

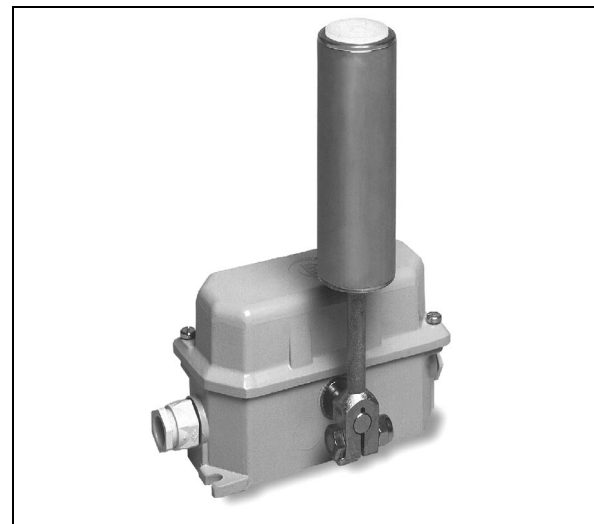
# Conveyor Belt Misalignment Switch Types HES



Device Id. Nos: 92.042 196.019

93.042 196.011 / .013 / .201 / .311 – .313

96.042 196.010, 96.042 222.004 / .008 / .010



## OPERATING INSTRUCTIONS

## **CE** 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 with the manufacturer.



## Table of Contents

	<b>1</b>	<b>For Your Own Safety</b> .....	<b>5</b>
	1.1	Intended Application.....	5
	1.2	Symbols.....	5
	<b>2</b>	<b>Transport, Packing, Storage and Disposal</b> .....	<b>6</b>
	2.1	Transport and Packing.....	6
	2.2	Storage.....	6
	2.3	Disposal.....	6
	<b>3</b>	<b>Design and Function</b> .....	<b>7</b>
	<b>4</b>	<b>Technical Data</b> .....	<b>9</b>
	4.1	Overview: HES Variants.....	9
	4.2	General Technical Data.....	10
	4.2.1	Electrical Data (Standard Design).....	11
	4.2.2	Electrical Data for 93.042 196.312 and .313.....	11
	4.2.3	Electrical Data for 92.042 196.019.....	11
	4.3	Dimensions.....	12

	<b>5</b>	<b>Mounting and Dismounting .....</b>	<b>13</b>
	5.1	Scope of Supply .....	13
	5.2	Mounting .....	13
	5.2.1	Mechanical Mounting .....	13
	5.2.2	Electrical Connection .....	15
	5.2.3	Adjusting the Switching Points .....	17
	5.3	Dismounting .....	19
	<b>6</b>	<b>Maintenance .....</b>	<b>19</b>
	<b>7</b>	<b>Repair .....</b>	<b>20</b>
	7.1	Replacing the Roller Lever .....	20
	7.2	Replacing the Switches .....	21
	<b>8</b>	<b>Ordering Devices and Spare Parts .....</b>	<b>22</b>
	8.1	Ordering Devices .....	22
	8.2	Ordering Spare Parts .....	22



# 1 For Your Own Safety

## 1.1 Intended Application

Conveyor belt misalignment switches of the type HES are installed in conveying systems for monitoring the off-track running of continuously running belt conveyors. They serve to protect the belts from damage or destruction in case of off-track running.

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

"Intended application" particularly means that any work performed with or on the device is to be carried out in accordance with these **operating instructions**. Only **skilled persons** who are familiar with the **Regulations on the Prevention of Accidents** as well as generally accepted safety rules are allowed to work on this device. **You protect yourself and prevent damage to the device when you apply the device as intended!**

## 1.2 Symbols

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



### Danger!

**Information that has to be observed at all events in order to protect the user from being injured.**



### Attention!

**Information that has to 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 when you send the device or components to KIEPE ELEKTRIK e.g. for repair. Take great care that the device is protected against shocks and humidity. In this way damage to the device due to transport is prevented for which the manufacturer is not liable.

### 2.2 Storage

Avoid significant variations in temperature as this can lead to condensed water, which might damage the device.

The permissible storage temperature is between -30°C and +80°C.



**Attention!**

**Keep the device clean and dry.**

### 2.3 Disposal

Reuse the **packing material**, if possible, or dispose of it in an environment-friendly way.

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



### 3 Design and Function

Conveyor belt misalignment switches of the type HES are installed in conveying systems operating on particularly rough conditions and monitor the off-track running of continuously running belt conveyors. They serve to protect the belts from damage or destruction in case of off-track running. In order to avoid material surcharges or malfunctioning, feeding plants can be switched off promptly.

Belt misalignment switches of the type HES are installed in pairs at the top belt in front of the driving cylinder, at the bottom belt in front of the deflection cylinder and additionally at critical locations in plants with wide axle spacing or at transfer stations (see also Fig. 5-1).

