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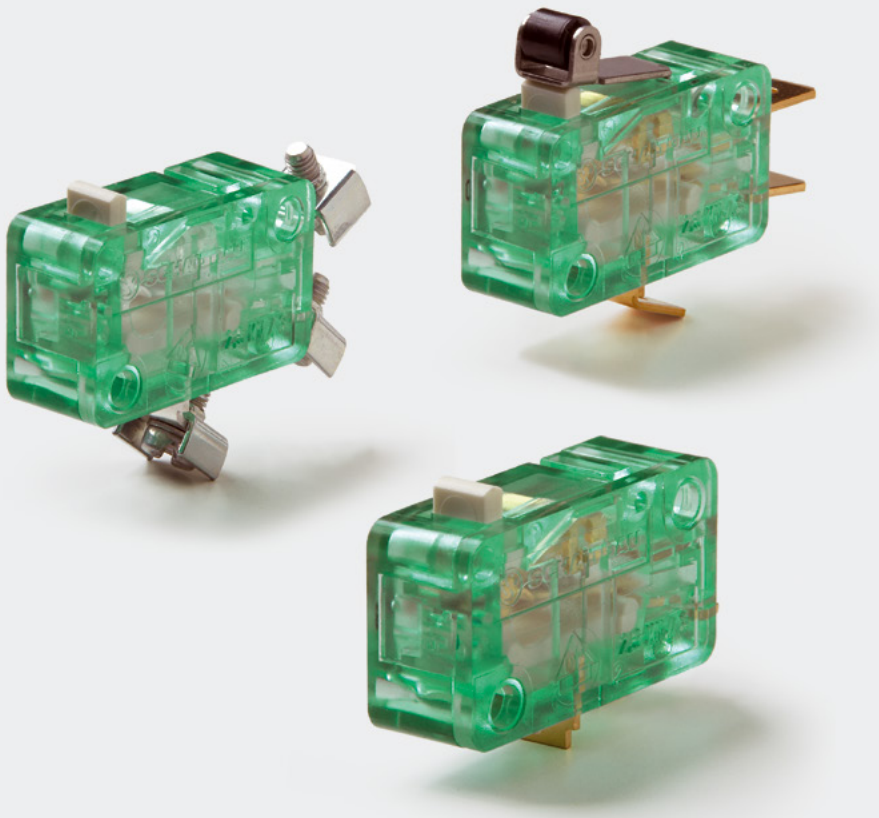
2

Snap-Action Switches

S840, S845, S846 series

Single-break changeover,
NC or NO contacts,
positive opening operation
and wiping action

Catalogue D40.en



More information
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Snap-action switches, S840, S845, S846 series

Single-break SPDT with positive opening operation and self-cleaning contacts

S840 Series snap-action switches feature VDE-approved positive opening operation, which guarantees a reliable opening of the NC contact even when welded due to a short-circuit or overload currents . Self-cleaning, wiping contacts ensure high reliability even at low electric loads.

The snap mechanism allows for fast and precise switching at a speed essentially independent of actuator speed.
S845 and S846 Series switches are SPST versions with NC and NO contacts respectively.

Features

S840/S845/S846 series

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.

Self-cleaning contacts: Constantly low contact resistance ensures high contact reliability over the entire design life of the switch

Single-break contacts: SPDT but also SPST-NC and SPST-NO versions available. Compact design.

Ingress protection rating: IP40 in accordance with IEC 60529

IP40 max

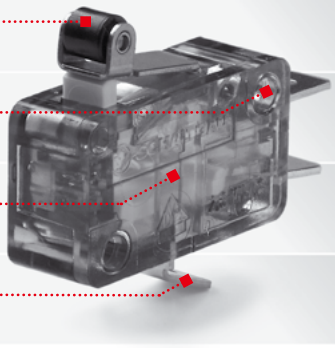
Precision switch: High switching accuracy and resistance to shock and vibration

