

4

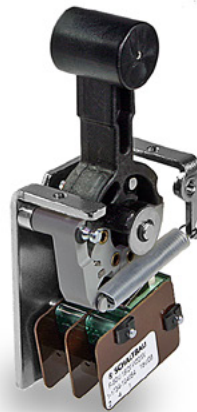
Electrics for Rolling Stock

F, L, P, K series

Toggle switches
for drivers' desks
of rail vehicles

Installation and
maintenance instructions

Manual F112-M.en



Content

1. Important background information	3
1.1 Legal information	3
1.2 Other applicable documents	3
1.3 Conventions for these installation and maintenance instructions	3
2. General and safety information	4
2.1 Compliance with the installation and maintenance instructions	4
2.2 Duties of the operating company	4
2.3 Intended use	5
2.4 Ambient conditions	5
3. Hazards and safety precautions	6
3.1 Electrical hazards	6
3.2 Mechanical hazards	6
3.3 Lubricants	7
4. Description	8
5. Series F toggle switches	9
5.1 Safety	9
5.2 Installation instruction	9
5.3 Replacement of snap-action switches	10
5.4 Spare parts for series F toggle switches	10
6. Series L toggle switches	11
6.1 Safety	11
6.2 Installation instruction	11
6.3 Replacement of the switching elements	12
6.4 Spare parts for series L toggle switches	12
7. Series P toggle switches	13
7.1 Safety	13
7.2 Installation instruction	13
7.3 Replacement of the switching elements	14
7.4 Spare parts for series P toggle switches	14
8. Series K toggle switches	15
8.1 Safety	15
8.2 Installation instruction	15
8.3 Installation with quick-release fasteners	16
8.4 Spare parts for series K toggle switches	16
8.5 Installation with a screw device	17
8.6 Spare parts for series K toggle switches	17
9. Series F - dimensional drawings	18
10. Series L - dimensional drawings	19
11. Series P - dimensional drawings	20
12. Series K - dimensional drawings	21
13. Maintenance	22
14. Technical data	23

1. Important background information

1.1 Legal information





The installation and maintenance instructions must not be reproduced, distributed, modified, communicated, translated into any other language or otherwise used, either in whole or in part, electronically or mechanically without the express written permission of SCHALTBAU GmbH.
 SCHALTBAU GmbH shall not be liable for any damage resulting from failure or partial failure to observe the installation and maintenance instructions.

1.2 Other applicable documents

Technical documents of purchased parts, material data sheets or checklists and reports, e.g. of completed servicing or maintenance work, are also applicable documents.

1.3 Conventions for these installation and maintenance instructions

These installation and maintenance instructions describe the installation and maintenance of the different toggle switch series.
 Cross references are shown in **bold and italics** in these installation and maintenance instructions.
 The following symbols are used in these installation and maintenance instructions to highlight safety instructions and information.

 DANGER	Indicates a directly threatening dangerous situation. Death or severe injuries will result if it is not prevented.
 WARNING	Indicates a possibly dangerous situation. Death or severe injuries may result if it is not prevented.
 CAUTION	Indicates a possibly dangerous situation. Medium or minor injuries may result if it is not prevented.
ATTENTION	Indicates a possibly detrimental situation. If it is not prevented, assemblies, the system or property in its surroundings could be damaged.
	Indicates technical features and methods to simplify working or indicates information of particular importance.

2. General and safety information

The electrical devices described here are a part of systems used in rail vehicles. They have been designed and tested according to the relevant accepted codes of practice. In general, if electrical equipment is deployed incorrectly, operated incorrectly or inadequately maintained with unauthorised work being performed, the results could include severe harm to health or property damage. Therefore, strictly observe the maintenance instructions for these devices.

If anything is not clear, clarification must be sought with any queries stating the device type and the serial number.

Planning and execution of the mechanical and electrical installations, transport, erection and commissioning as well as maintenance and repair work must only be carried out by responsible specialists with appropriate technical knowledge. This applies both to compliance with the general installation and safety regulations for working on power installations (e.g. DIN, VDE) and also the correct use of approved tools and the use of personal protective equipment where necessary. Electrical devices must be protected against moisture and dust during installation, operation or storage.

In case of doubt, we recommend that you profit from the support and service provision of SCHALTBAU GmbH in respect of installation, commissioning and any service tasks that may arise.

2.1 Compliance with the installation and maintenance instructions

- ▶ Personnel must read, understand and observe the Assembly and Maintenance Instructions for all work that arises.
- ▶ **Observe all safety instructions strictly and precisely!**

2.2 Duties of the operating company

- ▶ Observe all applicable national regulations, all safety, accident prevention and environmental protection regulations as well as the recognised technical rules for safe and correct working.
- ▶ Regularly check all fitted protection and safety equipment for correct function.
- ▶ Work on electrical equipment must only be carried out by a qualified electrician or by instructed persons under the supervision and control of a qualified electrician in accordance with electrical regulations.
- ▶ A specialist is someone who, on the basis of their technical training, knowledge and experience as well as knowledge of the relevant regulations, is able to assess the work assigned to them and identify possible dangers.
- ▶ The personnel must be clearly informed about who is responsible for servicing and maintenance work on the various F, K, L and P series toggle switches.
- ▶ Personnel who are undergoing training, teaching, instruction or are in general education may only work on the F, K, L and P series toggle switches under the constant supervision of an experienced person.
- ▶ It is not intended that the operating company/customer should repair the important-for-safety device. Please send the device to the Service Department of Schaltbau GmbH, Velden Germany.

2.3 Intended use

The F, K, L and P series toggle switches must only be operated:

- ▶ If all protection devices are present, correctly installed and fully functional.
- ▶ If solely SCHALTBAU GmbH original spare parts are used in any servicing work.
- ▶ Servicing work other than that outlined in these assembly and maintenance instructions may only be carried out by SCHALTBAU GmbH service personnel.
- ▶ F, K, L and P series toggle switches may not be converted or modified in any other way without prior written approval from SCHALTBAU GmbH. If this is contravened, the manufacturer will not be liable in anyway.
- ▶ Normal operation of the F, K, L and P series toggle switches may only take place if all protective devices are present, correctly installed and fully functional.
- ▶ If F, K, L and P series toggle switches need to be operated in modes that require temporary disabling of protective devices, this may only be performed by SCHALTBAU GmbH service personnel. During this work, the circumstances must be clearly indicated on the toggle switches, e.g. by a sign “Attention – maintenance work. Do not touch!” or, if necessary, access by third parties must be prevented. Once work is complete, all protective equipment must be properly reinstalled and checked for correct function.
- ▶ All faults and damage indicated by the system or identified in any other way must be immediately reported and rectified, see section **“3.1 Electrical hazards”, page 6**.
- ▶ None of the conditions of use such as voltages, currents, ambient conditions, etc., as defined in section **“14. Technical Data”, page 23**, must be changed.
- ▶ Only personnel who fulfil the requirements given in these installation and maintenance instructions may work on the F, K, L and P series toggle switches
- ▶ By-passing or jumpering of switches or other control components in not permitted.

2.4 Ambient conditions


ATTENTION

F, K, L and P series toggle switches have been designed for special ambient conditions.


- ▶ Only operate the F, K, L and P series toggle switches under the ambient conditions stated in Section **“14. Technical Data”, page 23**.


3. Hazards and safety precautions


3.1 Electrical hazards

	⚠ DANGER
	<p>The F, K, L and P series toggle switches contain components, that may be under high voltage.</p> <p><i>Danger to life due to electric shock!</i></p> <p>Always observe the following safety rules before starting work on the F, K, L and P series toggle switches:</p> <ul style="list-style-type: none"> ▶ Disconnect. ▶ Secure to prevent switching back on. ▶ Check that a voltage-free state exists. ▶ Earth and short-circuit. ▶ Clearly mark out the working area. ▶ In addition to the main electric circuits, also earth and short-circuit additional and auxiliary circuits. ▶ Cover or render inaccessible adjacent live parts.


3.2 Mechanical hazards


	⚠ CAUTION
	<p>The F, K, L and P series toggle switches contain components, that may be subject to mechanical stress. <i>Risk of crushing!</i></p> <ul style="list-style-type: none"> ▶ Use suitable tools when performing maintenance on components of the toggle switches of the individual series. ▶ Secure components that are under mechanical stress before fitting or removing them.

	⚠ CAUTION
	<p>When working on the F, K, L and P series toggle switches there is a risk of injury.</p> <ul style="list-style-type: none"> ▶ Use suitable tools when working on the F, K, L and P series toggle switches. ▶ Wear tightly fitting work clothes so that clothes cannot get caught or stuck in machine parts.

