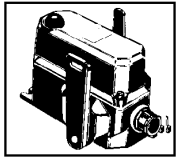
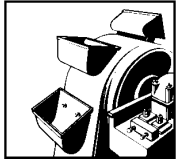
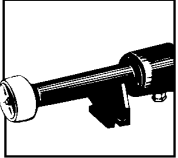
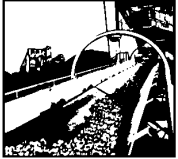
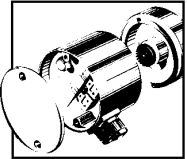


# Belt Conveyor Pull Rope Switch Types HEN, HEK and SEM



## OPERATING INSTRUCTIONS

## **CE-Sign and Conformity**





---





The device meets the requirements of the valid European and national regulations.

Conformity has been proved and the corresponding declarations and documents are deposited at the manufacturer.



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# 1 For your own Safety

## 1.1 Intended Application

Pull rope switches are installed in conveying systems for emergency cut-out of continuously running conveyors. The pull rope switches comply with the high requirements of the trade associations, who obligatorily stipulate emergency devices in belt conveyors for personal security (UVV – VBG 10).

Applications other than specified and unauthorized modifications to the device or its components may lead to injury to persons and damage to the device for which the manufacturer is **not liable**.

"Intended Application" means that any work performed with the device or on the device must be carried out in accordance with these **operating instructions**. Only **qualified personnel** that are familiar with the **regulations for the prevention of accidents** as well as the standard safety rules, are allowed to work on the device.

**This will ensure that you protect yourself and prevent damage to the device!**

## 1.2 Symbols

Please pay particular attention to the text passages that are marked with the following symbols:



### Danger!

**Information that must be observed under all circumstances in order to prevent the operator from being injured.**



### Attention!

**Information that must be observed in order to prevent damage to the device.**



Helpful additional information.



## 2 Transport, Packing, Storage, and Disposal

### 2.1 Transport and Packing

Choose a suitable packing in order to prevent damage to the device during transport or when sending devices or components to KIEPE ELEKTRIK for repair. Take great care that the device is protected against shocks and humidity. Thus, damage due to transport is prevented, for which the manufacturer is not liable.

### 2.2 Storage

Avoid significant variations in temperature that may cause the formation of condensation water, as this might damage the device.

The permissible storage temperature is between  $-25^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ .



**Attention!**

**Keep the device clean and dry.**

### 2.3 Disposal

If possible, reuse the **packing material** or dispose of it in an environmentally friendly way.

Send **defective devices and components** to KIEPE ELEKTRIK for correct recycling or disposal (*company address see back cover*).



### 3 Design and Function

Pull rope switches are used on conveyor systems as emergency power off switches for continuous conveyors. The devices are designed for long term service in extreme environmental conditions.



#### Danger!

**The release wire should be tightened along the conveyor system in such a way that its whole length can be seen.**

#### 3.1 Function of the emergency switch

The pull rope switch release lever (1) is operated by a pull rope (3) which is mounted along the conveyor system (s. fig. 3-1).

When the release lever (1) is operated, the switch cylinder (20) moves to the power off position and the release lever (1) is uncoupled. Switching is now no longer possible. If the pull rope switch used is fitted with a warning lamp (21) this will indicate the emergency off status (s. fig. 3-3).

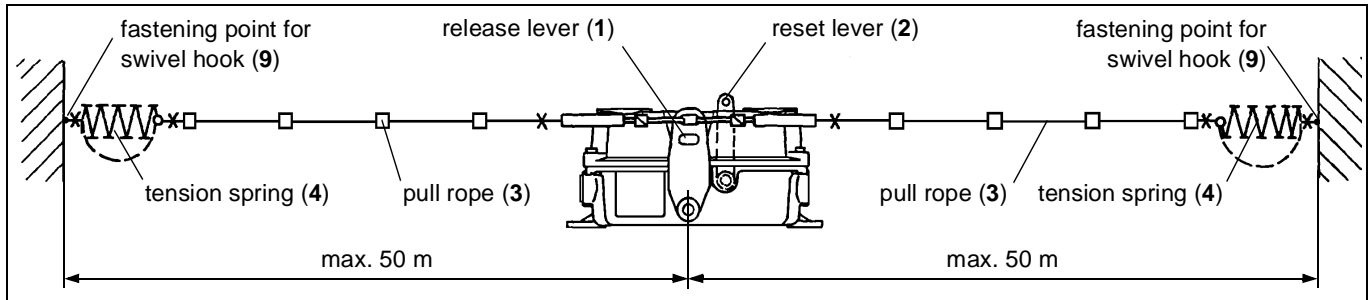


Fig. 3-1: Function

The pull rope switch can be triggered with the pull rope (3) from either one or two directions. The length of the pull rope (3) is dependent upon the locality but should not be longer than 50 metres. The tension springs (4) at the ends of the pull ropes (3) have a self monitoring function in that when one of the pull ropes (3) breaks the pull rope switch will be operated by the opposite tension spring (4).

The conveyor system cannot be switched back on until the reset lever (2) on the pull rope switch has been released. Pull rope switches are also available with square releases.

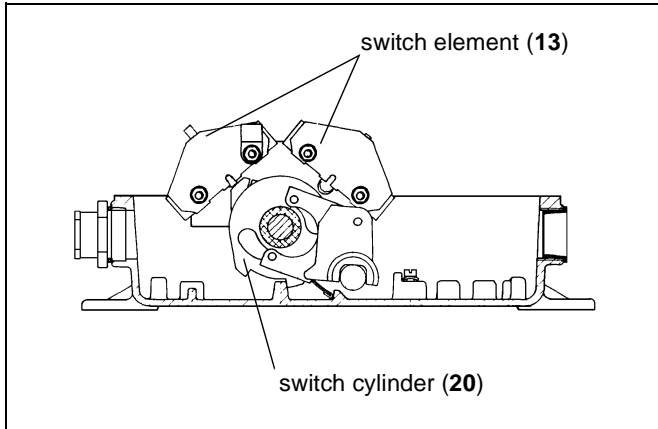


Fig. 3-2: Switch cylinder and element (pull rope switch not actuated)



### Danger!

**After activating and before resetting the pull rope switch the system must be checked along the total length of the release wire, in order to determine the reason for activating of the pull rope switch.**

SEM type pull rope switches are available with shut-down and holding key (22) (s. fig. 3-3). With this the reset lever (2) can be secured with a maximum of three padlocks for work on the conveyor system.

