



# Operating instructions



## SolConeX Switch Socket, 125 A

> 8581/31



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## 1 General Information

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### 1.1 Manufacturer

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74638 Waldenburg  
Germany

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## 1.2 Information regarding the operating instructions

ID-No.: 205582 / 8581615300  
 Publication Code: 2014-10-10-BA00-III-en-03

## 1.3 Conformity with standards and regulations

Conformity with standards and regulations is specified in the corresponding certificates and declarations of the manufacturer (e.g. EC Declaration of Conformity).  
 These documents are available for download in the download area on the internet page [www.stahl-ex.com](http://www.stahl-ex.com).





## 2 Symbols Used

	<p><b>Safety Instructions</b>  <b>Non-observance may cause damage to the equipment, serious injuries or even death.</b>                  The safety instructions in this operating instructions and on the device must be observed!</p>
	<p><b>Warning Symbol</b>                  Danger due to explosive atmosphere!</p>
	<p><b>Warning Symbol</b>                  Danger due to live parts!</p>

## 3 General Safety Notes

### 3.1 Storage of these Operating Instructions



Read carefully these operating instructions and store them near the installation place. For correct operation, please observe all other operating instructions enclosed in this delivery and the operating instructions of the equipment to be connected.

 <b>WARNING</b>	
	<p><b>Use the devices only for their intended purpose!</b></p> <ul style="list-style-type: none"> <li>▶ We cannot be held liable for damage caused by an incorrect or unauthorized use or by non-observance of these operating instructions.</li> <li>▶ Use the device only if it is undamaged and clean.</li> </ul>
 <b>WARNING</b>	
	<p><b>Any unauthorized work on the device is prohibited!</b>                  Installation, maintenance, overhaul and repair may only be carried out by appropriately authorized and trained personnel.</p>

**Observe the following information during installation and operation:**

- ▶ Any damage can invalidate the explosion protection
- ▶ National and local safety regulations
- ▶ National and local accident prevention regulations
- ▶ National and local assembly and installation regulations (e.g. IEC/EN 60079-14)
- ▶ Generally recognized technical regulations
- ▶ Safety instructions in these operating instructions
- ▶ Characteristic values and rated operating conditions on the rating and data plates
- ▶ Additional instruction plates fixed directly to the device

### 3.2 Modifications and alterations

 <b>WARNING</b>	
	<p><b>Alterations and modifications to the device are not permitted.</b> We shall not accept any liability or warranty obligations for damage resulting from unauthorized alterations and modifications.</p>

### 3.3 Special Versions

For special versions, the actual components included in delivery may differ from the description given here in the following cases:

- ✗ additional/different order options
- ✗ modifications to the versions described here due to the latest technical developments

## 4 Intended Use

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The switch sockets 8581/31 are explosion-protected equipment approved for use in hazardous areas of Zones 1, 2 and 21, 22. They connect portable and fixed electrical equipment as well as cables and circuits in hazardous areas.