Contact finish: Silver or gold-plated

Ag / Au

Design and function

S840/S845/S846 series



- **Actuator**
  - Standard: push button
  - Auxiliary actuator: Plain lever / Roller / Simulated roller
- **Mounting**
  - Side mount (ganging)
- **Contact area**
  - Single-break SPDT / SPST-NC / SPST-NO
  - Positive opening operation and wiping contacts
  - Contact finish: Silver or gold-plated
- **Terminals**
  - M3 screw with saddle clamp
  - Flat tabs
  - Solder lug terminals

Competence

The success of a product is owed to its quality

The Schaltbau product line is clearly defined and adapted to customer needs. 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

S840/S845/S846 series

The switches are designed for use with systems and components that require a high degree of safety and reliability, such as

- Gear limit switches for wind energy applications
- Safety limit switches in electrical installations and control systems

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Ordering code

S840/S845/S846

Example: **S840 r10/20**

Series

S840	SPDT
S845	SPST-NC
S846	SPST-NO

Actuator

b	Push button (standard)
r	Roller lever
v	Roller lever, short
k	Plain lever, short
l	Plain lever, long
n	Simulated roller lever

Terminals

Captive screws	*
Flat tabs	20
Solder lugs	28

Contact material

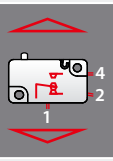
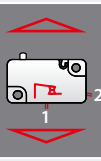
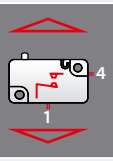
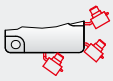
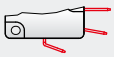
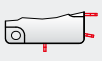
Silver	*
Gold	10

* *No index*

Note:

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

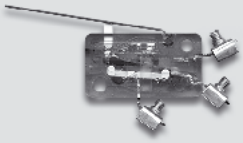
Special variant: If you need a special variant of the switch, please do not hesitate to contact us. Maybe the type of switch you are looking for is among our many special designs. If not, we can also supply customized designs. In this case minimum quantities apply.

Parameter	Identification	Option		
Series / contact configuration		**S840** / SPDT	**S845** / SPST-NC	**S846** / SPST-NO
Actuator styles				
▶ **Push button (standard)**	b			
▶ **Roller lever**	r			
▶ **Roller lever, short**	v			
▶ **Plain lever, short**	k			
▶ **Plain lever, long**	l			
▶ **Simulated roller lever**	n			
▶ **Series** SPDT / SPST-NC / SPST-NO ▶ **Contact material**	S840 / S845 / S846 No Index / 10			
Terminal styles				
▶ **Captive screws**	No Index			
▶ **Flat tabs**	20			
▶ **Solder lugs**	28			

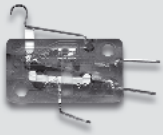
S840 b
Push button (standard) and captive screws