	<p>⚠ CAUTION</p> <p>When working on the F, K, L and P series toggle switches the following protective equipment is necessary to prevent injury:</p> <ul style="list-style-type: none"> ▶ Wear safety gloves to prevent hand injuries. ▶ Wear safety shoes to prevent injury from falling parts. ▶ Wear safety glasses with hardened lenses to prevent eye injuries.
---	---

3.3 Lubricants

	<p>⚠ WARNING</p> <p>Explosive gases can arise when mixing different lubricants. Risk of explosion!</p> <ul style="list-style-type: none"> ▶ Do not mix different lubricants together. ▶ Observe the manufacturer’s instructions.
--	---

	<p>⚠ WARNING</p> <p>Lubricants are potential health hazards.</p> <ul style="list-style-type: none"> ▶ Observe the manufacturer’s instructions. ▶ Do not eat, drink or smoke when handling lubricants. ▶ Wash hands thoroughly with soap and water after handling lubricants.
---	--

<p>ATTENTION</p> <p>Lubricants may damage the environment.</p> <ul style="list-style-type: none"> ▶ Ensure that lubricants cannot get into the sewage system, groundwater or the soil. ▶ Dispose of lubricants according to the locally applicable national regulations.

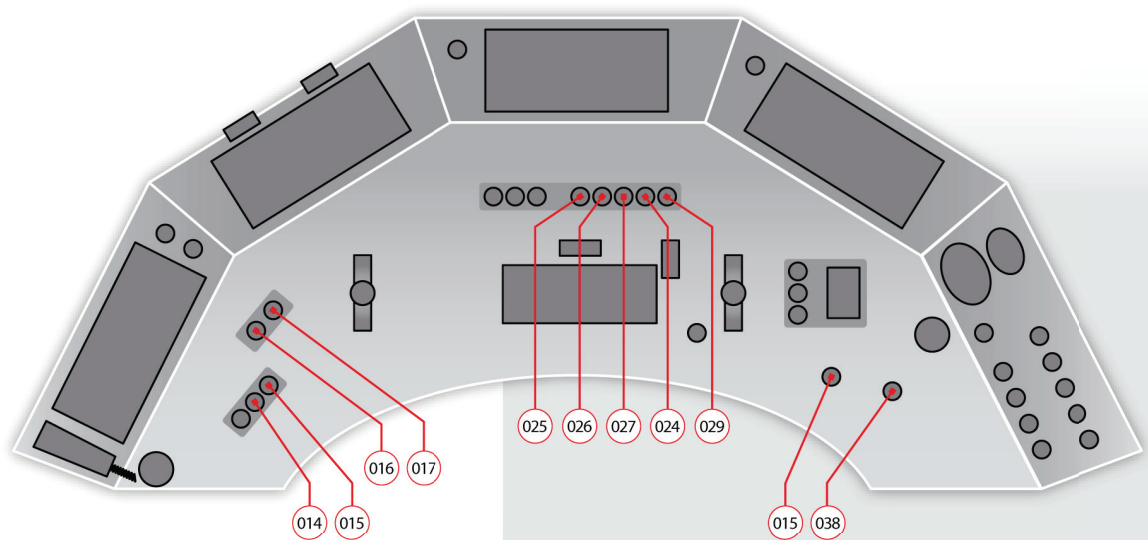
4. Description

Typical applications are driver's cabs in railway vehicles. However, use in the control consoles of cranes and cable cars is equally conceivable. Three or five switching positions can be implemented with a multitude of different switching functions. Based on UIC 612-0 and provided they are of the latest technological version, the F, K, L and P series toggle switches are compatible with each other in respect of their switching function.

Characteristics:

- ▶ Standard and special lever according to UIC 612-0 for intended use (finger actuation).
- ▶ Stylish and robust design
- ▶ Long mechanical service life
- ▶ Long electrical service life at e.g. 24 V DC / 10 mA
- ▶ Compact, quickly installable function units
- ▶ Shock and vibration check according to IEC 60077.

Driver's desk elements



F, K, L and P series toggle switches in EUDDplus driver's cabs


The European driver's desk as specified by the EUDDplus project complies with the UIC 612-0 standard, which describes the interface between driver and driver's desk of EMUs, DMUs, locomotives and driving trailers. The project aims at an optimum ergonomic configuration of the desk elements by standardizing and harmonizing their design.

Function	Handle	Settings	Action
014 ETCS release intervention	Standard	3	TKNKT
015 ETCS acknowledgement	Ball, yellow	3	TKNKT
016 Pantograph / Engine	T-handle	5	TTNTS
017 Main circuit breaker / Power	Standard	3	TKNKT
024 Train lighting	Standard	3	TKNKT
025 Sanding	Ball, black	3	TKNKT
026 Release brake	Standard	3	TKNKT
027 External front lights	Standard	5	SSNSS
028 Instrument lighting	Standard	3	SKNKS
029 Task & driver's cab lighting	Standard	5	STNKT
038 External warning horn	Cylinder	3	TKNKT

Subject to change

5. Series F toggle switches

5.1 Safety



⚠ DANGER

Series F toggle switches contain components, that may be under high voltage. Danger to life due to electric shock!
Always observe the following safety rules before starting work on the toggle switches:

- ▶ Disconnect
- ▶ Secure to prevent switching back on
- ▶ Check that a voltage-free state exists
- ▶ Earth and short-circuit
- ▶ Clearly mark out the working area
- ▶ In addition to the main electric circuits, also earth and short-circuit additional and auxiliary circuits.
- ▶ Cover or render inaccessible adjacent live parts

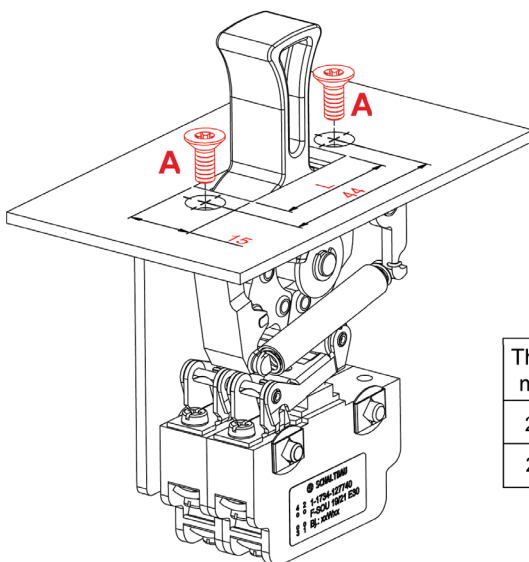
5.2 Installation instruction

Suitable fastening holes and mounting cut-outs must be provided for the installation of the F series toggle switches in the driver's cab. Installation is usually on the driver's desk within reach of the driver. The installation dimensions can be found in the drawing below.

Device installation

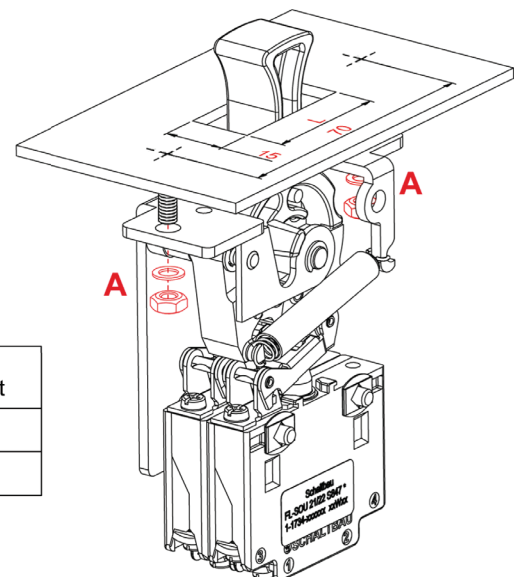
- ▶ Suitable fasteners (countersunk screws M4 (A) and hexagon nuts M4 (B), and locking elements) must be used to fasten the toggle switches. High stresses and uneven fastening surfaces are not permitted.
Maximum tightening torque 3,1 Nm.

Note: Fasteners are not supplied.