## 5 Technical data

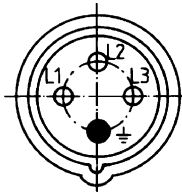
Version	8581/31																																	
Explosion protection																																		
Gas and dust	<p>Ex d e IIC T6 (Ta = -30 ...+40 °C)                      Ex d e IIC T5 (Ta = -30 ...+45 °C)                      Versions with auxiliary contacts for Ex i circuits:                      Ex d e [ib] IIC T6 (Ta = -30 ...+40 °C)                      Ex d e [ib] IIC T5 (Ta = -30 ...+45 °C)</p> <p>Ex tD A21 IP66 T65 °C (Ta = -30 ... +40 °C)                      Ex tD A21 IP66 T75 °C (Ta = -30 ... +45 °C)                      Versions with auxiliary contacts for Ex i circuits:                      Ex tD A21 [ib] IP66 T65 °C (Ta = -30 ... +40 °C)                      Ex tD A21 [ib] IP66 T75 °C (Ta = -30 ... +45 °C)</p>																																	
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Certificates																																		
IECEX	IECEX PTB 06.0034																																	
Europe (ATEX)	PTB 01 ATEX 1161																																	
Ambient temperature	see explosion protection data -45 C° on request (internal lubrication using silicone grease)																																	
<p>Assignment of temperature class / ambient temperature / rated operational voltage / rated connection cross-section  <b>Valid for the following versions:</b> 208705_V02; 208738_V02; 212169_V02</p>																																		
<table border="1"> <thead> <tr> <th colspan="2">Temperature class</th> <th rowspan="2">Rated operational current</th> <th colspan="2">Rated connection cross-section</th> </tr> <tr> <th>T6</th> <th>T5</th> <th>Socket</th> <th>Plug</th> </tr> </thead> <tbody> <tr> <td></td> <td>≤ + 45 °C</td> <td>125 A</td> <td rowspan="3">70 mm<sup>2</sup></td> <td rowspan="3">50 mm<sup>2</sup></td> </tr> <tr> <td>≤ + 40 °C</td> <td>≤ + 55 °C</td> <td>110 A</td> </tr> <tr> <td>≤ + 45 °C</td> <td>≤ + 60 °C</td> <td>100 A</td> </tr> <tr> <td></td> <td>≤ + 40 °C</td> <td>125 A</td> <td rowspan="2">50 to 70 mm<sup>2</sup></td> <td rowspan="2">35 mm<sup>2</sup> Use only heat-resistant cables ≥ 85 °C, e.g., Type NSSHÖU!</td> </tr> <tr> <td></td> <td>≤ + 45 °C</td> <td>115 A</td> </tr> <tr> <td>≤ + 40 °C</td> <td>≤ + 55 °C</td> <td>100 A</td> <td>50 to 70 mm<sup>2</sup></td> <td>35 mm<sup>2</sup></td> </tr> </tbody> </table>		Temperature class		Rated operational current	Rated connection cross-section		T6	T5	Socket	Plug		≤ + 45 °C	125 A	70 mm <sup>2</sup>	50 mm <sup>2</sup>	≤ + 40 °C	≤ + 55 °C	110 A	≤ + 45 °C	≤ + 60 °C	100 A		≤ + 40 °C	125 A	50 to 70 mm <sup>2</sup>	35 mm <sup>2</sup> Use only heat-resistant cables ≥ 85 °C, e.g., Type NSSHÖU!		≤ + 45 °C	115 A	≤ + 40 °C	≤ + 55 °C	100 A	50 to 70 mm <sup>2</sup>	35 mm <sup>2</sup>
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Interlocked switch	3 pole switch with isolating characteristics 1 auxiliary contact (ON - delayed, OFF - advanced)																																	
Switching handle	padlockable in position 0 and I																																	
Rated operational voltage	max. 690 V																																	
Rated operational current	max. 125 A																																	
Rated insulation voltage	max. 690 V																																	