The roller lever (3) of stainless steel is ball-bearing in order to better cope with lateral forces and shocks (see Fig. 3-1). As a result of the large roller diameter of 48 mm it is possible to operate the belt at high speeds. All external parts are either made of stainless steel or treated galvanically.

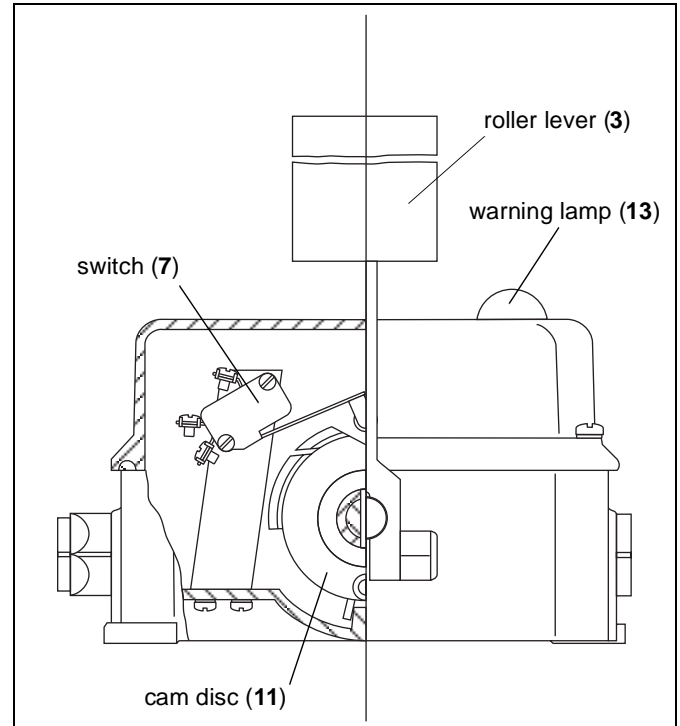


Fig. 3-1: Conveyor belt misalignment switch of the type HES

The roller levers (3) of the HES type belt misalignment switches can be deflected in both directions (see Fig. 3-2). The adaptation of switching points to certain locations is realized with adjustable cam discs (11) (see section 4.1 „Overview: HES Variants“). When the first switching point is reached, the belt misalignment switch triggers an early warning. When the second switching point is reached, the belt conveyor plant is switched off. If the belt misalignment switches have a warning lamp (13), these warning lamps (13) can be connected as following (see Fig. 3-2): the warning lamp (13) can e.g. light already at the early warning or only when the belt conveyor plant is being switched off.

The belt misalignment switch of the type HES 019 has an additional pushbutton (21) (see Fig. 4-1, page 12). This pushbutton (21) allows electrical by-passing of the switch (7) that effects switching off the belt in case of actuation. Thus, it is possible to move the continuous flow conveyor during tip operation despite belt misalignment to carry out repair or centering work.

Information on further possible designs of the belt misalignment switches of the type HES is found in section 4.1 „Overview: HES Variants“.