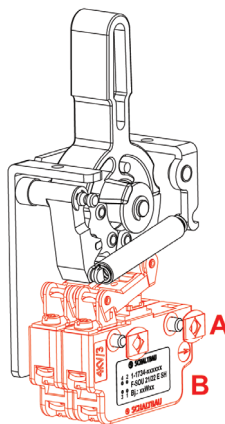
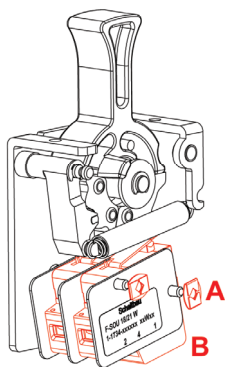
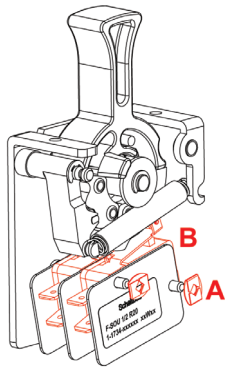
Attachment using countersunk screws

Thickness of the mounting plate	L x 15 Mounting cut-out
2.0 ... 2.5 mm	32 x 15 mm
2.5 ... 4.0 mm	34 x 15 mm



Stud fastening

5.3 Replacement of snap-action switches



Checking snap-action switches S800 / S826 / S840 / S870

Tools required

- ▶ Continuity tester

Procedure

- ▶ Ensure that the system is electrically isolated and all safety rules are complied with (see section “5.1 Safety”, page 9).
- ▶ Check contact making using the continuity tester.

Replacing snap-action switches S800 / S826 / S840 / S870

Tools required

- ▶ Screwdriver no. 2
- ▶ Continuity tester

Procedure

1. Undo connection screws (A), remove wiring.
2. Remove DuoClips (A), exchange snap-action switch (B) for a new snap-action switch.
3. Secure snap-action switch (B) with **new** DuoClips (A) and reattach the wiring (maximum tightening torque 0.8 Nm).
4. Check contact making using the continuity tester.

ATTENTION

The use of screw locking paste and other such materials that are not approved by us is **not** permitted!

Detent-edged rings or lock washers that fall down and remain in the device, could result in malfunctions of and/or damage to the device.


Important: After replacing the snap-action switch, new DuoClips must be used!

5.4 Spare parts for series F toggle switches

Designation	Art. no.:	Use	
S800 e snap-action switch W	1-1520-243444		
S800 e 24 snap-action switch W	1-1520-243579		
S826 e snap-action switch W	1-1522-530987		
S826 e 24 snap-action switch W	1-1522-148486		
S840 r snap-action switch W	1-1540-193362		
S840 r 20 snap-action switch W	1-1540-193306		
S870 W1A1 r snap-action switch W	1-1570-961870		
S870 W1D1 r snap-action switch W	1-1570-261910		
DuoClips 3 SXN 10 phosphated	1-5341-101487		S840 / S870
Duo-Clip DC4, phosphated	1-5341-436681		S800 / S826

6. Series L toggle switches

6.1 Safety



⚠ DANGER

Series L toggle switches contain components, that may be under high voltage. Danger to life due to electric shock!
Always observe the following safety rules before starting work on the toggle switches:

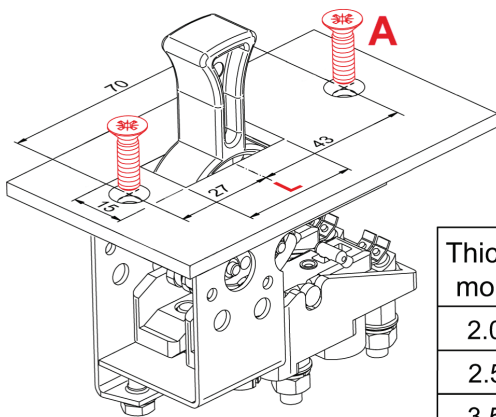
- ▶ Disconnect
- ▶ Secure to prevent switching back on
- ▶ Check that a voltage-free state exists
- ▶ Earth and short-circuit
- ▶ Clearly mark out the working area
- ▶ In addition to the main electric circuits, also earth and short-circuit additional and auxiliary circuits.
- ▶ Cover or render inaccessible adjacent live parts

6.2 Installation instruction

Suitable fastening holes and mounting cut-outs must be provided for the installation of the L series toggle switches in the driver's cab. Installation is usually on the driver's desk within reach of the driver. The installation dimensions can be found in the drawing below.

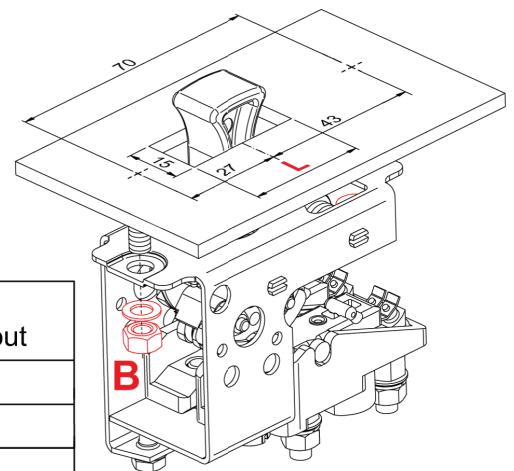
Device installation

- ▶ The toggle switches are fastened using the supplied M5 countersunk screws (A) or, where the SO special design is used, using studs. High stresses and uneven fastening surfaces are not permitted. For stud fastening, the fastenings (B) are not supplied.
Maximum tightening torque 6 Nm.



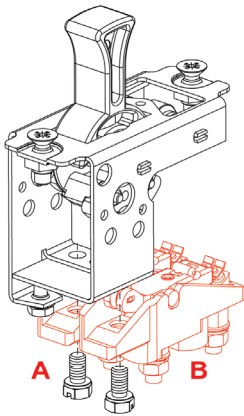
Attachment using countersunk screws

Thickness of the mounting plate	L x 15 Mounting cut-out
2.0 ... 2.5 mm	30 x 15 mm
2.5 ... 3.5 mm	32 x 15 mm
3.5 ... 6.0 mm	35 x 15 mm



Stud fastening

6.3 Replacement of the switching elements



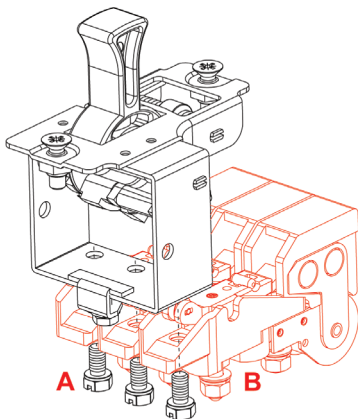
Checking switching elements S005a / S007a / S007c / S008 P5 / S008 P6

Tools required

- ▶ Continuity tester

Procedure

- ▶ Ensure that the system is electrically isolated and all safety rules are complied with (see section **“6.1 Safety”, page 11**).
- ▶ Check contact making using the continuity tester.



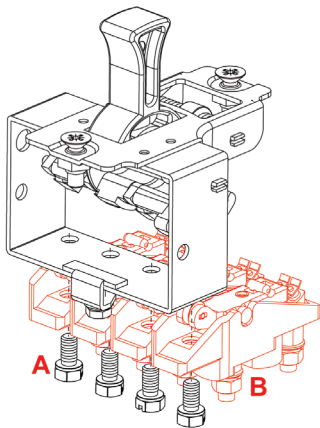
Replacing switching elements S005a / S007a / S007c / S008 P5 / S008 P6

Tools required

- ▶ 8 mm box spanner
- ▶ Continuity tester

Procedure

1. Undo connection screws (A), remove wiring.
2. Remove fixing screws (A), replace switching elements (B) with new switching elements.
3. Fit switching elements (B) with ISO4017 M 5x10 socket screws (A) (maximum tightening torque 2.8 Nm) and reattach wiring (max. tightening torque 2.0 Nm).
4. Check contact making using the continuity tester.



ATTENTION

The use of screw locking paste and other such materials that are not approved by us is **not** permitted!


Detent-edged rings or lock washers that fall down and remain in the device, could result in malfunctions of and/or damage to the device.