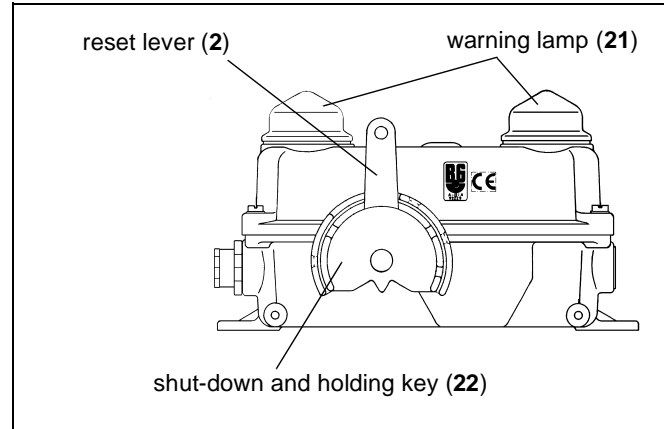


Fig. 3-3: Pull rope switch with shut-down and holding key



### 3.2 HEN and HEK with DUPLINE bus terminal

The pull rope switch types HEN and HEK with DUPLINE bus terminal differ from the basic types so far that a DUPLINE field an installation bus node has been integrated in addition to the emergency cut-out function. The DUPLINE bus enables the direct locating of a triggered pull rope switch within the total system of a conveying system.



#### Danger!

**The DUPLINE bus is a pure information bus and *not* a safety bus! Switching off a conveyor system must still take place by disconnecting!**

When the cut-out function is triggered the contacts of the switch elements (13) S1 are opened to switch off the conveying system. When triggering the HEN resp. HEK with DUPLINE bus a further switch element (13) S2 will be closed. The integrated bus terminal recognises this and transmits this information via the DUPLINE bus. Closing the switch element (13) S2 will also be indicated by the light emitting diode (23).

By means of the manual coder (type GAP 1605) an address will be applied to each pull rope switch via a programmable plug (24). In linkage with an external DU-

PLINE channel generator and an indicating device the address of the triggered pull rope switch can be displayed.

The channel generator continuously transmits the digital pulse code (the DUPLINE carrier signal) to the DUPLINE network. The channel generator synchronises the system via the cock pulse and time control of all pull rope switches (bus participants) connected to the system.

By using the time multiplex process up to 128 independent signals can be transmitted via merely two wires of the DUPLINE bus toward any direction up to a distance

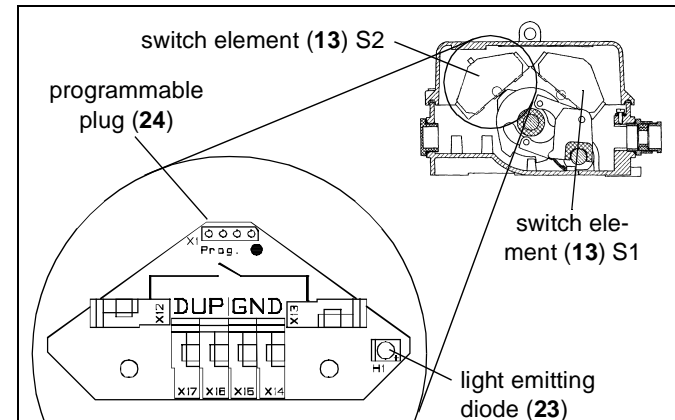


Fig. 3-4: HEN and HEK with DUPLINE bus terminal

of three kilometres. Simultaneously, the signal serves as operating voltage source for the transmitting electronics of the pull rope switch.



## 4 Technical Data

### 4.1 Technical Data – All Types

Guideline compliance	EN 60947-5-1, EN 60947-5-5, EN 0418, VDE 0110 – Contamination degree 3, UVV – VBG 10
Suitable for	Controls and systems i. a. w. EN 60204
Housing	HEN: Aluminium, GK-AISi12; HEK/SEM: Brass, GK-CuZn38Al
Paint work	DD-paint; Housing: yellow, RAL 1004; release lever: red, RAL 3000; reset lever: blue, RAL 5010
Fastening	2 elongated holes for M 8 screws
Permissible ambient temperature (VDE 0660)	– 25 °C ... + 70 °C
Max. height above NN	2.000 m (installation at higher altitudes only prior agreement with the manufacturer)
Switch system	Cam switch, max. 6 forced actuated switch elements
Rated insulation voltage $U_i$	AC 380 V, DC 440 V
Rated power voltage $U_e$	AC 240 V, DC 250 V
Conventional thermal current $I_{th}$	16 A
Switching capacity, DC-13 (L / R = 100 ms)	$U_e = 24 V, I_e = 2,1 A$ $U_e = 60 V, I_e = 0,9 A$
Housing protection	IP 65 i. a. w. DIN VDE 470, part 1 (EN 60529)
Contact durability	$0,5 \cdot 10^6$ switching operations at 100% $I_e$
Mechanical durability	$> 10^5$ switching operations
Cable guide	HEN/HEK: Thread tap for 2 x M 25 x 1,5 SEM: Thread tap for 2 x M 25 x 1,5 and 2 x M 32 x 1,5

Power cable diameter	max. 2,5 mm <sup>2</sup>
Protection cable connection	in housing, M 4

## 4.2 Technical Data – HEN, HEK, and SEM with Warning Lamp

Permissible operating voltage of the warning lamp	AC 230 V (HEN/HEK: terminals X1 / X2; SEM: terminals X1 / X2 and X3 / X4)
---	--

## 4.3 Technical Data – HEN and HEK with DUPLINE Bus Terminal

Operating voltage	via DUPLINE bus
Nominal current consumption	
when light emitting diode is switched off	typ. 150 µA
when light emitting diode is switched on	typ. 1.2 mA
Signal input	
drive	1 snap switch as closer; <i>s. also fig. 3-4</i>
open circuit voltage	5.3 to 7.6 V DC