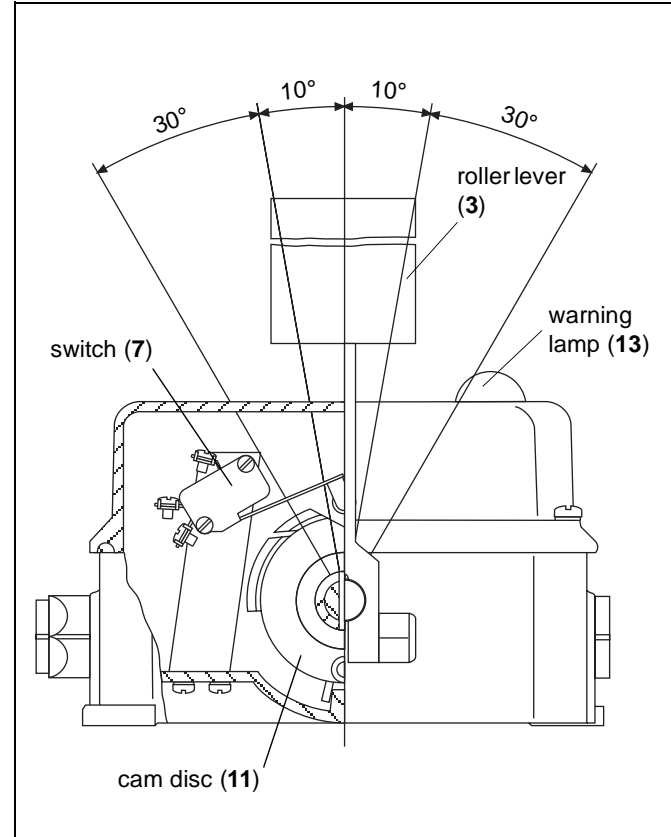


Fig. 3-2: Belt misalignment switch of the type HES





## 4 Technical Data

### 4.1 Overview: HES Variants

Device Id. No.	Switch elements	Switching points*	Special feature
96.042 196.010	2 changeover contacts with spring operation	5° to 15° and 15° to 35°	warning lamp 230 V**
93.042 196.011	2 changeover contacts with spring operation	5° to 15° and 15° to 35°	
93.042 196.013	2 changeover contacts with spring operation	5° to 15° and 15° to 35°	venting stub, gold contacts
92.042 196.019	2 changeover contacts, forced actuated normally closed contact	5° to 15° and 15° to 35°	pushbutton for jumpering the switching off of the belt
93.042 196.201	3 changeover contacts with spring operation	5° to 15° and 15° to 30° or 45°	
93.042 196.311	2 changeover contacts with spring operation	10° and 30°	3 threads for PG 16 screw joint, gold contacts
93.042 196.312	proximity switch	10° and 30°	
93.042 196.313	proximity switch	10° and 30°	
96.042 222.004	2 changeover contacts with spring operation	5° to 15° and 15° to 35°	venting stub
96.042 222.008	2 changeover contacts with spring operation	5° to 15° and 15° to 35°	gold contacts
96.042 222.010	2 changeover contacts with spring operation	5° to 15° and 15° to 35°	gold contacts and terminal strip

\* The switching points are adjustable (except 93.042 196.311 to .313). All belt misalignment switches are preset at  $2 \times 10^\circ$ .

\*\* The connecting cables of the warning lamp are not wired in the device at the delivery.

## 4.2 General Technical Data

EN 60947-5-1 VDE 0110	Low-voltage switching devices, control devices and switch elements Insulation coordinates for electrical equipment in low-voltage installations: pollution degrees 2 (inside), 4 (outside)
Suitable for	Controls and plants according to EN 60204: Safety of machinery – Electrical equipment of machines
Casing	Light alloy GK-AISI 12
Varnishing	DD – two-component varnish, yellow RAL 1004
Degree of protection (EN 60529) design with venting grommet	IP 65 IP 54
Permissible ambient air temperature	– 30 °C ... + 80 °C
93.042 196.312	– 25 °C ... + 65 °C
93.042 196.313	– 25 °C ... + 80 °C
Kind of drive	Cylinder roller of stainless steel, $\varnothing$ 48 mm
Deflection of the roller lever	max. 75°
Switching rate	1,500 switchings/h
Mechanical life	$0.5 \times 10^6$ switching cycles
Cable entry	2 threads for PG 16 screw joint
Cross section of connecting cable	max. 2.5 mm <sup>2</sup>
Protective conductor terminal	Screw M 5
Fastening	By means of two elongated holes for screws M 8
Mounting position	Preferably as shown in <i>Fig. 4-1: Dimensions of HES (in mm)</i>
Weight	approx. 1820 g

### 4.2.1 Electrical Data (Standard Design)

Rated insulation voltage $U_i$	AC 380 V, DC 250 V
Conventional thermal current $I_{th}$	10 A
Switching capacity $I_e/U_e$	4 A / 250 V; 2.5 A / 380 V

### 4.2.2 Electrical Data for 93.042 196.312 and .313

Rated insulation voltage $U_i$	
93.042 196.312	DC 5 V ... DC 25 V
93.042 196.313	DC 5 V ... DC 36 V
Conventional thermal current $I_{th}$	200 mA

### 4.2.3 Electrical Data for 92.042 196.019

#### Switching Elements

Rated insulation voltage $U_i$	250 V
Thermal current $I_{th}$	10 A
Switching capacity	
AC-15	AC 230 V / 1.5 A
DC-13	DC 60 V / 0.5 A
DC-13	DC 24 V / 2.0 A

#### Pushbutton

Switching voltage	max. AC 250 V
Switched current	max. 0.7 A
Service life	$2.5 \times 10^4$ operating cycles