6.4 Spare parts for series L toggle switches

Designation	Art. no.:
S005 A - Switching element	1-1501-270027
S007 A - Switching element	1-1502-270083
S007 C - Switching element	1-1502-270061
S008 P5 - Switching element	1-1503-270174
S008 P6 - Switching element	1-1503-270163

7. Series P toggle switches

7.1 Safety



⚠ DANGER

Series P toggle switches contain components, that may be under high voltage. Danger to life due to electric shock!
Always observe the following safety rules before starting work on the toggle switches:

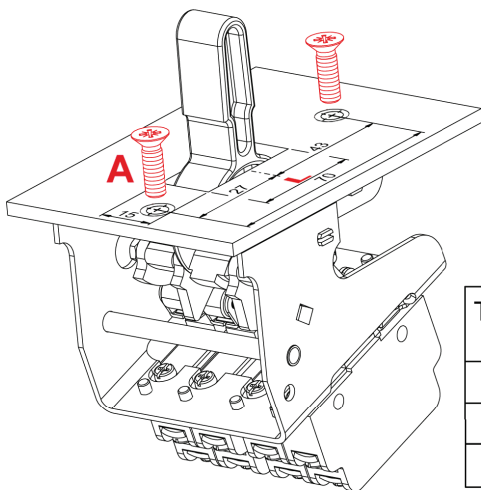
- ▶ Disconnect
- ▶ Secure to prevent switching back on
- ▶ Check that a voltage-free state exists
- ▶ Earth and short-circuit
- ▶ Clearly mark out the working area
- ▶ In addition to the main electric circuits, also earth and short-circuit additional and auxiliary circuits.
- ▶ Cover or render inaccessible adjacent live parts

7.2 Installation instruction

Suitable fastening holes and mounting cut-outs must be provided for the installation of the P series toggle switches in the driver's cab. Installation is usually on the driver's desk within reach of the driver. The installation dimensions can be found in the drawing below.

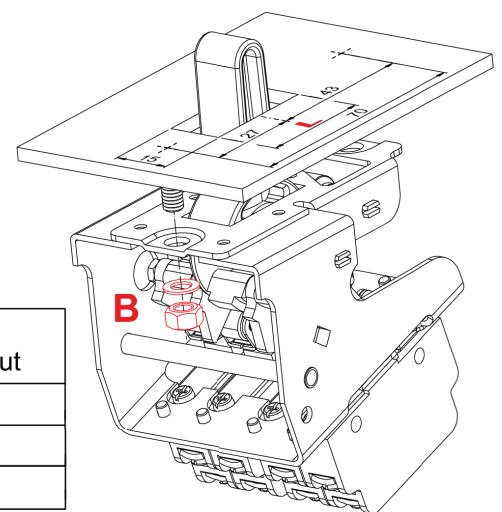
Device installation

- ▶ The toggle switches are fastened using the supplied M5 countersunk screws (A) or, where the SO special design is used, using studs. High stresses and uneven fastening surfaces are not permitted. For stud fastening, the fastenings (B) are not supplied.
Maximum tightening torque 6 Nm.



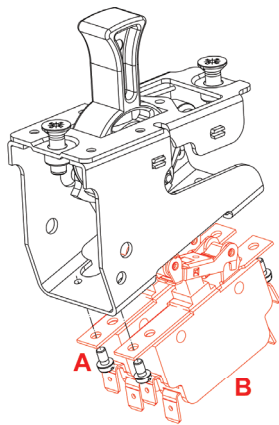
Attachment using countersunk screws

Thickness of the mounting plate	L x 15 Mounting cut-out
2.0 ... 2.5 mm	30 x 15 mm
2.5 ... 3.5 mm	32 x 15 mm
3.5 ... 6.0 mm	35 x 15 mm



Stud fastening

7.3 Replacement of the switching elements



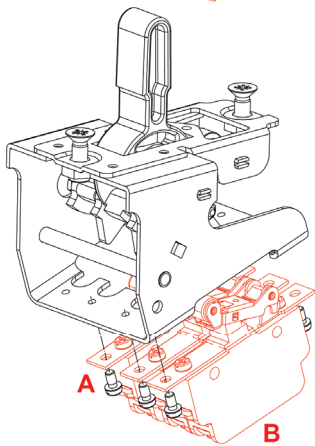
Checking snap-action switches S800 a / S800 a24 / S800 a30 / S826 a24 / S826 a/L / S826 a10 / S826 a10/24

Tools required

- ▶ Continuity tester

Procedure

- ▶ Ensure that the system is electrically isolated and all safety rules are complied with (see section “7.1 Safety”, page 13).
- ▶ Check contact making using the continuity tester.



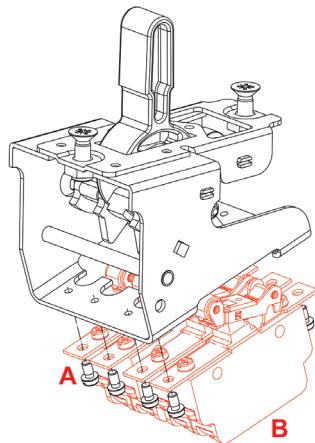
Replacing snap-action switches S800 a / S800 a24 / S800 a30 / S826 a / S826 a24 / S826 a/L / S826 a10 / S826 a10/24

Tools required

- ▶ Screwdriver no. 2
- ▶ Continuity tester

Procedure

1. Undo connection screws (A), remove wiring.
2. Remove fixing screws (A), replace switching elements (B) with new switching elements.
3. Fit switching elements (B) with DIN 7984 M 3x6 cylindrical screws (A) (maximum tightening torque 1.3 Nm) and reattach wiring (max. tightening torque 0.9 Nm).
4. Check contact making using the continuity tester.



ATTENTION

The use of screw locking paste and other such materials that are not approved by us is **not** permitted!


Detent-edged rings or lock washers that fall down and remain in the device, could result in malfunctions of and/or damage to the device.

7.4 Spare parts for series P toggle switches

	<i>Designation</i>	<i>Art. no.:</i>
S800 a	Snap-action switch W	1-1520-209546
S800 a24	Snap-action switch W	1-1520-243320
S800 a30	Snap-action switch W	1-1502-243308
S826 a	Snap-action switch W	1-1522-530965
S826 a24	Snap-action switch W	1-1522-258709
S826 a L	Snap-action switch W	1-1522-532449
S826 a10	Snap-action switch W	1-1522-104022
S826 a10/24	Snap-action switch W	1-1522-275431

8. Series K toggle switches

8.1 Safety



⚠ DANGER

Series K toggle switches contain components, that may be under high voltage. Danger to life due to electric shock!
Always observe the following safety rules before starting work on the toggle switches:

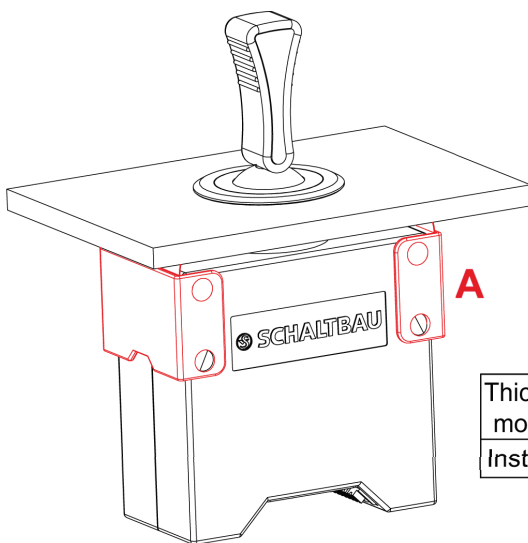
- ▶ Disconnect
- ▶ Secure to prevent switching back on
- ▶ Check that a voltage-free state exists
- ▶ Earth and short-circuit
- ▶ Clearly mark out the working area
- ▶ In addition to the main electric circuits, also earth and short-circuit additional and auxiliary circuits.
- ▶ Cover or render inaccessible adjacent live parts

8.2 Installation instruction

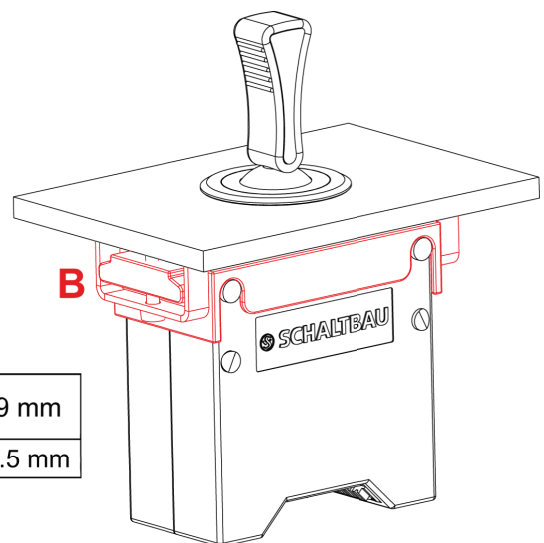
Suitable fastening holes and mounting cut-outs (Ø 30.5 mm) must be provided for the installation of the K series toggle switches in the driver's cab. Installation is usually on the driver's desk within reach of the driver.