## 4.4 Dimensions

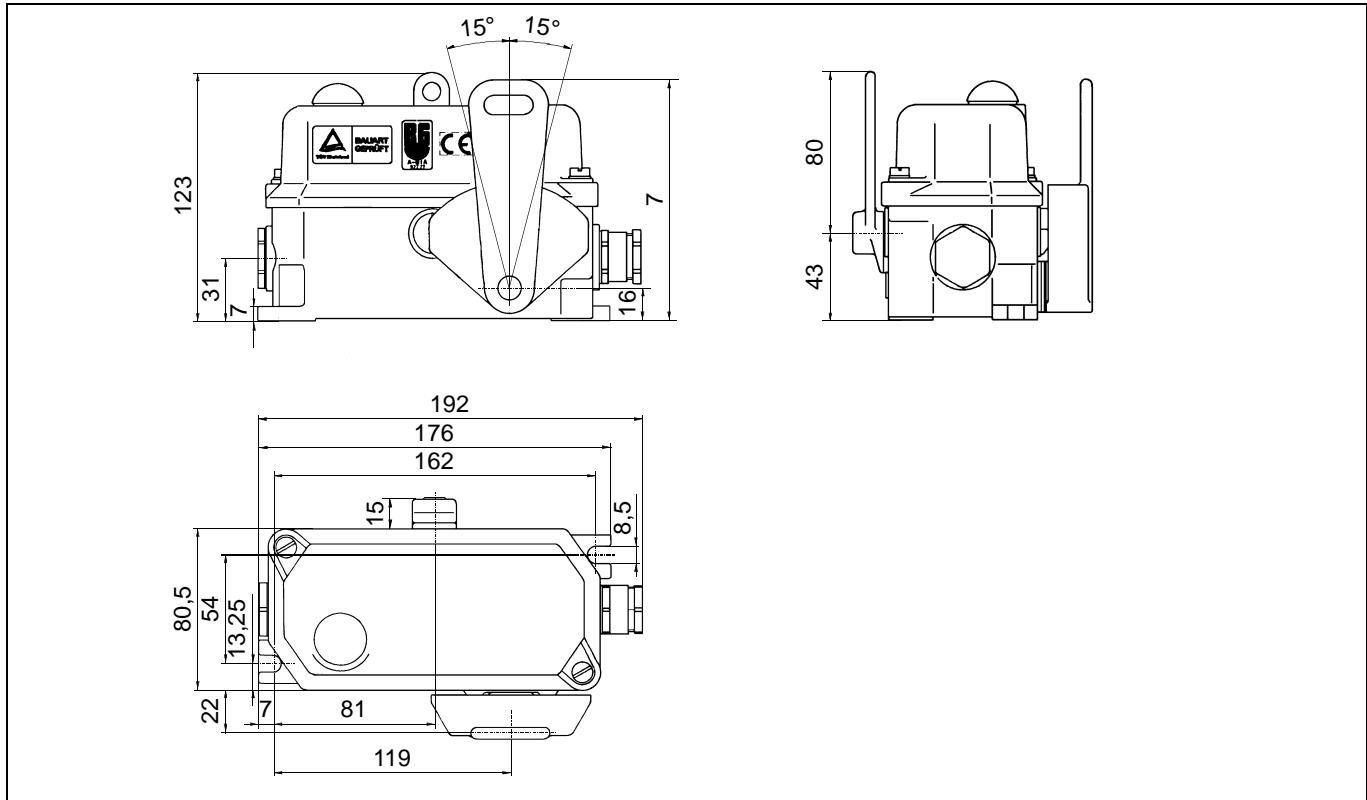


Fig. 4-1: Dimensions HEN / HEK

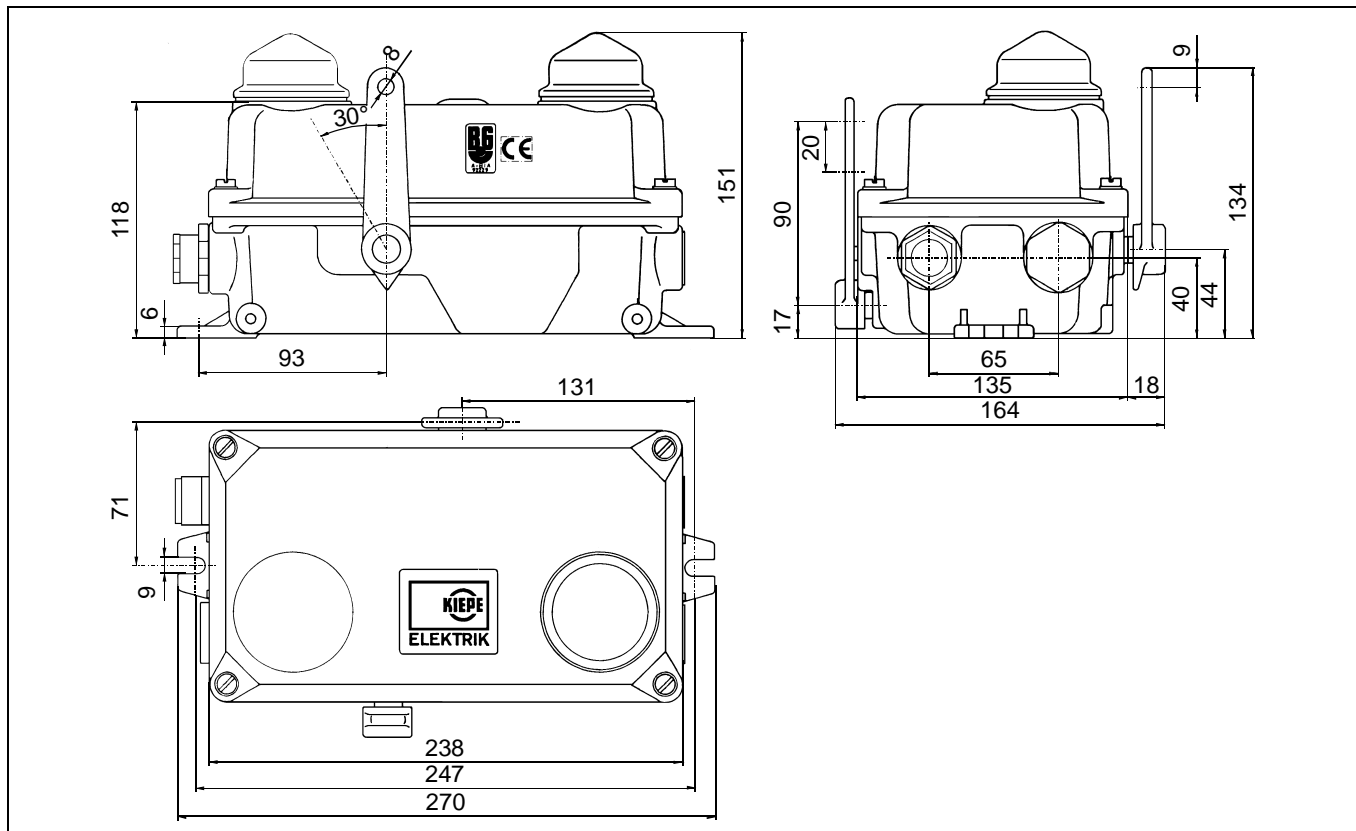


Fig. 4-2: Dimensions SEM



## 5 Mounting and Dismounting

### 5.1 Scope of Delivery

Pull rope switches are delivered ready for operation and without accessories (refer to section 8.1 "Ordering Accessories").