### 4.3 Dimensions

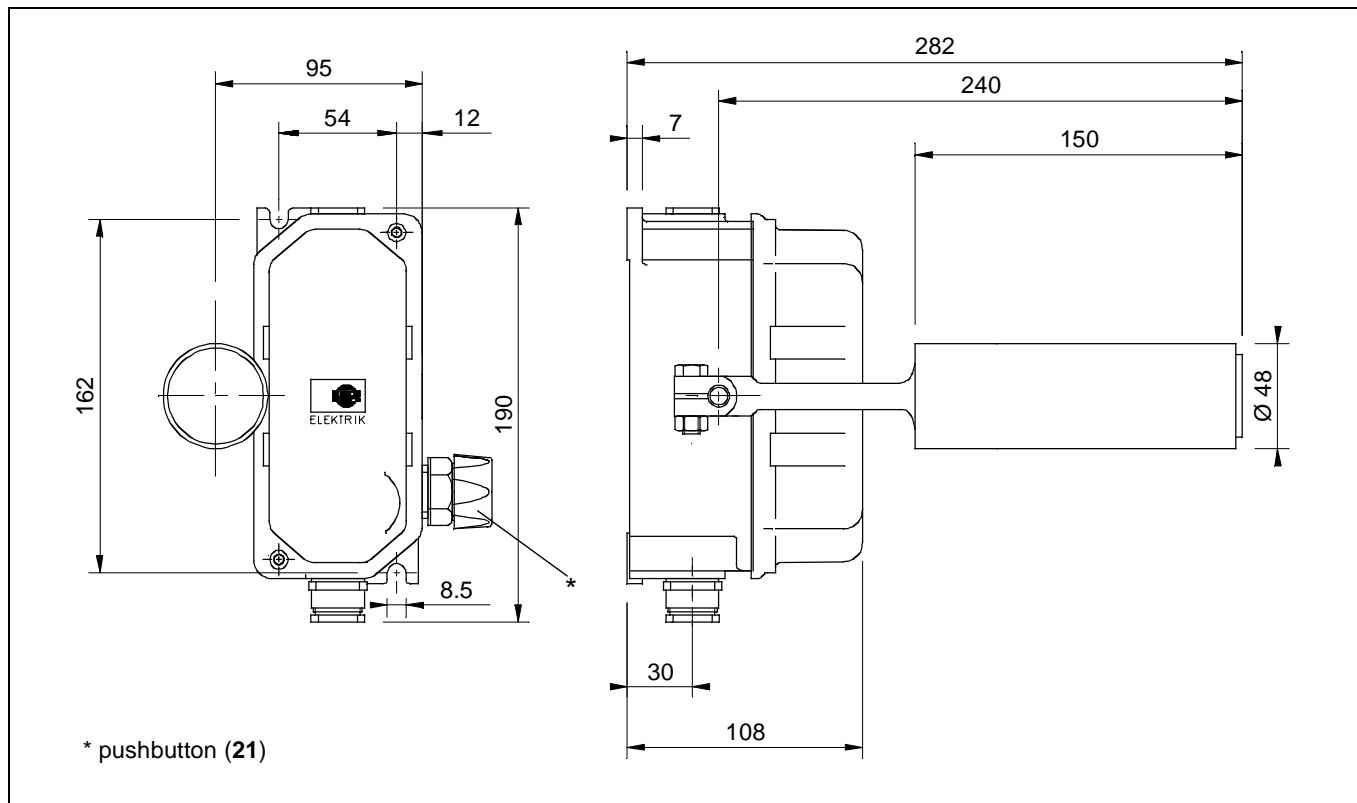


Fig. 4-1: Dimensions of HES (in mm)



## 5 Mounting and Dismounting

### 5.1 Scope of Supply

The conveyor belt misalignment switches of the type HES are delivered ready for operation. The screws for the mechanical fastening are not included in the scope of supply.

### 5.2 Mounting



**Danger!**

**Disconnect the belt conveyor plant from the power supply before the mounting. Prevent it from being switched on again.**



**Attention!**

**It is only allowed to insert the conveyor belt misalignment switches in control circuits.**

#### 5.2.1 Mechanical Mounting



**Attention!**

**Mount the belt misalignment switch so that the belt edge actuates the roller lever (3) in the lower half of the roller in case of off-track running. Thus, it is prevented that the belt slides over the roller lever (3) (see Fig. 5-1).**

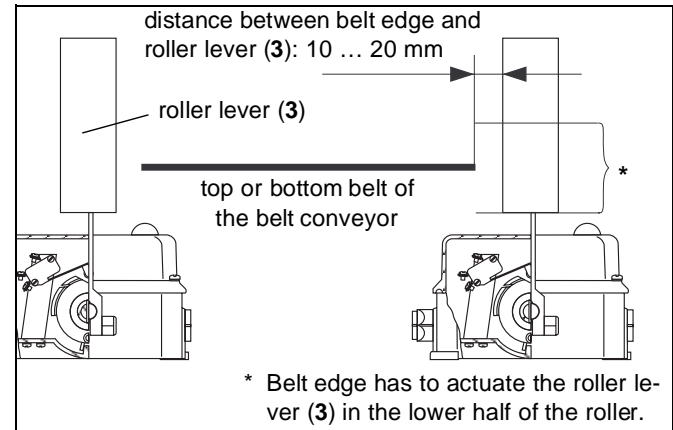


Fig. 5-1: Mounting belt misalignment switches on the belt conveyor in pairs

Belt misalignment switches of the type HES are installed in pairs at the top belt in front of the driving cylinder, at the bottom belt in front of the deflection cylinder and additionally at critical locations of plants with wide axle spacing or at transfer stations (see Fig. 5-1).

1. Disconnect the belt conveyor plant from the power supply before the mounting. Prevent it from being switched on again.
2. Fasten the belt misalignment switches on the belt conveyor structure by putting screws M 8 (4) through the two elongated holes (10) (see Fig. 5-2).