Device installation

- ▶ The toggle switches are fastened using the supplied quick-release fasteners (A) or, where the special design screw fastening (B) is used, using clamping brackets. High stresses and uneven fastening surfaces are not permitted.



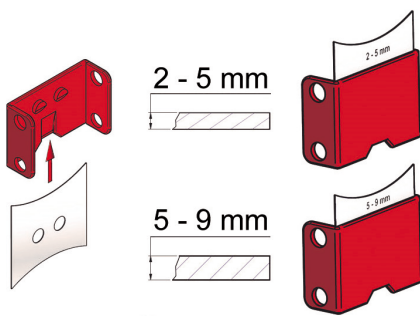
Fastening using quick-release fasteners



Screw fastening

Thickness of the mounting plate	2 - 9 mm
Installation hole	Ø 30.5 mm

8.3 Installation with quick-release fasteners

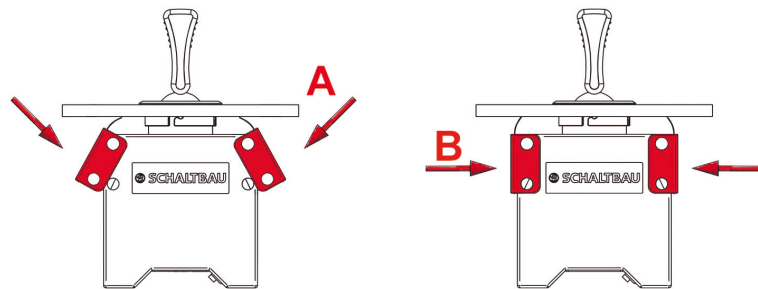
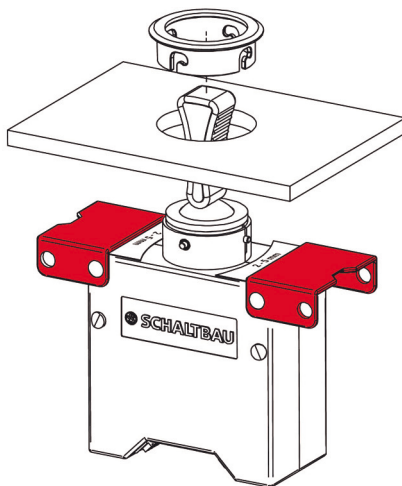


Preparation for installation

- ▶ Selection of the installation range. There are two mounting plate ranges available (2 to 5 mm and 5 to 9 mm).
- ▶ Depending on the selection of the mounting plate range, insert the fastening springs until they engage.
- ▶ Clip in the quick-release fasteners at the toggle switch.

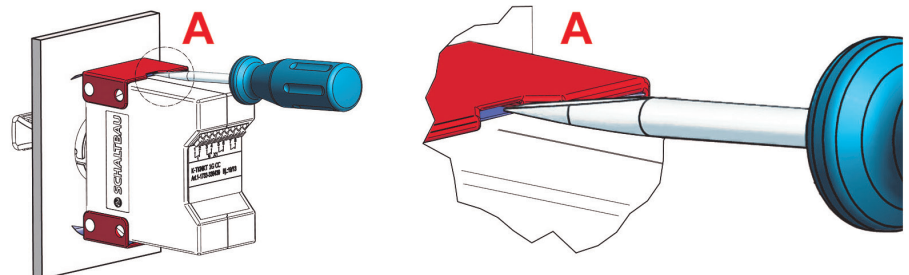
Device installation

- ▶ Guide the toggle switch through the mounting hole and secure using the locking ring.
- ▶ Locate the quick-release fasteners in position **A**
 - Alignment of the toggle switch is possible
- ▶ Locate the quick-release fasteners in position **B**
 - The toggle switch has been fixed.



Removal

- ▶ Push a size 2 screwdriver between fastening spring and bracket (see detail **A**) until the fastening spring releases.
- ▶ Take off the lock ring and remove the toggle switch.



ATTENTION

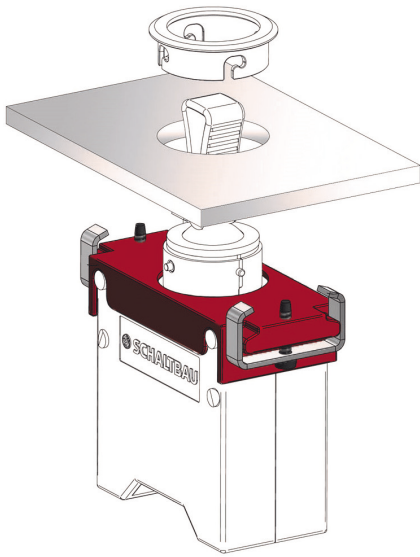
The quick-release fasteners are only intended for a **single installation** - **Do not use more than once!**

No further repair or maintenance work is permitted on Series K toggle switches!

8.4 Spare parts for series K toggle switches

Designation	Art. no.:
Quick-release fasteners	1-2733-337377

8.5 Installation with a screw device



Procedure

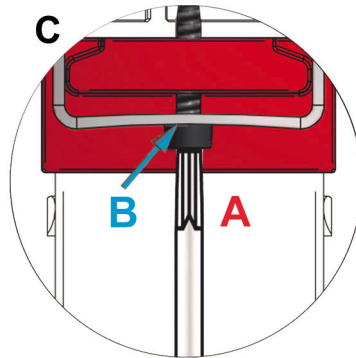
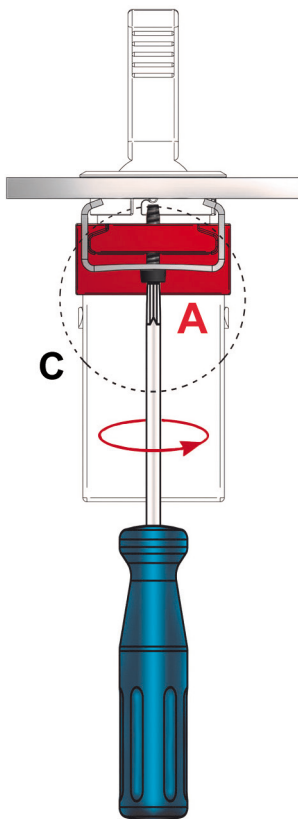
- ▶ Ensure that the system is electrically isolated and all safety rules are complied with (see section “8.1 Safety”, page 15).

Tools required

- ▶ Torx no. 10 screwdriver

Device installation

- ▶ Guide the toggle switch through the mounting hole and secure using the locking ring.
- ▶ Slightly tighten screws (A) and align the toggle switch.
- ▶ Tighten screws (A) until a slight deformation (B) of the fastening bracket results.



ATTENTION

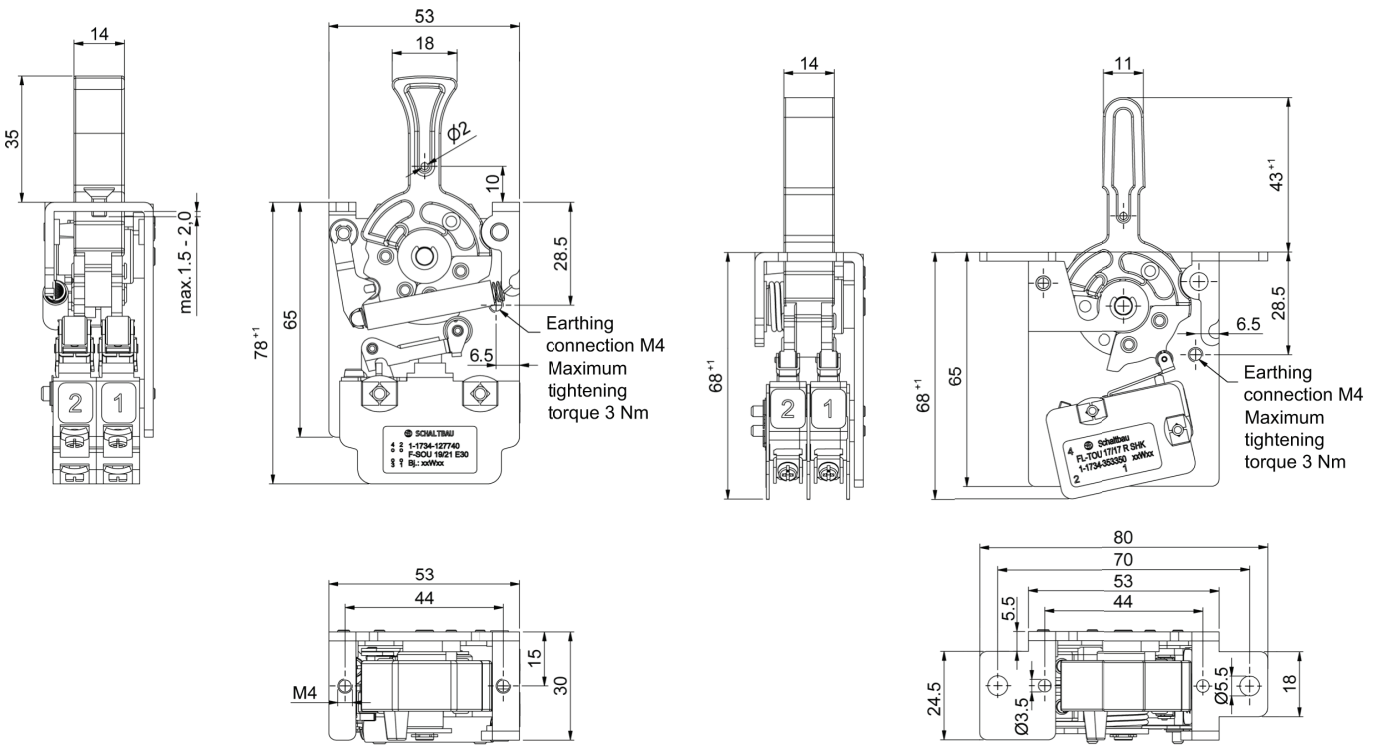
The screw devices are only intended for a **single installation - Do not use more than once!**