### 5.2 Mounting

#### 5.2.1 Important Mounting Pointers

By all means the pointers given below are to be considered during the mounting to ensure correct operation of the emergency cord switches. In case of deviating conditions you have to consult KIEPE ELEKTRIK (see back cover for company address).

- Only use KIEPE accessories for the mounting.
- The operating temperature range of the emergency cord switches and the activating arrangement is between  $-25\text{ °C}$  and  $+70\text{ °C}$ .
- Mounting has to be carried out at an ambient temperature of about  $+15\text{ °C}$ .
- The emergency cord switch has to be mounted concentrically between the fastening points. Deviation of up to maximum 3 % of the distance between the

emergency cord switch and the fastening point is permitted.

- It is *not* allowed that the distance between the fastening point exceeds 100 m.
- The fastening points for the swing hooks (9) have to be mechanically stable structural parts.
- It is not allowed that the distance between the eyebolts (8) exceeds 2.5 m (s. fig. 5-1).

#### 5.2.2 KIEPE Accessories for the Mounting

Pull rope switches must be mounted to the belt conveyor structure together with the KIEPE-accessories.

In order to mount the pull rope switches, the following accessories are required (s. fig. 5-1):

- two screws M 8 (5) for fastening the pull rope switch
- pull rope (3) of plastic coated, red, flexible wire steel,  $\varnothing 3\text{ mm}$
- oval clamps (7)
- eyebolts (8) M 12 x 60
- swing hooks (9) M 10
- tension springs (4),  $170 \times \varnothing 20\text{ mm}$
- tension wire locks (6)

### 5.2.3 Mechanical Mounting



**Danger!**

Switch off power supply to the conveyor belt system before starting mounting. Ensure that the power cannot be reconnected.



**Danger!**

The release wire should be tightened along the conveyor system in such a way that its whole length can be seen.



**Attention!**

Pull rope switches can only be used in control circuits.

#### Mounting the Pull Rope Switch onto the Conveyor Belt

1. Before mounting, disconnect the conveyor belt system from the power supply, and prevent it being switched on again.

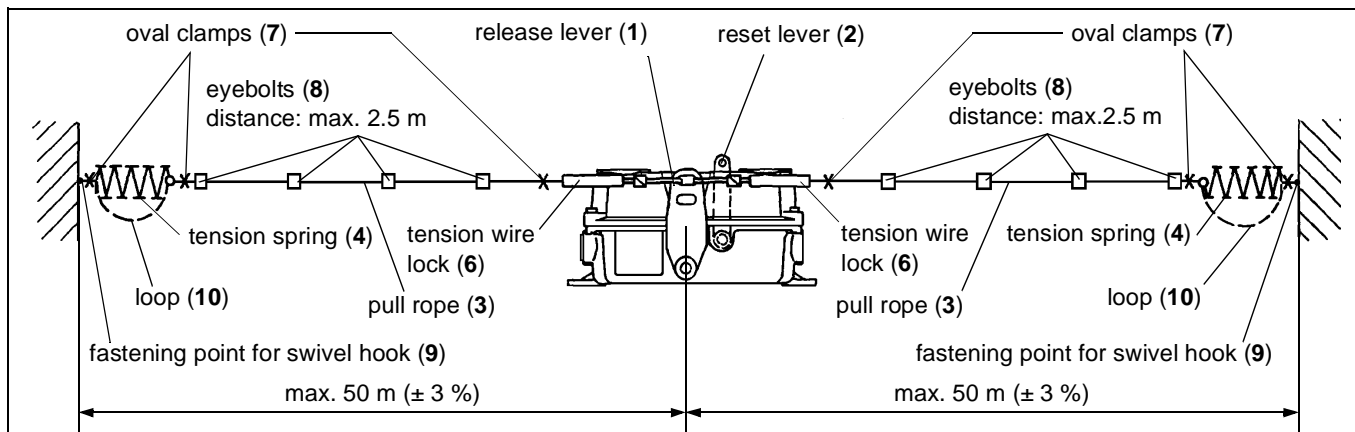


Fig. 5-1: Fastening on the conveyor belt structure



- Fasten the emergency cord switch *concentrically* between the fastening points to the conveyor belt construction (s. fig. 5-4).

Here the pull rope switch release lever (1) must face the belt. Fasten the pull rope switch with two screws M 8 (5) through the elongated holes (s. fig. 5-2).

- The fastening points for the swing hooks (9) have to be mechanically stable structural parts, from which the swing hooks (9) cannot tear out when the pull rope (3) is actuated

Attach the swing hooks (9) to the fastening points (s. fig. 5-4).

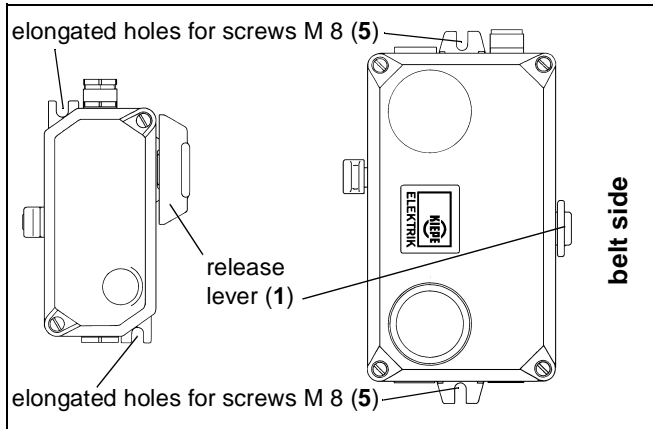


Fig. 5-2: Fastening the pull rope switch

- Hang the tension spring (4) into the swivel hook (9) (s. fig. 5-3).
- Stick one end of the pull rope (3) through the eyelet of the tension spring (4). Pull the pull rope (3) approximately 450 to 500 mm through the eyelet so that you can form a loop (10) from the end as a *conclusion* of the mounting (s. fig. 5-3).



The loops (10) limit the actuator travel of the pull rope (3) and prevent overstretching of the tension springs (4). Maximum stretch of a tension spring (4) is about 400 mm.