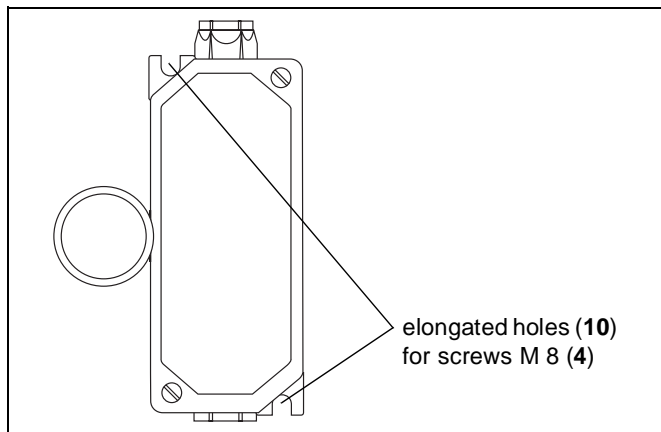


Fig. 5-2: Mounting belt misalignment switches on the belt conveyor

In order to prevent swift wear of the roller lever (3), the roller lever (3) should be so aligned that it is approximately 10 to 20 mm before the belt edge (see Figs. 5-1 and 5-3).

3. Place the roller lever (3) on the shaft (14).



### Attention!

When you tighten the nut (9) make sure that the distance to the cover (2) is so large that the roller lever (3) cannot run against the cover (2) if it is deflected.

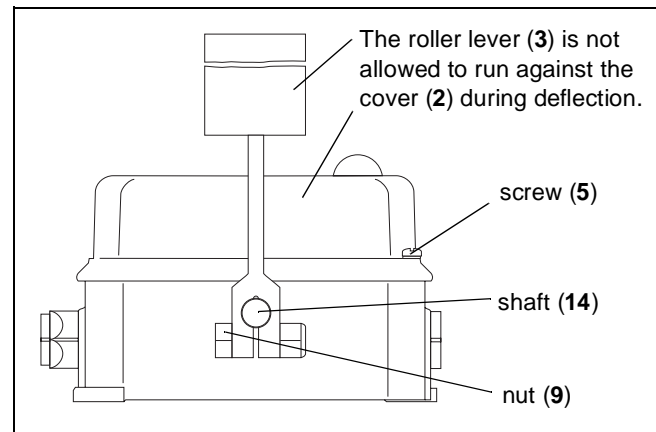


Fig. 5-3: Mounting belt misalignment switches on the belt conveyor

- Turn the roller lever (3) into the desired position and tighten the locknut (9) with an open-end wrench SW 13.

### 5.2.2 Electrical Connection

- Disconnect the belt conveyor plant from the power supply before the mounting. Prevent it from being switched on again.
- Open the cover (2) of the belt misalignment switch by loosening both screws (5) (see Fig. 5-3).
- Loosen the nut of the PG 16 screw joint (6) and slide the nut over the connecting cable (see Fig. 5-4).

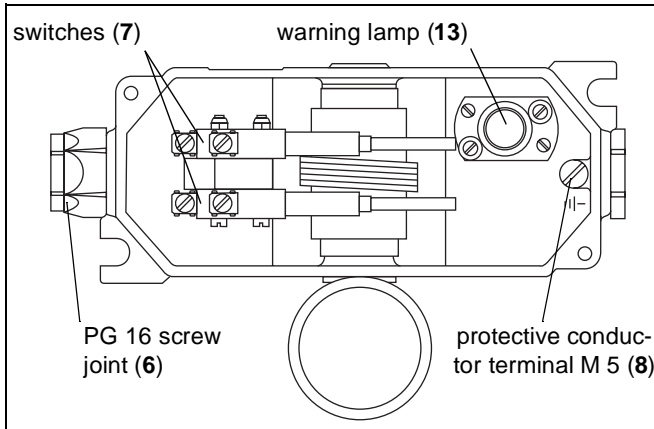


Fig. 5-4: Connection of the belt misalignment switch

- Insert the connecting cable through the PG 16 screw joint (6) (see Fig. 5-4).
- Connect the connecting cable with the switches (7), the terminal strip (19) or the proximity switch (20) in accordance with the wiring diagrams (see Figs. 5-5 to 5-8).
- Belt misalignment switches with a warning lamp (13): connect the connecting cables of the warning lamp (13) (see Fig. 5-4).