No further repair or maintenance work is permitted on Series K toggle switches!

8.6 Spare parts for series K toggle switches

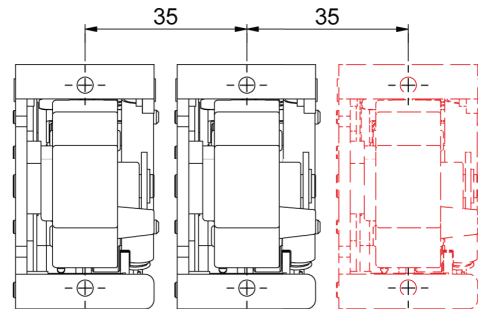
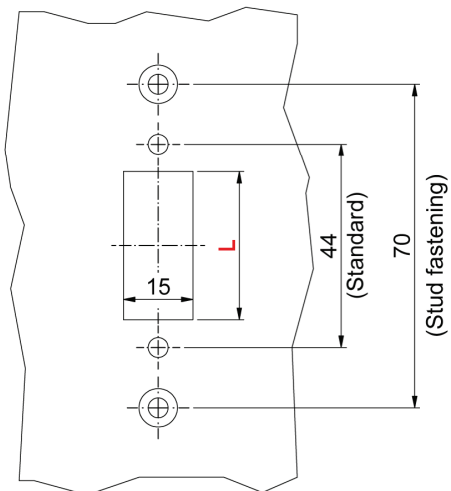
Designation	Art. no.:
Screw device	1-1733-337107

9. Series F - dimensional drawings

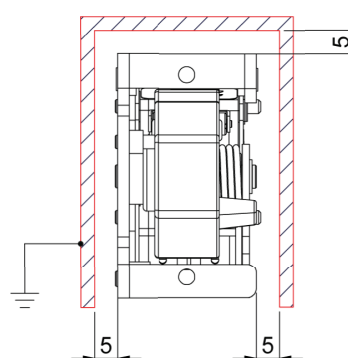


Mounting cut-out

- ▶ All mounting cut-outs are only guidelines and can be adjusted accordingly. To achieve a more aesthetically pleasing appearance, these can be optimised with, e.g., a chamfer or bevel.

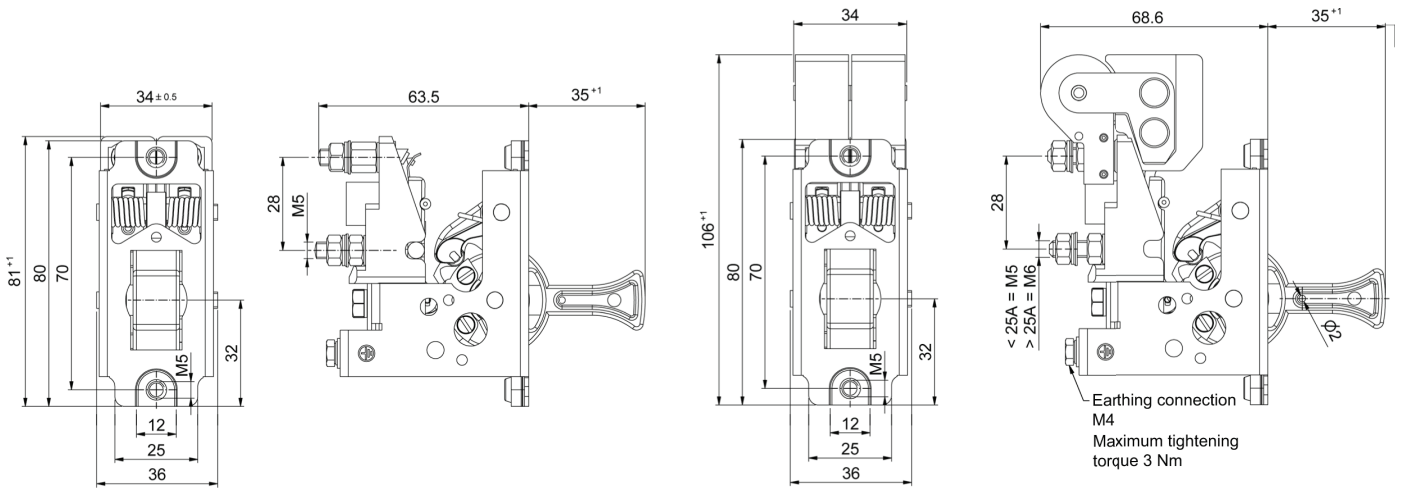


▶ Minimum clearances



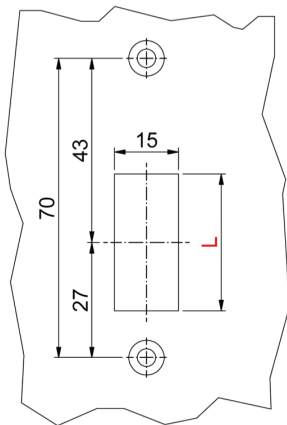
Thickness of the mounting plate	L x 15 Mounting cut-out
2.0 ... 2.5 mm	32 x 15 mm
2.5 ... 4.0 mm	34 x 15 mm

10. Series L - dimensional drawings



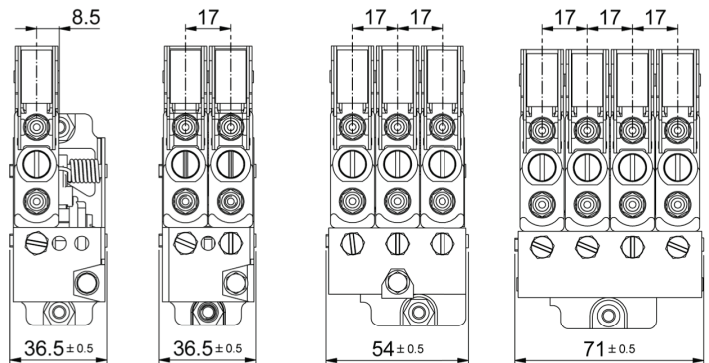
Mounting cut-out

► All mounting cut-outs are only guidelines and can be adjusted accordingly. To achieve a more aesthetically pleasing appearance, these can be optimized with, e.g., a chamfer or bevel.