S840 k 20
Plain lever, short and flat tabs 6.3 x 0.8

S840 k 28
Plain lever, short and solder lugs

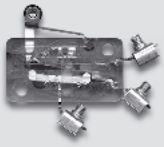


S840 l
Plain lever, long and captive screws



S840 n 20
Simulated roller lever and flat tabs 6.3 x 0.8

S840 r 20
Roller lever and flat tabs 6.3 x 0.8



S840 v
Roller lever, short and captive screws

Specifications

S840/S845/S846 series

Series	Standard	S840	S845	S846
Contact configuration	IEC 60947	Single-break Form C (SPDT) switch with 3 terminals	Single-break Form B (SPST-NC) switch with 2 terminals	Single-break Form A (SPST-NO) switch with 2 terminals
Conventional thermal current I_{th}	IEC 60947 UL 508	6 A at T = 85° C ---		
Rated insulation voltage U_i	IEC 60947 UL 508	250 V 300 V		
Pollution degree	IEC 60947 UL 508	PD3 PD3		
Rated impulse withstand voltage U_{imp}	IEC 60947	4 kV		
Overvoltage category	IEC 60947 UL 508	OV3 OV3		
Utilization category for silver contacts *1	IEC 60947 UL 508	AC-15, 230 VAC / 1.5 A 240 V AC / 1 A General Purpose, 240 V AC / 6 A resistive, 24 V DC / 6 A resistive		
Contact gap, typical	---	1x 1.2 mm		
Contact force, typical	---	0.3 N min.		
Contact resistance, typical, without leads connected	---	100 mΩ		
Positive opening force *2	IEC 60947	25 N		
Actuator travel for positive opening	IEC 60947	see page 5		
Maximum actuator travel *2	IEC 60947	2.5 mm		
Actuation speed	IEC 60947	1 m/s max. 1 mm/s min.		
Vibration resistance *3 10 … 500 Hz all directions at 0.1 ms max. opening time	IEC 60068-2-6	5 g		
Shock resistance *3 at 0.1 ms max. opening time	IEC 60068-2-27	15 g, half sinus		
Short-circuit protection for silver contacts *1	IEC 60269-2	6 A gG		
Max. operating frequency	IEC 60947	300 cycles/minute		
Actuation force *2	IEC 60947	2.4 N max.	2.4 N max.	3.1 N max.
Release force *2	IEC 60947	0.5 N max.		
Degree of protection Contacts Terminals	IEC 60529	IP40 IP00		
Mechanical endurance	IEC 60947	10 million cycles min.		
Temperature range	IEC 60947	-40 °C … +85 °C		
Material Contacts Terminals Housing	 --- --- ---	 Silver (Ag90Ni10) or gold (AuNi3Ag26) Brass, silver or gold plated PC, light green, transparent		
Mounting position	---	Any		
Weight, version S840 b 20	---	approx. 10 g		
Approvals	---			

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*1 Data for gold contacts upon request *2 Measured next to actuator *3 No auxiliary actuator

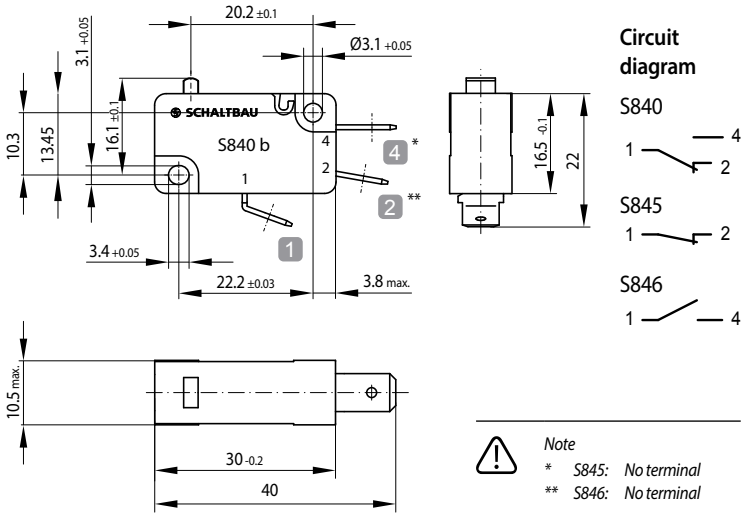
Notes:

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

Dimension and circuit diagram

S840/S845/S846 series

- **Dimension diagram S840 b20 / S845 b20 / S846 b20** SPDT / SPST-NC / SPST-NO



Circuit diagram

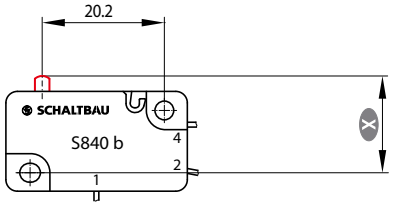
Note
* *S845: No terminal*
** *S846: No terminal*

S840 b10/20	
S840 b10/20	SPDT
S845 b10/20	SPST-NC
S846 b10/20	SPST-NO
S840 b 10/20	Push button (standard)
S840 b 10/20	Contact finish: gold (silver without index)
S840 b10/ 20	Flat tabs