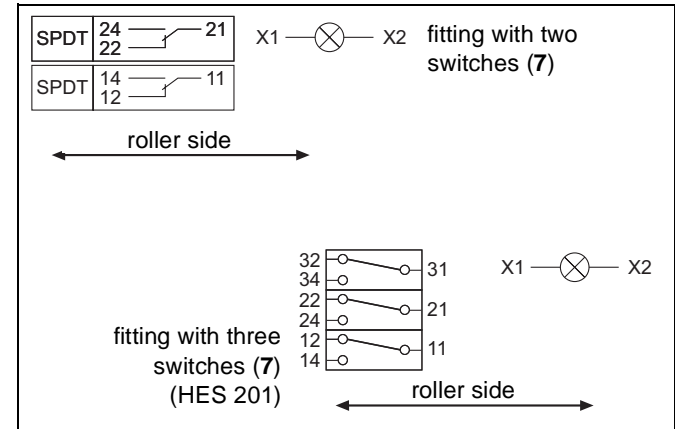


Fig. 5-5: Connection of the belt misalignment switch – with switch fitting without terminal strip

7. Connect the protective conductor with the protective conductor terminal M 5 (8) (see Fig. 5-4).

Except for the types 93.042 196.201 and .311 to .313 the manufacturer has preset the switching points of the belt misalignment switches at 10° in both directions of actuation. You have to adjust the switching points of these devices in accordance with your requirements:

8. Adjust the switching point of the roller lever (3) on the cam disc (11) if you want another switching point (see section 5.2.3 „Adjusting the Switching Points“).

9. Close the cover (2) of the belt misalignment switch and retighten both screws (5) (see Fig. 5-4).

10. Tighten the nut of the PG 16 screw joint (6).

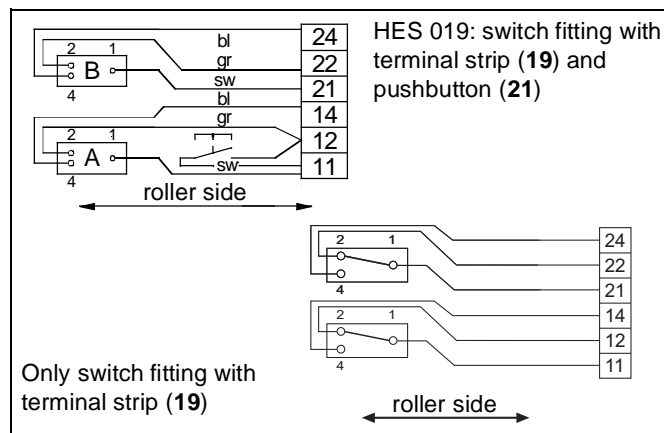


Fig. 5-6: Connection of the belt misalignment switch – with switch fitting with terminal strip and pushbutton

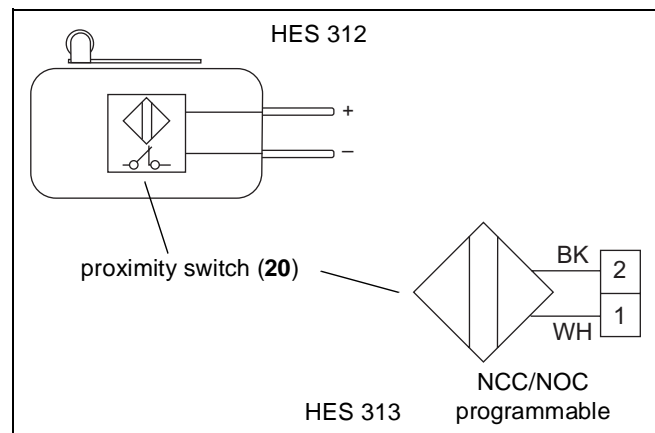


Fig. 5-8: Connection of the belt misalignment switch – with proximity switch fitting



### 5.2.3 Adjusting the Switching Points

Except for the types 93.042 196.201 and .311 to .313 the manufacturer has preset the switching points of the belt misalignment switches at 10° in both directions of actuation. You have to adjust the switching points "early warning" and "switch off" of these devices in accordance with your requirements.

1. Disconnect the belt conveyor plant from the power supply before the adjusting. Prevent it from being switched on again.

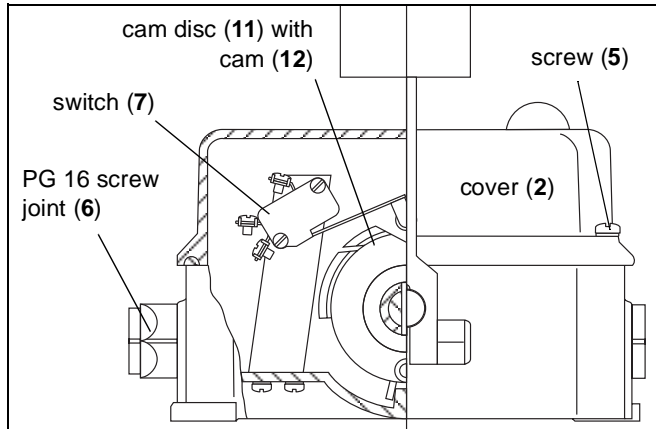


Fig. 5-9: Adjusting the switching points – breaking out the cam

2. Open the cover (2) of the belt misalignment switch by loosening both screws (5) (see Fig. 5-9).
3. Adjust the switching point "early warning" (see Figs. 5-9 and 5-10): adjustment range: 5° to 15°
  - a. Loosen the screws (15) in the cam disc (11).
  - b. Adjust the switching point "early warning" by turning the cam disc (11).
  - c. Retighten the screws (15).