Switching capacity	acc. to IEC/EN 60947-3:												
	<table border="0"> <tr> <td>AC-3</td> <td>DC-23</td> <td>DC-1</td> </tr> <tr> <td>690 V, 125 A</td> <td>220 V, 125 A<sup>3)</sup></td> <td>220 V, 125 A<sup>3)</sup></td> </tr> <tr> <td></td> <td>120 V, 125 A<sup>2)</sup></td> <td>120 V, 125 A<sup>2)</sup></td> </tr> <tr> <td></td> <td>60 V, 125 A<sup>1)</sup></td> <td>60 V, 125 A<sup>1)</sup></td> </tr> </table>	AC-3	DC-23	DC-1	690 V, 125 A	220 V, 125 A <sup>3)</sup>	220 V, 125 A <sup>3)</sup>		120 V, 125 A <sup>2)</sup>	120 V, 125 A <sup>2)</sup>		60 V, 125 A <sup>1)</sup>	60 V, 125 A <sup>1)</sup>
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	60 V, 125 A <sup>1)</sup>	60 V, 125 A <sup>1)</sup>											
	<p>1) 1 contact                  2) 2 contacts connected in series                  3) 3 contacts connected in series</p>												
Short-circuit protection													
Without thermal protection	max. 125 A gG acc. to IEC/EN 60269-2												
With thermal protection	max. 160 A gG acc. to IEC/EN 60269-2												
Connection cross-section													
Single conductor connection	35 ... 150 mm <sup>2</sup> (AWG 2/0 ... 300 kcmil) stranded 50 ... 150 mm <sup>2</sup> (AWG 1/0 ... 300 kcmil) finely stranded												
Multiple conductor connection	2 x 35 mm <sup>2</sup> ... 2 x 50 mm <sup>2</sup> (2 x AWG 2 ... 2 x AWG 1/0)												
	Only conductors of the same cross-section are permissible! Connect PE terminal using cable lugs and assembly kit only (see "Accessories and Spare Parts" Assembly kit Cable lugs, art. no. 211465)												
Service life													
electrical	20,000 operating cycles												
Mechanical	100,000 operating cycles												
Tightening torque													
Main contacts	25 ... 30 Nm												
Cover screws	4.5 Nm												
Cable gland	1 x M63 x 1.5 (lateral positioning acc. to order possible)												
Clamping range	31 ... 48 mm												
Stopping plug	1 x M25 x 1.5, 1 x M63 x 1.5												
Enclosure material	polyester, glass fibre reinforced												
Degree of protection	IP66 acc. to IEC/EN 60529												
Auxiliary contacts													
Standard version	<b>8080/1-1</b> : 1 NC contact + 1 NO contact in left installation slot NO contact ON delayed NO contact OFF leading (> 20 ms before opening of the main contacts) NC contacts synchronizing												
Possible auxiliary contacts	max. 2 auxiliary contact blocks of type 8080/1 (slow-action contacts) <b>8080/1-1</b> : 1 NC contact / 1 NO contact NO contact ON delayed <sup>1)</sup> NO contact OFF advanced (> 20 ms before opening of the main contacts) <sup>1)</sup> NC contact synchronizing <b>8080/1-3</b> : 2 NC contacts <sup>2)</sup> <b>8080/1-4</b> : 2 NO contacts <sup>2)</sup> <sup>1)</sup> only in the left installation slot, synchronising in the right installation slot <sup>2)</sup> synchronising in all installation slots												
Rated operational voltage	250 V AC / DC 400 V AC, for equal potential of both contacts 500 V AC, when 1 NC + 1 NO and the same potential of both contacts is used												
Rated operational current	max. 6 A												
Short-circuit protection	10 A, tripping characteristic gG acc. to IEC/EN 60269-1												
Connection cross-section	1.5 ... 2.5 mm <sup>2</sup> (AWG 16 ... 14) solid / finely stranded												
Tightening torque	0.4 Nm												

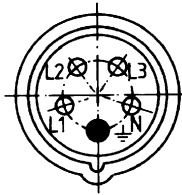
## 5.1 Arrangement of Contact Sleeves and Terminal Marking

### Arrangement of contact sleeves and terminal marking:

The example shows the 6 o'clock position



3 P + PE  
8581/31-4..



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3P + N + PE  
8581/31-5..

06555E00

No. of poles	Frequency	Rated operational voltage	Colour code	Earth contact sleeve position
3 P + PE 8581/31-4..	50 and 60 Hz	100 ... 130 V	yellow	4 h
		200 ... 250 V	blue	9 h
		380 ... 415 V	red	6 h
	60 Hz	440 ... 460 V <sup>1)</sup>	red	11 h
	50 and 60 Hz	480 ... 500 V	black	7 h
		600 ... 690 V	black	5 h
		after isolating transformer	4)	12 h
	50 Hz 60 Hz	380 V 440 V <sup>2)</sup>	red	3 h
	100 ... 300 Hz	> 50 V	green	10 h <sup>3)</sup>
> 300 ... 500 Hz	> 50 V	green	2 h	
3P + N + PE 8581/31-5..	50 and 60 Hz	57 / 100 ... 75 / 130 V	yellow	4 h
		120 / 208 ... 144 / 250 V	blue	9 h
		200 / 346 ... 240 / 415 V	red	6 h
		277 / 480 ... 288 / 500 V	black	7 h
		347 / 600 ... 400 / 690 V	black	5 h
	60 Hz	250 / 440 ... 265 / 460 V <sup>1)</sup>	red	11 h
	50 Hz	220 / 380 V <sup>2)</sup>	red	3 h
	60 Hz	250 / 440 V <sup>2)</sup>		
	100 ... 300 Hz	> 50 V	green	10 h <sup>3)</sup>
	> 300 ... 500 Hz	> 50 V	green	2 h
Any no. of poles	All nominal operating voltages and/or frequencies not covered by other arrangements.			1 h