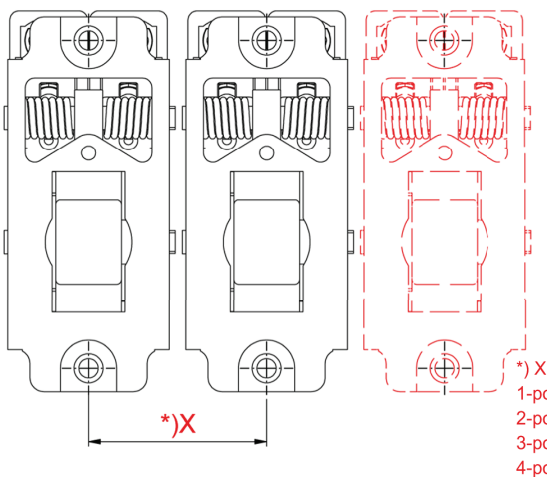


Thickness of the mounting plate	L x 15 Mounting cut-out
2.0 ... 2.5 mm	30 x 15 mm
2.5 ... 3.5 mm	32 x 15 mm
3.5 ... 6.0 mm	35 x 15 mm

Connection designation (information on the nameplate)							
2	4	2	6	4	2	8	6
1	3	1	5	3	1	7	5

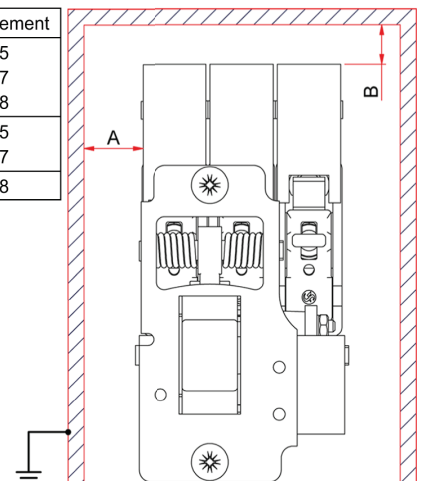


► Minimum clearances

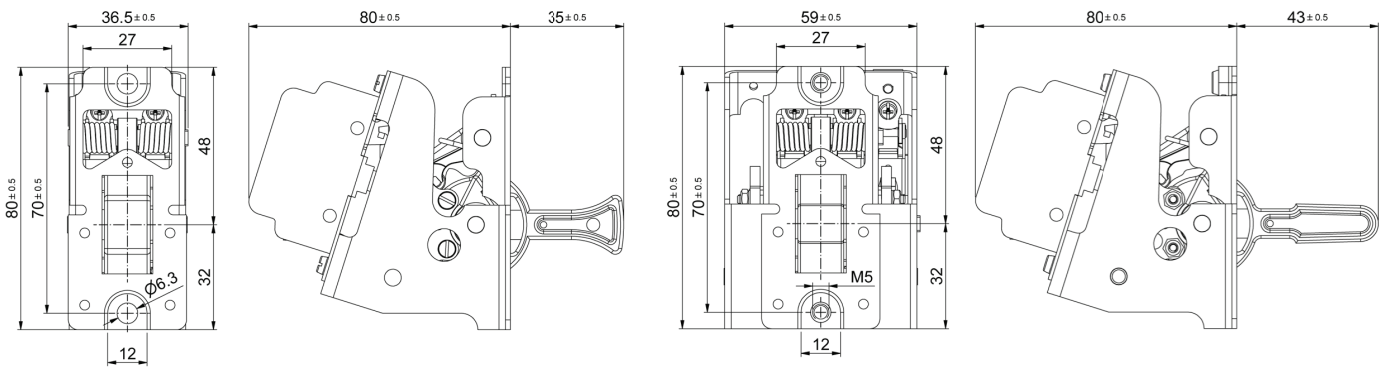


- *) X
- 1-pole 38 mm
- 2-pole 38 mm
- 3-pole 56 mm
- 4-pole 73 mm

Dimension	Distance	Switch element
A	2 mm	S005 S007 S008
B	10 mm	S005 S007
	30 mm	S008

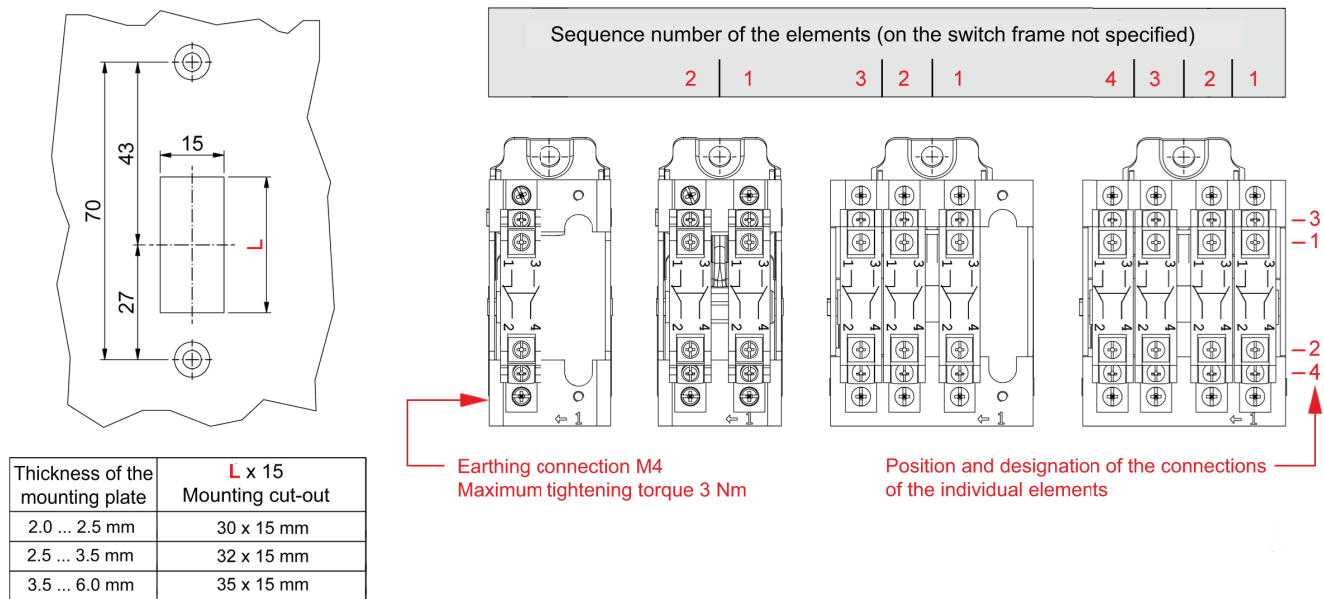


11. Series P - dimensional drawings

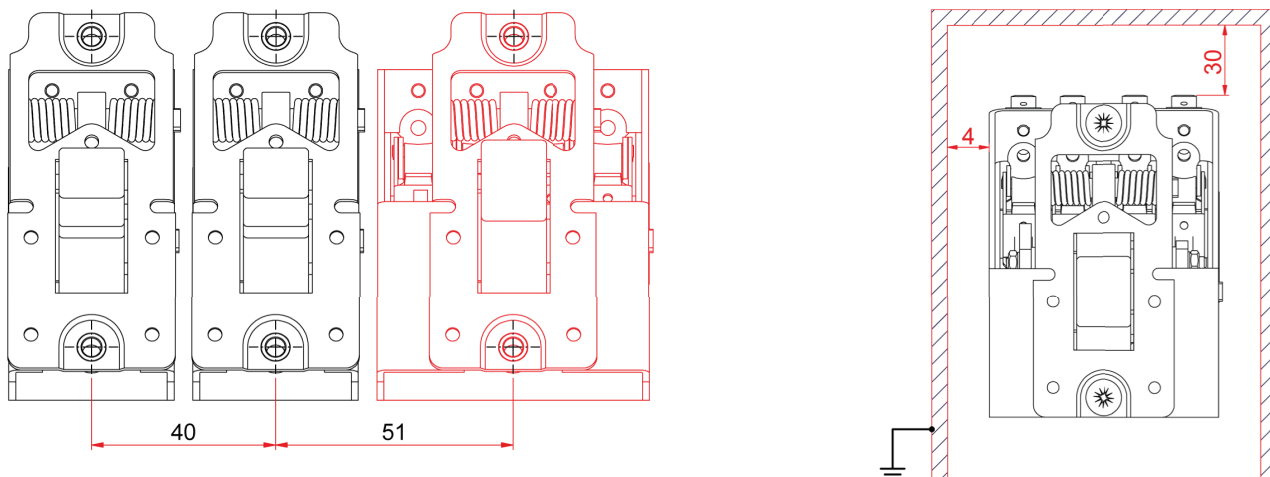


Mounting cut-out

► All mounting cut-outs are only guidelines and can be adjusted accordingly. To achieve a more aesthetically pleasing appearance, these can be optimised with, e.g., a chamfer or bevel.