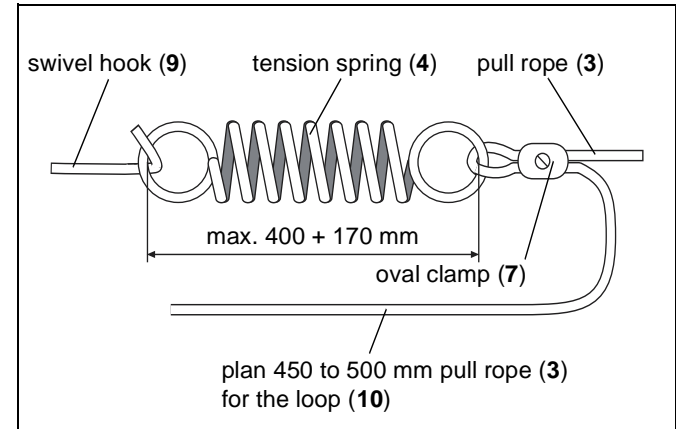


Fig. 5-3: Fastening the pull rope to the tension spring

6. Fasten the pull rope (3) with an oval clamp (7) to the tension spring (4) (s. fig. 5-3).
7. Mount the eyebolts (8) on the conveyor belt structure to guide the pull rope (3) (s. fig. 5-4).  
Distance between the eyebolts (8): max. 2.5 m
8. Pull the pull rope (3) through the eyebolts (8) (s. fig. 5-4).

### Adjusting the Spring Tension

Due to the symmetrical arrangement, the neutral position of the release lever (1) is not affected by variations in temperature. Stretching and retraction of the pull rope (3) caused by variations in temperature is equalized by the tension springs (4) (s. fig. 5-4).



#### Attention!

**If the pull rope tears from the tension spring the pull rope switch must be activated from the opposite side.**

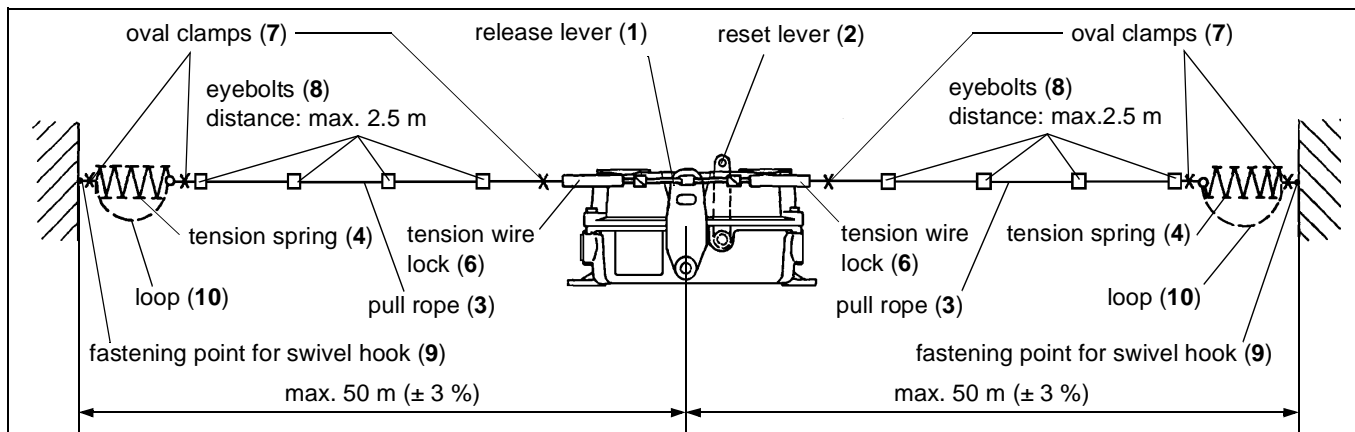


Fig. 5-4: Mounting on the conveyor belt structure an adjusting spring tension

9. Completely release the tension wire locks (6) (s. fig. 5-5).
10. Pull one end of the pull rope (3) through the eyelet of the tension wire lock (6) and hang the tension wire lock (6) on the release lever (1).



**Attention!**

**The length of the pull ropes must not exceed max. 50 metres.**

11. Tighten the pull rope (3) so that the tension spring (4) is stretched by 35 mm (s. fig. 5-4).

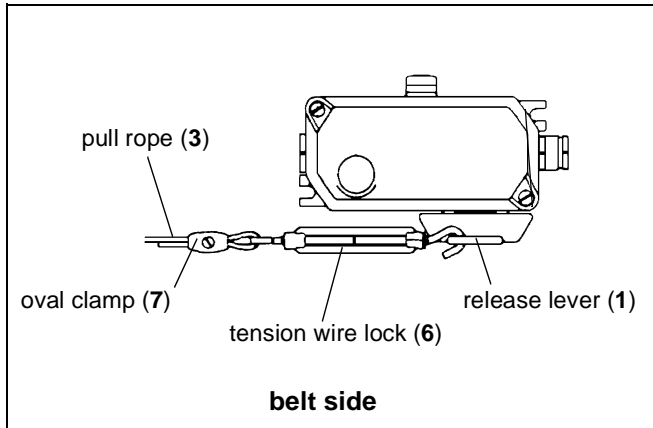


Fig. 5-5: Securing the tension wire lock

12. Fasten this end of the pull rope (3) with an oval clamp (7) (s. fig. 5-5).
13. Unlock the tension wire lock (6) again. Unlock the pull rope switch by means of the reset lever (2) (s. fig. 5-4).
14. Repeat steps 5. to 12. to mount the pull rope (3) on the other side of the pull rope switch (s. fig. 5-4).
15. Hook both tension wire locks (6) and actuate the pull rope switch release lever (1) (s. fig. 5-4).  
The release lever (1) can be moved.
16. Set the release lever (1) in the central position with the tension wire locks (6) and set the lengths of the tensioned tension springs (4) to about 210 mm (s. fig. 5-4).