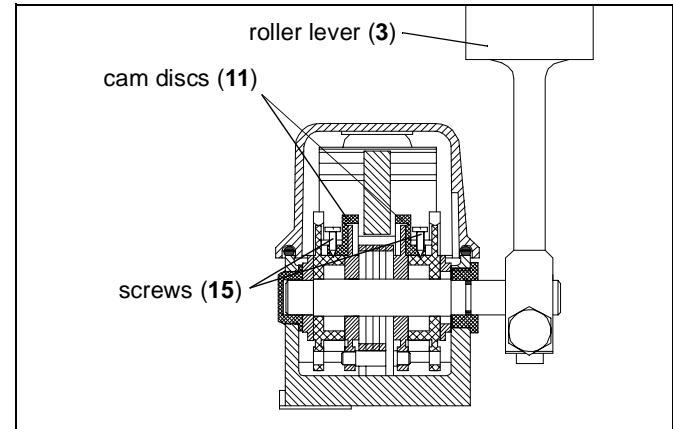


Fig. 5-10: Adjusting the switching points – loosening the screws in the cam discs

4. Adjust the switching point "switch off" (see Figs. 5-11 and 5-12): adjustment range: 15° to 35°
  - a. Break the cam (12) out of the cam disc (11) to get a larger adjustment range.
  - b. Loosen the screws (15) in the cam disc (11).
  - c. Adjust the switching point "switch off" by turning the cam disc (11).
  - d. Retighten the screws (15).
5. Close the cover (2) of the belt misalignment switch and retighten both screws (5) (see Fig. 5-11).

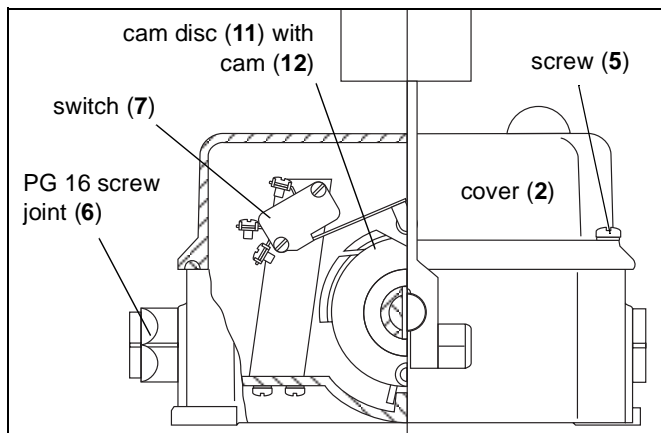


Fig. 5-11: Adjusting the switching points – breaking out the cam

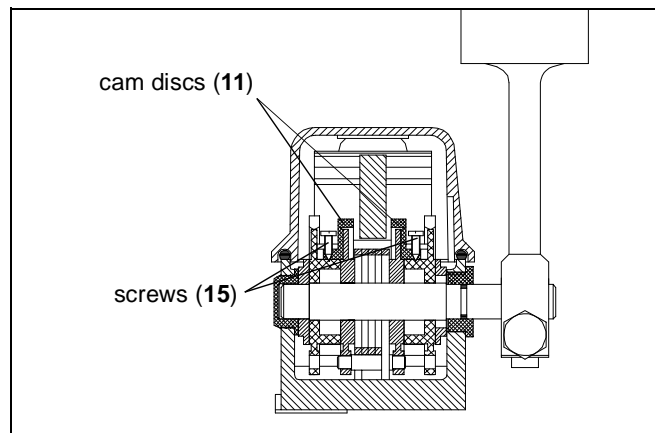


Fig. 5-12: Adjusting the switching points – loosening the screws in the cam discs

### 5.3 Dismounting



**Danger!**

**Disconnect the belt conveyor plant from the power supply before the dismounting. Prevent it from being switched on again.**

1. Disconnect the belt conveyor plant from the power supply before the dismounting. Prevent it from being switched on again.
2. Open the cover (2) by loosening both screws (5) (see Fig. 5-11).

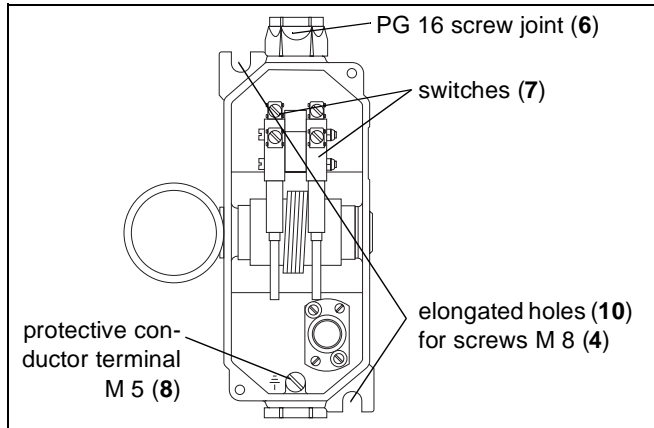


Fig. 5-13: Dismounting belt misalignment switches from the belt conveyor

3. Loosen the electrical connections to the switches (7) (see Fig. 5-13).
4. Loosen the protective conductor from the protective conductor terminal M 5 (8).
5. Unscrew the PG 16 screw joint (6) and pull the connecting cable out of the belt misalignment switch.
6. Loosen both screws M 8 (4) and remove the belt misalignment switch from the belt conveyor plant.