**Colour code and arrangement of the earth contact sleeve, relative to the polarizing slot, for different voltages and frequencies according to IEC/EN 60309-2**

- 1) Mainly for ship installations
- 2) Only for refrigerated containers (according to ISO standards)
- 3) Not standardized but recommended preferred position
- 4) Colour code in accordance with voltage colour code

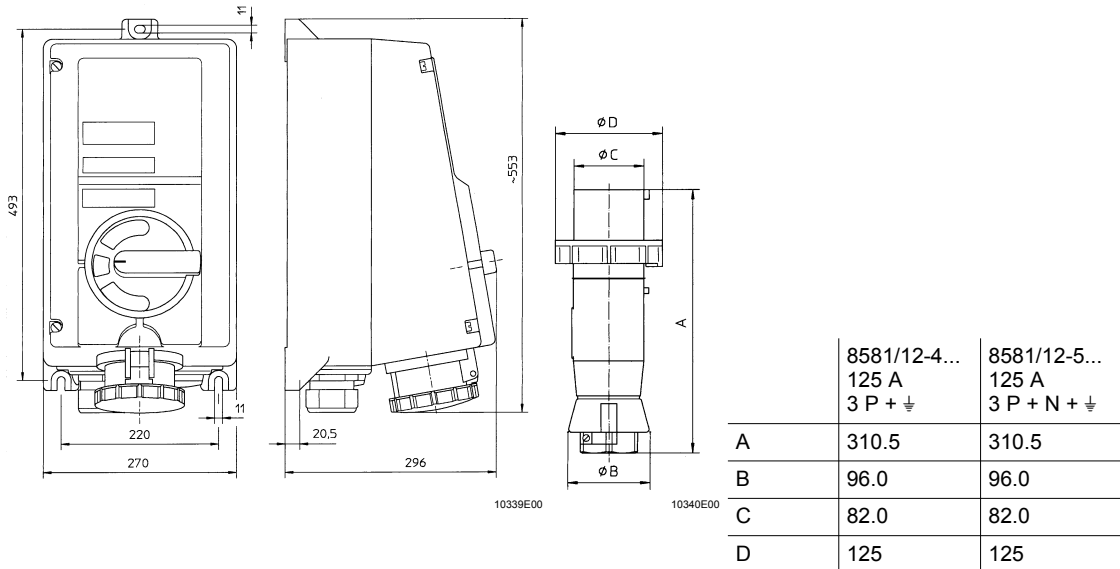
## 6 Transport and storage

- ▶ Transport and storage are only permitted in the original packaging.
- ▶ The devices must be stored in a dry place and vibration-free.

## 7 Installation

### 7.1 Dimensions / fastening dimensions






Dimensional drawings (all dimensions in mm) - subject to alterations



8581/31-...  
CES 125 A switch socket

8581/12-...  
SolConeX 125 A plug

### 7.2 Installation Conditions

 <b>WARNING</b>	
	<p><b>Risk of electric shock!</b> Before opening the device, disconnect it from the power supply.</p>
 <b>WARNING</b>	
	<p><b>Use approved components only!</b> For unused enclosure holes, use R. STAHL stopping plugs, for unused cable entries, use R. STAHL plugs. Make sure that these components have appropriate approval and meet the requirements of IEC/EN.</p>
<b>NOTICE</b>	
	<p>When open, the switch cogwheel may not be switched, since the switching function is not guaranteed with a wrong cogwheel position.</p>



### 7.3 Opening / Closing the Enclosure


#### To open the enclosure

- ▶ Loosen the cover screws.
- ▶ Open the cover including the rotary handle.

