions S880 WxR** PCB terminals, 90° angled left side
- **Dimensions S880 WxD** PCB terminals, 90° angled right side

![Diagram of S880 WxR](image3)

**Note:**
- Terminals: Leads AWG 24
- Length: 500 mm
- Connection:

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>grey</td>
</tr>
<tr>
<td>4</td>
<td>blue</td>
</tr>
<tr>
<td>1</td>
<td>black</td>
</tr>
</tbody>
</table>

**Note:**
- Hand soldering:
  - Soldering apparatus: Hand-held soldering iron
  - Solder: Flux-filled solder wire, leadfree
  - Temperature/duration: 350 °C; 4 s * max.
- Selective soldering:
  - Soldering apparatus: Selective soldering station
  - Solder: Leadfree solder for selective and wave soldering
  - Temperature/duration: 300 °C; 1.5 s; 3 mm wave distance; Flux time: 0.2 s
- Wave soldering:
  - Soldering apparatus: Wave soldering station, 1 wave (Wörthmann wave)
  - Solder: Leadfree solder for selective and wave soldering
  - Temperature/duration: 261 °C; 3 s; wave width: 66 mm; conveyor speed: 1.3 m/min; pre-heating approx. 70 s at 110...130 °C (typical)
  - PCB: 1.6 mm; through-contacted

**Note:**
- Terminals flat tabs 2.8 x 0.5 mm

Subject to change / Dimensions in mm
**Mounting** Mechanical fastening

**Ganging (lateral mounting)**
- through the two transversal holes in the body of the switch by means of a collar screw or threaded bolt. Torque 0.2 Nm max.
- Alternatively, DUO-Clips or retaining rings can be used.

**Mounting on PCB**
- Mounting holes for PCB terminals, 180°
- Mounting holes for PCB terminals, 90° LH-side

**Electrical rating**

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)
- switching rate (operations/minute)
- arc-extinguishing rate / capacity (especially in DC applications)
- pollution, e.g. dust, harmful substances, noxious gases and vapours

**Switch series based on the following standards:**
- IIEC 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
- Dimensions according to DIN 41636-3, type B
- DIN EN ISO 13849-1: Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design
- IEC 60668-2-6: Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)

**Note:**
- The curve is based on the results of electrical life tests carried out under laboratory conditions. The values shown in the diagram are representative.
- We reserve the right for changes which serve the technical progress.
Mounting Use of roller levers

When to use a roller lever?
- 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 trigger cam
- Switch with roller lever actuated by cam disk

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 assembled leads.
- 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.
- Avoid tilting the screw when mounting to prevent mechanical tension on the housing.
- 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.
- 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.

Non-permissible environmental conditions:
- Cleaning agents, adhesives, solvents, or screw-retaining varnish must be compatible with polycarbonate. Never use polycarbonate incompatible chemicals.
- Using chemicals which are not compatible with polycarbonate can result in cracks, deformation, breakage and dissolution of the housing or complete destruction of the switch.
- Switches sealed to IP 67 are immersion protected. That means there is no ingress of water in a harmful quantity when a new switch (which is not operated) is immersed in water (1 m depth) for 30 minutes. This degree of protection cannot be warranted when polycarbonate incompatible chemicals are used.

Safety instructions:
- In case of moisture of any kind or impact of aggressive substances, chemicals, solvents or acids appropriate protective measures must be taken by the user in accordance with IEC 60364-4-41:2005, modified (Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock). One such measure is the limitation of the voltage range.
- 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.
- For applications with both a high ambient temperature of >40°C and a high Ith current, a correction factor i.a.w. DIN EN 60204-1 Tab. 6 and Table D.1 must be applied for the wire and current.

Defective parts must be replaced immediately!

For detailed maintenance, safety and mounting instructions please refer to our operating manuals: schaltbau.info/safety2en!
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
- Snap-action switch made of robust polyetherimide (PEI)
- Snap-action switch with two galvanically isolated contact bridges
- 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