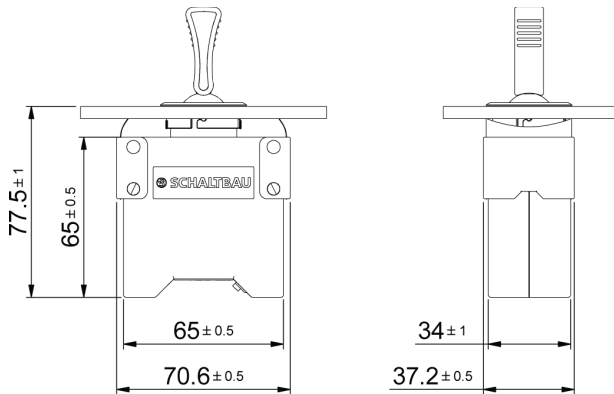


► Minimum clearances

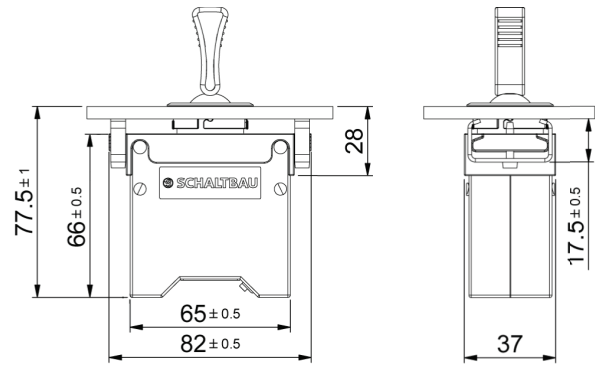


12. Series K - dimensional drawings

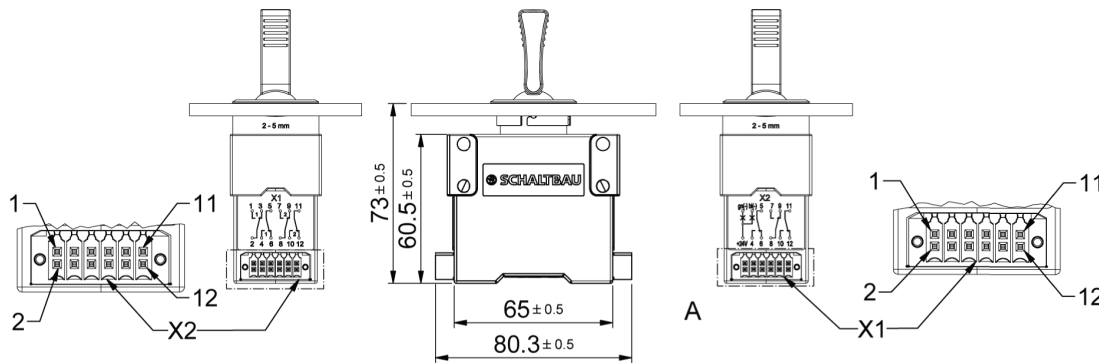
► K toggle switch with quick-release fastening



► K toggle switch with screw fastening



► Connection via 12 pole plug



► Installation holes (highest packing density)

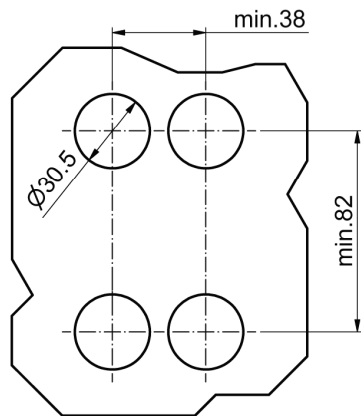
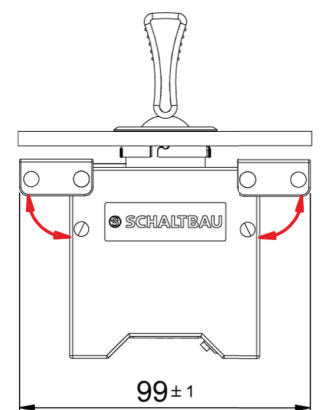
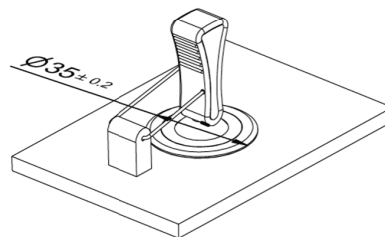


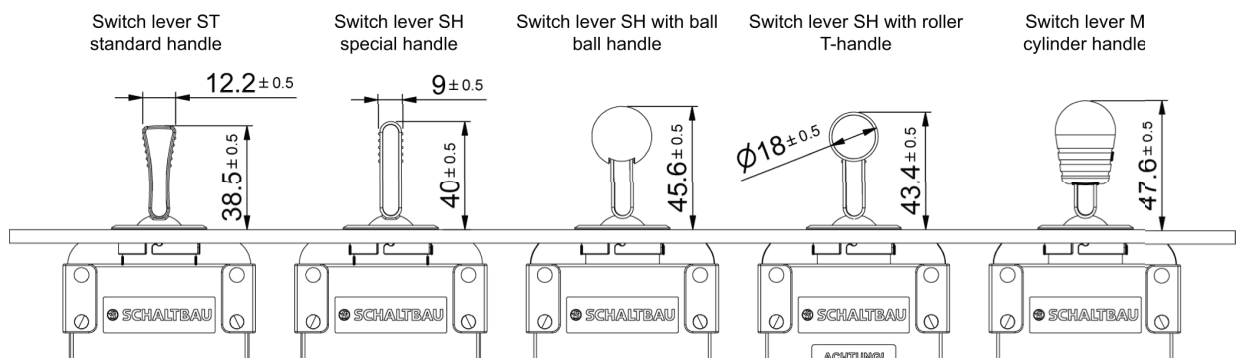
Plate thickness: 2 - 9 mm

► Quick release fastening

Special design: With option for tamper-proof seal



► Switch lever forms



13. Maintenance

F, K, L and P series toggle switches are low maintenance. However, the condition of the devices also depends on environmental influences. To ensure the toggle switches have a long service life, the following maintenance actions must be regularly performed.

Maintenance measures	Interval
Cleaning of the devices and replacement of permanently soiled or damaged snap-action switches or switching elements.	▶ In the event of heavy soiling
Checking of the complete device and replacement of damaged snap-action switches or switching elements.	▶ After a contact fault
Replace snap-action switches or switching elements.	▶ After approximately 1 million switching cycles or after 10 years' operation

Exception: No replacement of snap-action switches is permitted for series K toggle switches.

ATTENTION

Due to the safety-relevant functions of the F, K, L and P series toggle switches, a repair must only be performed by authorised specialists of SCHALTBAU GmbH.

For series F, L and P, it is permissible to replace the snap-action switch or the switching elements (see section 5, 6, 7).

ATTENTION

The use of screw locking paste and other such materials that are not approved by us is **not** permitted!

Detent-edged rings or lock washers that fall down and remain in the devices, could result in malfunctions of and/or damage to the devices.

14. Technical data

Toggle switch	F series	L series	P series	K series
Switch settings	2 x 30°	2 x 35°	2 x 35°	2 x 32°
3-contact settings	4 x 15°	4 x 17.5°	4 x 17.5°	4 x 16°
5-contact settings				
Switching elements				
Snap-action switch S800	X		X	
Snap-action switch S826	X		X	
Snap-action switch S870	X			
Snap-action switch S880				X
Cam switching elements S005		X		
Cam switching elements S007		X		
Cam switching elements S008		X		
Number of switching elements	1 ... 2	1 ... 4	1 ... 4	1 ... 8
Vibration resistance (EN 61373)	5 ... 20 Hz: 0.0193 g/Hz / 20 ... 150 Hz: 7.9 m/s ²			
Shock resistance (EN 61373)	5 g / 22 ms, half sine			
Mechanical service life	> 300,000 cycles	> 100,000 cycles	> 300,000 cycles	> 1,000,000 cycles
Ambient temperature Tu	-20°C ... +70°C			-40°C ... +85°C
Weight	170 g ... 190 g	230 g ... 600 g	200 g ... 360 g	150 g ... 250 g

► Please see the following product information for the technical data of the snap-action switches or switching elements:

Snap-action switches / switching elements	S800	S826	S870	S880	S005	S007	S008
Individual catalogue	D20	D26	D70	D80	B42		

Schaltbau GmbH

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

Schaltbau GmbH
Hollerithstrasse 5
81829 Munich
Germany



Phone +49 89 9 30 05-0
Fax +49 89 9 30 05-350
Internet www.schaltbau.com
e-Mail contact@schaltbau.de

with compliments:



The production facilities of Schaltbau GmbH have been IRIS certified since 2008.



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
- High-voltage roof equipment
- Equipment for electric brakes
- Design and engineering of train electrics to customer requirements