#### To close the enclosure

- ▶ Close the cover including the rotary handle.
- ▶ Tighten the cover screws to the specified torque (4.5 Nm).

### 7.4 Mounting and Operating Position

<b>NOTICE</b>	
	<ul style="list-style-type: none"> <li>▶ When explosion protected equipment is exposed to the weather, it is advisable to provide a protective cover or wall.</li> <li>▶ The elongated holes allow vertical and horizontal adjustment during mounting.</li> </ul>

#### When mounting, make sure that


- ▶ the hinged cover is at the bottom, the connection chamber is on top
- ▶ the device is fixed in a vertical installation position to a plane wall using three screws ( $\varnothing$  6 ... 8 mm) and suitable washers
- ▶ all screws and nuts have been firmly tightened.


### 7.5 Electrical Connection

- ▶ The information given in chapter "Technical Data" must be observed.
- ▶ The conductor connection must be made with particular care.
- ▶ The conductor insulation must reach up to the clamping points.
- ▶ Do not damage the conductor (nicking) when removing the insulation.
- ▶ Select suitable cables to be used and appropriate way of installing them to ensure that the maximum permitted conductor temperatures and the maximum permitted surface temperature are not exceeded.

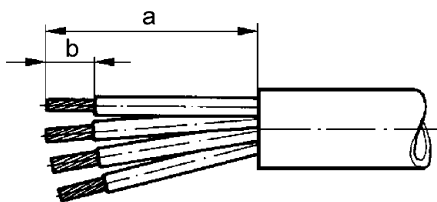
<b>NOTICE</b>	
	A protective conductor is always required.

## 7.6 Connection

<b>⚠ WARNING</b>	
	<p><b>Ensure correct conductor connection!</b></p> <ul style="list-style-type: none"> <li>▶ Observe the maximum connection cross-sections, please refer to chapter "Technical Data".</li> <li>▶ In case of multiple conductor connection, connect PE terminal using cable lugs and assembly kit only (art. no. 211465)</li> <li>▶ In case of multiple conductor connection, only connectors of the same type and the same cross-section and material may be used.</li> </ul>

<b>NOTICE</b>	
	Metal cable glands are included in the earthing measures.

- ▶ Open the connecting chamber cover.
- ▶ Strip the insulation from the cable ends.
- ▶ Push the cable through the cable gland into the connection chamber.
- ▶ Clamp stripped cable ends under the corresponding clamping point.
- ▶ While clamping, ensure that the stripped cable ends are fully underneath the clamping plate.
- ▶ Make sure that the clamping points are strain-relieved.
- ▶ Tighten the union nut of the cable gland, place the connection chamber cover carefully on top and tighten it.



	a [mm]	b [mm]	max. [mm <sup>2</sup> ]
Main contacts	380	20	50
Auxiliary contacts	380	10	2.5

09290T00

## 8 Auxiliary Contacts

Standard versions are delivered with an auxiliary contact (8080/1-1: 1 NC contact and 1 NO contact) in the left installation slot.

A maximum of 2 Type 8080/1 auxiliary contacts can be used.

The switching function of the auxiliary contact depends on the installation slot used, see chapter "Technical Data".

Auxiliary contacts in Ex i circuits

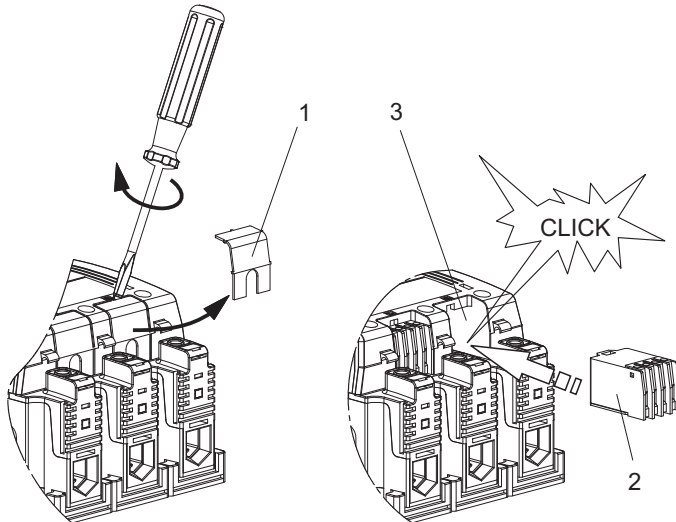
If the auxiliary contacts of Type 8080/1 are used in Ex i circuits, they must be provided with a cover (art. no. 168855).