Actuator options, actuator positions

S840/S845/S846 series

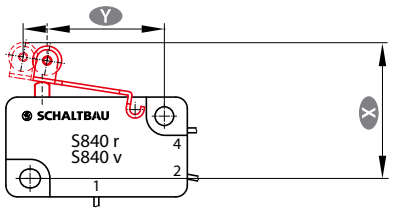
- **S840 b xx/xx** Push button (standard)



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.*

Actuator position	Push button (standard) b Actuator travel X in mm
Free position	16.0 ± 0.1
Operating position	14.8 ± 0.2
Release position	15.0 ± 0.2
Total positive opening travel	13.6
Total travel position	13.5 min.
Movement differential (between operating and release position)	0.2 (typical)

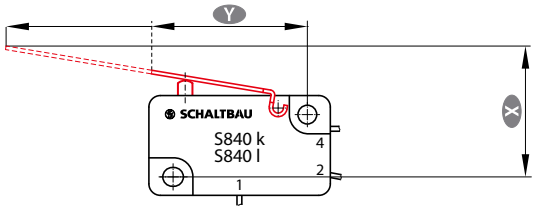
- **S840 r xx/xx / S840 v xx/xx** Roller lever / Roller lever, short



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.*

Actuator position	Roller lever r Travel X in mm	Roller lever v Travel X in mm
Lever length Y	22.7	19.1
Free positon	22.4 ± 0.3	21.9 ± 0.3
Operating position	21.1 ± 0.4	20.7 ± 0.4
Release position	21.3 ± 0.4	20.9 ± 0.4
Total positive opening travel	19.5	19.6
Total travel position	19.4 min.	19.4 min.
Movement differential (between operating and release position)	0.3 (typical)	0.3 (typical)

- **S840 k xx/xx / S840 l xx/xx** Plain lever, short / Plain lever, long



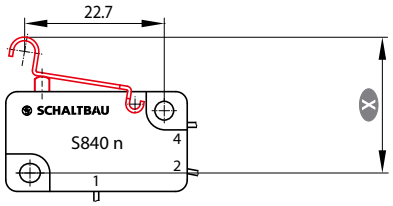
Note: *To ensure the proper working of the positive opening operation it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be pushed beyond total travel position. Data is valid for new switches.*

Actuator positions	Plain lever k Travel X in mm	Plain lever l Travel X in mm
Lever length Y	25.7	49.2
Free position	17.3 ± 0.2	21.5 ± 0.8
Operating position	15.9 ± 0.3	17.6 ± 1.0
Release position	16.1 ± 0.3	18.3 ± 1.0
Total positive opening travel	14.15	---
Total travel position	14.0 min.	13.5 min.
Movement differential (between operating and release position)	0.2 (typical)	0.7 (typical)

Actuator options, actuator positions (continued)

S840/S845/S846 series

- **S840 n xx/xx** Simulated roller lever



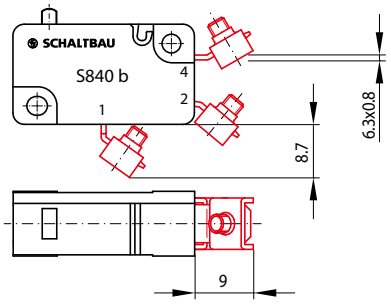
Note: To ensure the proper working of the positive opening operation it is necessary to depress the plunger to the point of total positive opening travel. However, it must not be pushed beyond total travel position.
Data is valid for new switches.

Actuator positions	Simulated roller lever n Actuator travel X in mm
Free position	22.4 ± 0.3
Operating position	21.1 ± 0.4
Release position	21.3 ± 0.4
Total positive opening travel	19.3
Total travel position	19.2 min.
Movement differential (between operating and release position)	0.3 (typical)