**Attention!**

**By all means form the loops on both tension springs.**

**The loops are to limit the actuator travel of the release wire and to prevent overstretching of the tension springs (s. fig. 5-6). Maximum stretch of a tension spring is about 400 mm.**

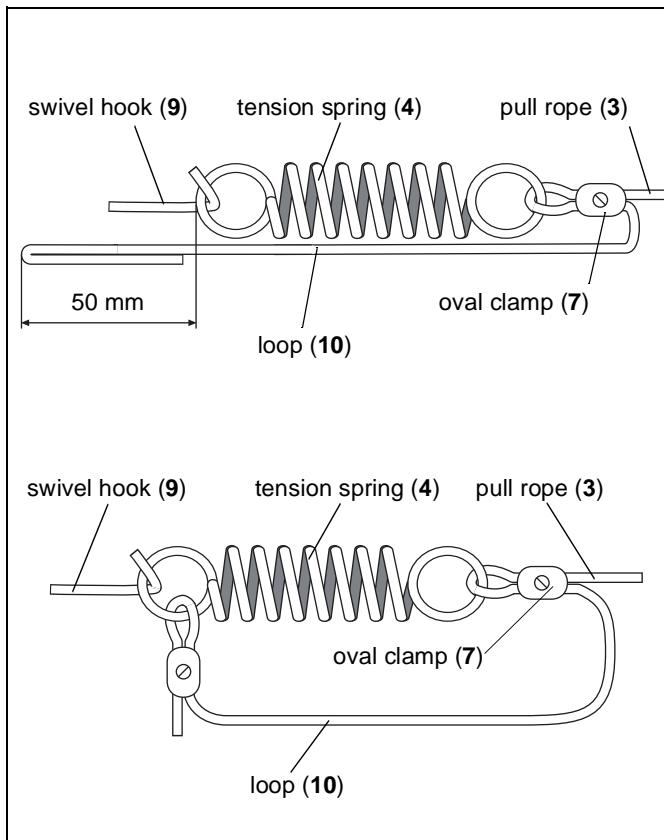


Fig. 5-6: Forming loops

17. Form the loops (10) on both tension springs (4) in the following way:

- Place the part of the pull rope (3) provided for the loop (10) along the tension spring (4) (s. fig. 5-6, upper part).
- Form a fastening loop (10) with the end of the loop (10), which ends approximately 50 mm from the end of the tension spring (4) (s. fig. 5-6, upper part).
- Fasten the loop (10) to the swivel hook (9) with an oval clamp (7) (s. fig 5-6, lower part).

### 5.2.4 Electrical Connection

1. Open the cover (12) of the pull rope switch by loosening the two resp. four screws (11) (s. fig. 5-9).
2. Loosen the nut of the cable fitting (17) and guide the connection cable through.

#### Connecting types HEN, HEK, and SEM

1. Connect the wires according to the wiring diagram inside the cover (12) (s. fig. 5-9).
2. Connect the protective conductor to the appropriate connector (15) (s. fig. 5-8).

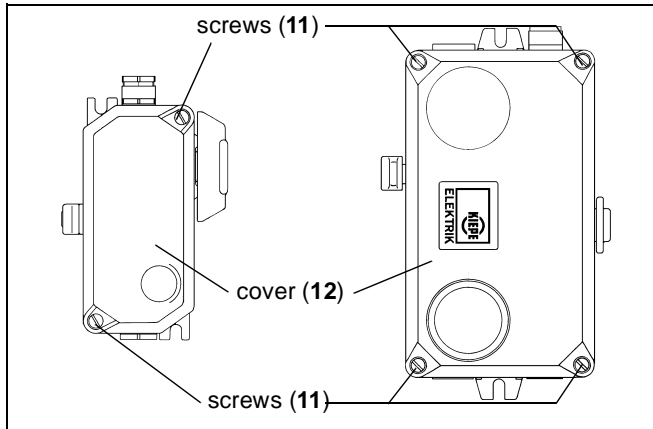


Fig. 5-7: Mounting cover



#### Attention!

**To avoid contamination with dirt and moisture the cover is replaced immediately following electrical connection.**

3. Tighten the nut of the cable fitting (17).
4. Replace the cover (12) and tighten the fastening screws (11) (s. fig. 5-7).

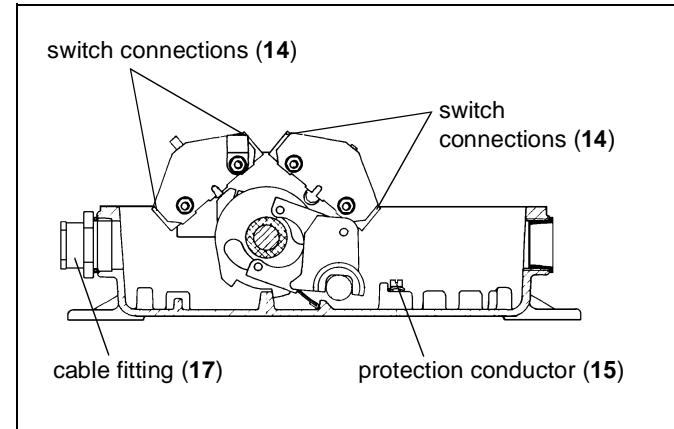


Fig. 5-8: Connection of switches and protection conductor

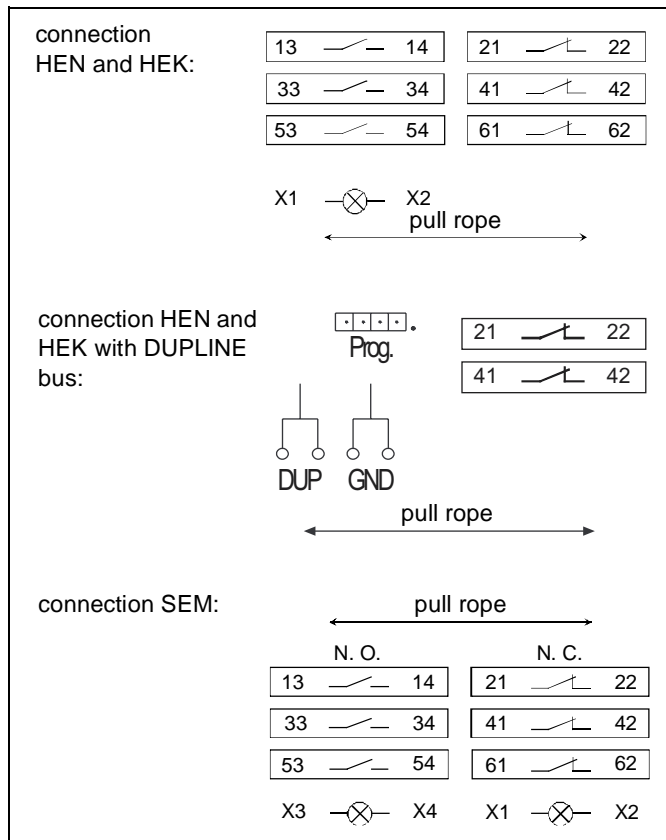


Fig. 5-9: Connecting types HEN, HEK, and SEM

### Connecting and programming types HEN and HEK with DUPLINE bus terminal

1. Connect the wires and the protection connector (15) (s. fig. 5-8 and 5-9).



#### Danger!

The DUPLINE bus is a pure information bus and *not* a safety bus! Switching off a conveyor system must still take place by disconnecting! Therefore, always connect the switch elements (13).