## 8.1 Mounting Auxiliary Contacts

### NOTICE



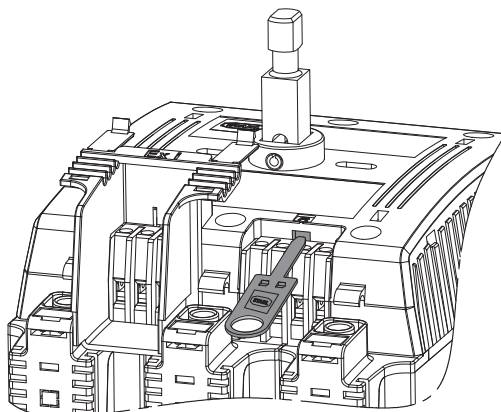
Before mounting an auxiliary contact, the cover (1) must be removed. The degree of protection IP20 (finger-safe) remains intact even after removing the cover.



12435E00

- ▶ Carefully remove the cover (1) of the installation slot (3) using a screwdriver or a knife.
- ▶ Carefully insert the auxiliary contact (2) into the installation slot until it engages.
- ▶ Paste the enclosed circuit diagram indicating the respective switching function to the rating plate of the switch.


## 8.2 Dismounting Auxiliary Contacts




15021E00

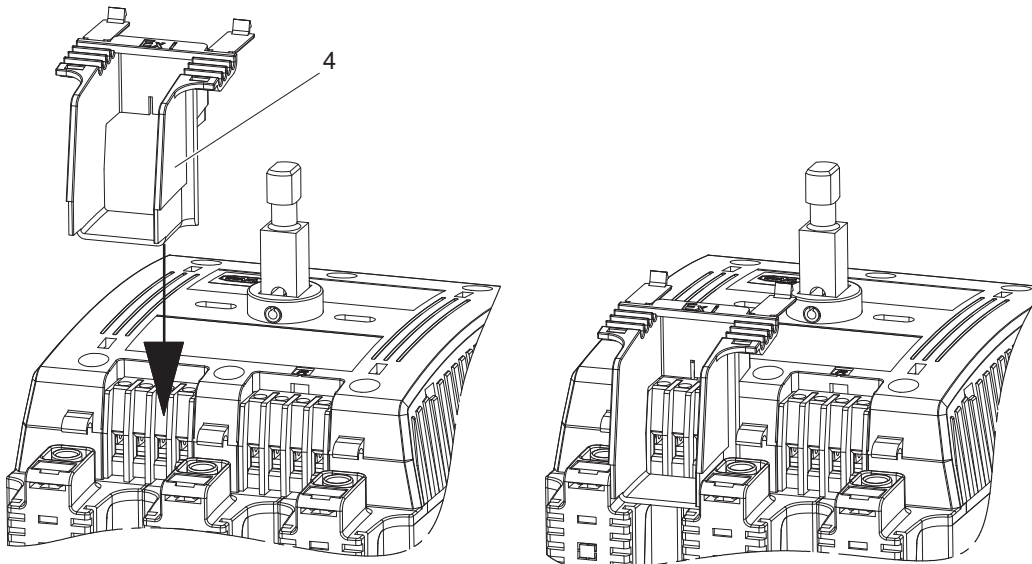
- ▶ Introduce the auxiliary contact key (art. no. 201909) with the Stahl logo pointing upwards (!) between the auxiliary contact and the switch cover.
- ▶ Pull out the auxiliary contact along with the auxiliary contact key.