Terminal styles

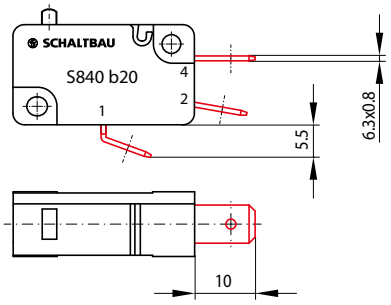
S840/S845/S846 series

- **S840 x xx/–** M3 screws



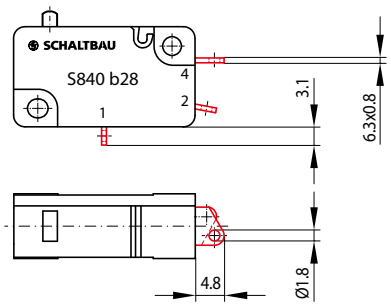
Note:
- *Single and multiple-wire conductors with wire gauges AWG 18 ... 12 (0.75 mm² ... 2.5 mm²) can be clamped without wire end ferrules. If a ferrule is used the maximum wire gauge is AWG 14 (1.5 mm² max.)*
- *Max. 2 conductors with the same wire gauge can be clamped per terminal.*
- *Tightening torque of terminal screws should be 0.5 Nm max.*
- *Ingress protection rating of terminals: IP00*

- **S840 x xx/20** Flat tabs



Note:
- *Suitable for flat tabs 6.3 x 0.8 mm*
- *Ingress protection rating of terminals: IP00*

- **S840 x xx/28** Solder lugs



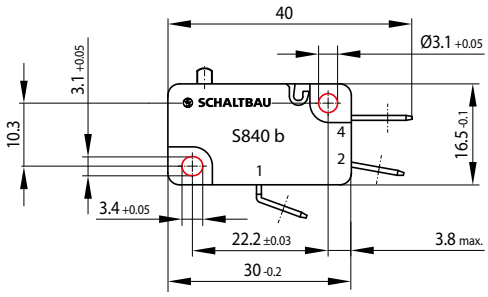
Note:

Hand soldering:
- *Soldering apparatus: Hand-held soldering iron*
- *Solder: Flux-filled solder wire, leadfree*
- *Temperature/duration: 400° C; 5 s * max.*
- *Ingress protection rating of terminals: IP00*

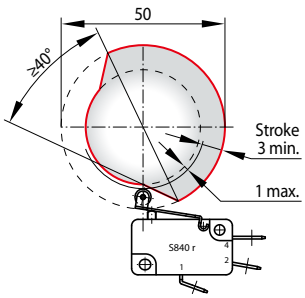
Mounting Mechanical fastening — Use of roller levers — S840/S845/S846 series

Ganging (side mount)

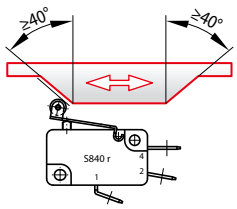
- through the two transversal holes in the body of the switch by means of a collar screw or threaded bolt .
  Tightening torque 0.7 Nm max.
- Alternatively, DUO-clips or retaining rings can be used.



Switch with roller lever actuated by cam disc



Switch with roller lever actuated by linear cam



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.*

Mounting and safety instructions, environmental conditions, standards — S840/S845/S846 series

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.
- 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.

Non-permissible environmental conditions:

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

Safety instructions:

- Be sure to make visual inspections regularly.
- Improper handling of the switch, e.g. when hitting the floor with 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 detailed maintenance, safety and mounting instructions please refer to our operating manuals:
schaltbau.info/safety2en!

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
- Dimensions according to DIN 41636-2, type A
- **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

For other applicable standards please refer to the specifications table on page 4.

Schaltbau GmbH

For detailed information on our products and services visit our website – or give us a call!

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with compliments:

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Certified to DIN EN ISO 14001 since 2002. For the most recent certificate visit our website.

Certified to DIN EN ISO 9001 since 1994. For the most recent certificate visit our website.

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
- Snap-action switch made of robust polyetherimide (PEI)
- Snap-action switch with two galvanically isolated contact bridges
- Special switches to suit customer requirements

Contactors
Emergency disconnect switches

- 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
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- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements

D1977/2312/0 Catalogue available as PDF