An address must be applied to each pull rope switch type HEN resp. HEK with DUPLINE bus terminal by means of the manual coder (type GAP 1605).

2. Program the pull rope switch type HEN resp. HEK with DUPLINE bus terminal on the required address on your system (see also section 3.2 „HEN and HEK with DUPLINE bus terminal“ and fig. 5-10).



#### Attention!

To avoid contamination with dirt and moisture the cover is replaced immediately following electrical connection.

3. Tighten the nut of the cable fitting (17).
4. Replace the cover (12) and tighten the fastening screws (11) (s. fig. 5-7).

### 5.3 Dismounting



**Danger!**

**Power to the conveyor belt system must be disconnected before dismounting. Ensure that power cannot be switched on again.**

1. Before dismounting, disconnect the conveyor belt system from the power supply, and prevent it being switched on again.
2. Open the cover (12) of the pull rope switch by loosening the screws (11) (s. fig. 5-11).

3. Separate the electrical connections.
4. Loosen the two screws M 8 (5), and remove the device (s. fig. 5-11).

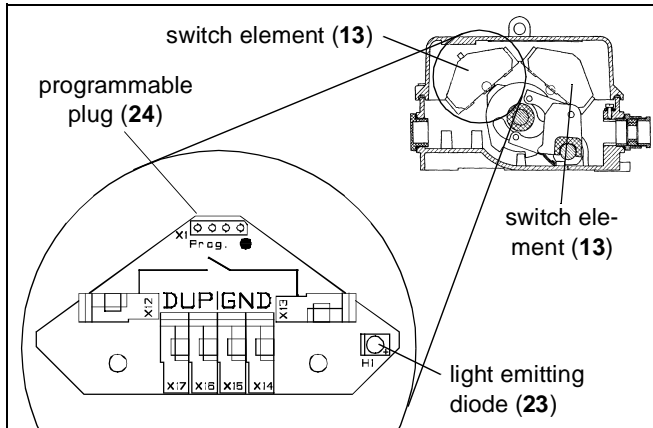


Fig. 5-10: HEN and HEK with DUPLINE bus terminal

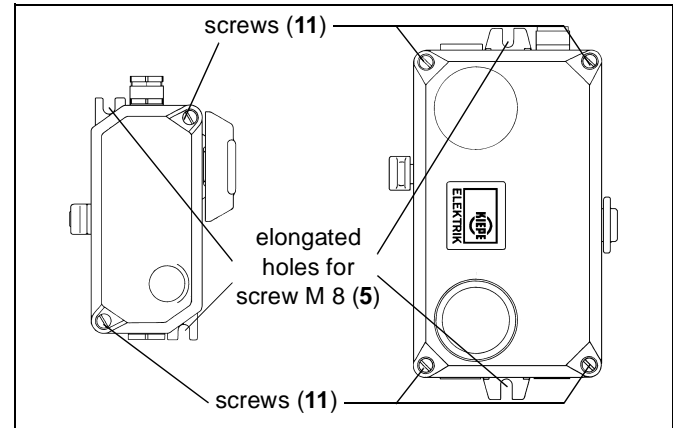


Fig. 5-11: Dismounting the pull rope switch



## 6 Maintenance

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The pull rope switch types HEN, HEK and SEM are maintenance free. Faulty devices can be returned to KIEPE ELEKTRIK (*see reverse for company address*).





## 7 Replacement of Switch Components



### Danger!

**Power to the conveyor belt system must be disconnected before dismantling. Ensure that power cannot be switched on again.**

1. Open the pull rope switch cover (12) by loosening the two resp. four screws (11) (s. fig. 7-1).

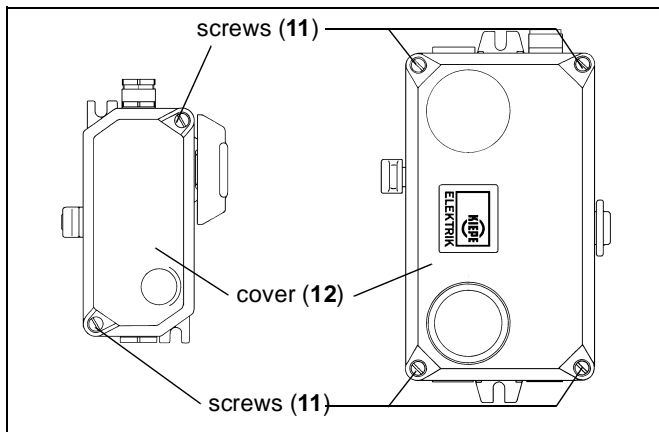


Fig. 7-1: Mounting/dismounting cover

2. Disconnect the wires from the connectors (14) of the switch elements (13) and the protection conductor (15) (s. fig. 7-2).
3. Disassemble the switch element (13) by loosening the nuts (16) and pulling off the switch element (13) and screws (18) (s. fig. 7-2 and 7-3).
4. Mount the new switch element (13) by fitting on to the screws (18) and fasten with new nuts (16) (s. fig.

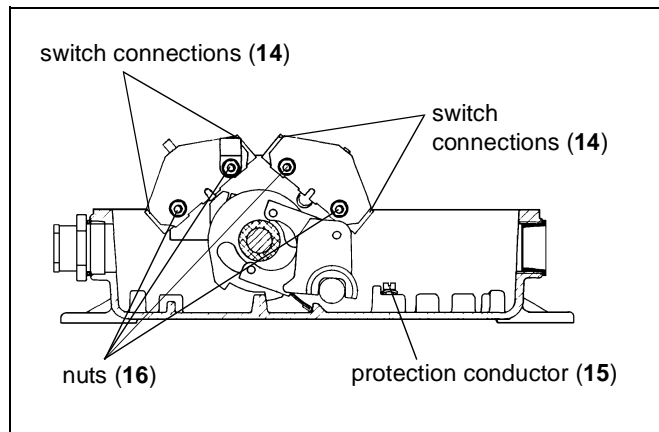


Fig. 7-2: Replacement of switch elements (front view)

- 7-3). When tightening the nuts (16) make sure that the switch element (13) is parallel to the switch cylinder (20).
5. Test the switch element (13) with a continuity tester in actuated and not actuated status (s. fig. 5-8 and 5-9).
  6. Reconnect the pull rope switch.