### 8.3 Auxiliary Contacts for Ex i Circuits

<b>⚠ WARNING</b>	
	<p><b>Observe the specified clearance and creepage distances!</b></p> <ul style="list-style-type: none"> <li>▶ For use in Ex i circuits, the auxiliary contacts (Type 8080/1) must be provided with a cover (art. no. 168855).</li> <li>▶ The customer is only allowed to install an intrinsically safe auxiliary contact if no alligator clips are mounted on the two terminals located on the left and right side of the respective installation slot!</li> </ul>

### 8.4 Mounting the Ex i Cover for the Auxiliary Contacts

<b>NOTICE</b>	
	<p>The Ex i cover serves to ensure the required tight string length (50 mm) between the connection points of intrinsically safe and non-intrinsically safe circuits.</p>



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- ▶ Attach the cover (4) from the top to the auxiliary contact until the lug engages.

## 9 Commissioning

- ▶ The switch socket may only be used fully closed with the connection chamber cover in place!
- ▶ The switch socket can only be switched on with inserted plug.
- ▶ Only Type 8581/12 plugs from R. STAHL may be used.
- ▶ Make sure that the bayonet lock of the socket is closed when the plug is pulled out.

### **Before commissioning, ensure that**

- ▶ no components are damaged
- ▶ the device has been installed according to regulations
- ▶ there are no foreign bodies inside the device
- ▶ all screws and nuts have been firmly tightened,
- ▶ the prescribed tightening torques have been observed
- ▶ connection has been made correctly.

**NOTICE**

- ▶ Switching on and off has to be done swiftly and completely!
- ▶ Avoid switching positions between 0 and I (ON and OFF)!

**9.1 Padlocking with a Padlock**

The switch can be padlocked in position 0 and I.

**10 Maintenance, Overhaul and Repair****⚠ WARNING****Risk of electric shock!**

Before opening the device, disconnect it from the power supply.

**The following details must be checked during maintenance:**

- ▶ Cables are held securely in place
- ▶ Compliance with the permitted temperatures (according to IEC/EN 60079)
- ▶ Damage to the enclosure and seals
- ▶ Check if screws and nuts are tight.

**NOTICE**

To avoid corrosion, the plug must be pulled regularly.

**10.1 Short-circuit in the Main Circuit****⚠ WARNING****After a short-circuit in the main circuit, the switch must be replaced!**

Replace the switch after each short circuit in the main circuit, since with hermetically sealed equipment the state of the switching contacts cannot be checked.




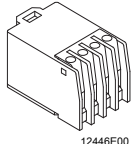
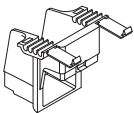

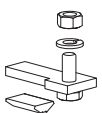
**11 Cleaning**

The device may only be cleaned with a damp cloth.

**12 Disposal**

Observe the national waste disposal regulations.

### 13 Accessories and Spare parts

 <b>WARNING</b>				
Use only original R. STAHL accessories and spare parts.				
Designation	Figure	Description	Art. no.	Weight kg
Switch insert		8549/1-31L Load and motor switch	168776	4.720
Plastic cable gland		8161/7-M25-1707 50 pieces	239157	0.020
		8161/7-M63-4828	239161	0.120
Stopping plug		8290/3-M25 x 1,5 1 pieces	143524	0.007
		8290/3-M63 x 1,5	143548	0.030
Auxiliary contact, series 8080/1		2 NC contacts (8080/1-3) <sup>2)</sup>	168356	0.026
		1 NC contact + 1 NO contact (8080/1-1) <sup>1)</sup>	168351	0.026
		2 NO contacts (8080/1-4) <sup>2)</sup>	168353	0.026
		The switching function of the auxiliary contact depends on the installation slot used. <sup>1)</sup> left: delayed (ON), advanced (OFF); right: synchronising <sup>2)</sup> left and right: synchronising		
Ex i cover		Ex i cover for auxiliary contacts for use in Ex i circuits	168855	0.008
Auxiliary contact key		for removing the mounted auxiliary contact	201909	0.035
Assembly kit Cable lugs		for the connection of conductors with cable lugs	211465	0.327