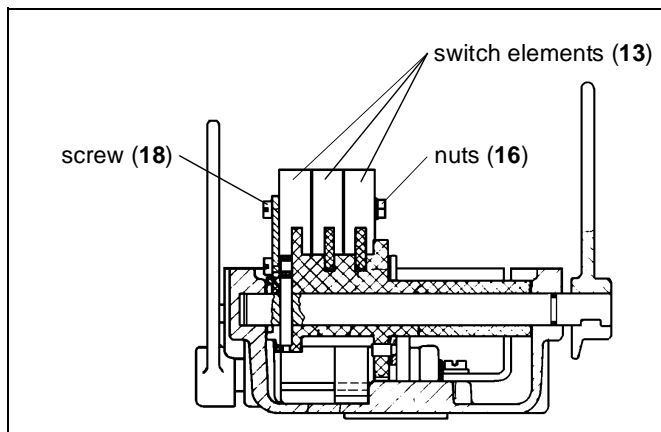


Fig. 7-3: Replacement of switch elements (side view)



## 8 Ordering Accessories and Spare Parts

### 8.1 Ordering Accessories

Please give the following details for all orders (*company address see back cover*):

1. **Accessory order text**  
e. g. eye bolt M 12 x 60
2. **Ordering number**  
e. g. 94.045 727.001

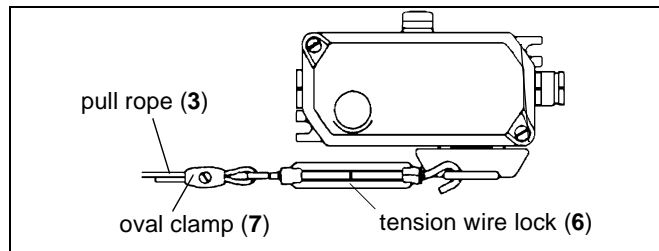


Fig. 8-1: Accessories

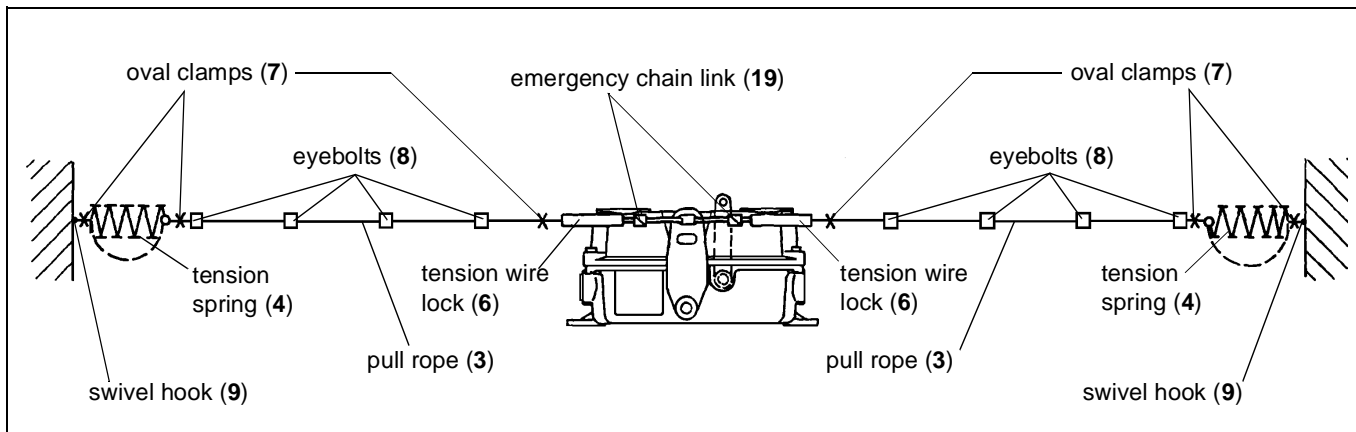


Fig. 8-2: Accessories

Item	Ordering text	Ordering number
3	Pull rope of plastic coated, red, flexible steel wire (available in rolls of 50, 100 or 500 m)	
	Ø 3 mm	94.045 731.001
	Ø 5 mm	94.045 731.002
4	Tension springs V2A	
	170 mm x Ø 20 mm	94.000 026.681
	230 mm x Ø 20 mm	94.000 026.683
6	Tension wire lock (Metal, 1 hook, 1 eyelet)	215.22.80.02.01
7	Oval clamp	
	for pull rope with Ø 3 mm	94.047 869.001
	for pull rope with Ø 5 mm	94.047 869.002
8	Eye bolts	
	M 12 x 60	94.045 727.001
	M 12 x 200	94.045 727.002
9	Swing hooks M 10	94.045 728.001
13	Cam switch	
	SN 4	91.040 910.001
	SN 4, 5 µ gold plated contacts	91.040 910.002

## 8.2 Ordering Spare Parts

Please give the following details for all orders (*company address see back cover*):

1. **Pull rope switch type**  
(*see table on inner housing*): e. g. HEN 001
2. **Device identification number**  
(*see table on inner housing*): e. g. 91.043 450.001
3. **Ordering text and number** (*see table*):  
e. g. cam switch SN 4, 91.040 910.001

Item	Description	Ordering text	Ordering number
13	Switch element	Switch element	220.03.01.01.01
		Switch element with gold plated contacts	220.03.01.01.02

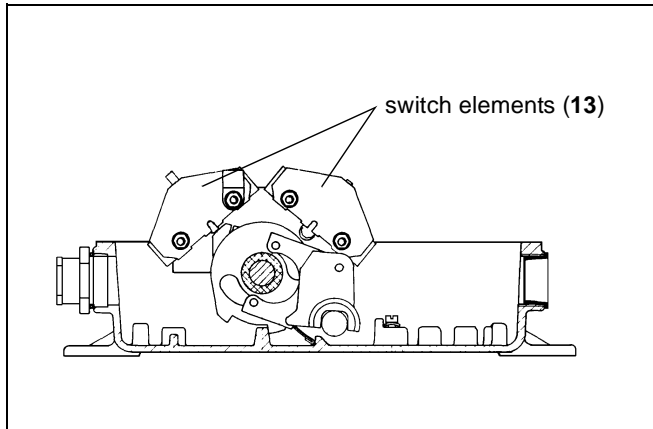


Fig. 8-3: Spare parts





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Doc.-Ident.-No.: 94.053 962.191

Edition: 19.03.2002

Modification Index: D