## 6 Maintenance

The conveyor belt misalignment switches of the type HES are maintenance-free. Defective devices can be sent to KIEPE ELEKTRIK for disposal (see company address on back cover).



## 7 Repair

### 7.1 Replacing the Roller Lever



#### Danger!

Disconnect the belt conveyor plant from the power supply before you begin the repair work. Prevent it from being switched on again.

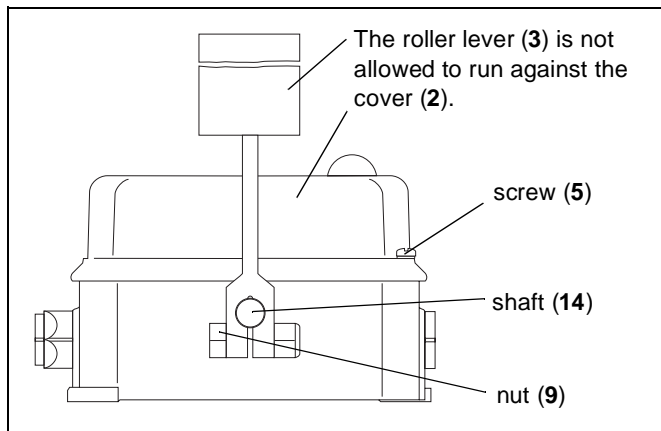


Fig. 7-1: Exchanging the roller lever

1. Disconnect the belt conveyor plant from the power supply before you begin the repair work. Prevent it from being switched on again.
2. Loosen the nut (9) with an open-end wrench SW 13 and pull the roller lever (3) from the shaft (14) (see Fig. 7-1).

In order to prevent too fast wear of the new roller lever (3), the roller lever (3) should be so aligned that it is approximately 10 to 20 mm before the belt edge (see Fig. 5-1).

3. Place the new roller lever (3) on the shaft (14).



#### Attention!

When you tighten the nut (9), make sure that the distance to the casing (1) is so large that the roller lever (3) cannot run against the casing (1) if it is deflected.

4. Turn the roller lever (3) into the desired position and tighten the locknut (9) with an open-end wrench SW 13.

## 7.2 Replacing the Switches



### Danger!

**Disconnect the belt conveyor plant from the power supply before you begin the repair work. Prevent it from being switched on again.**

1. Disconnect the belt conveyor plant from the power supply before you begin the repair work. Prevent it from being switched on again.

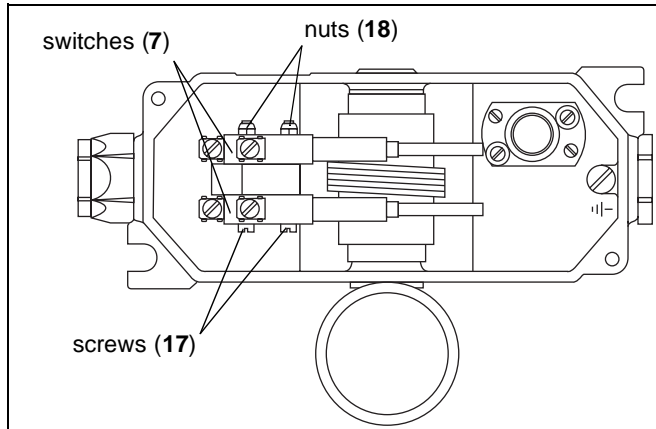


Fig. 7-2: Exchanging the switches

2. Dismount the belt misalignment switch (see section 5.3 „Dismounting“).
3. Exchange the switches (7) by loosening both nuts (18) with a socket wrench SW 5.5 and pulling out the screws (17) (see Fig. 7-2).
4. Mount the new switches (7) on the support (16) by putting new screws (17) M 3 x 35 through the mounting holes of the first switch (7).
5. Put the screws (17) through the support (16) and place the second switch (7).
6. Fasten the switches (7) with new locknuts (18) M 3.
7. Remount the belt misalignment switch on the belt conveyor plant and connect it (see section 5.2 „Mounting“).



## 8 Ordering Devices and Spare Parts

### 8.1 Ordering Devices

Please always quote the following data when you place a purchase order with KIEPE ELEKTRIK (see company address on back cover):

1. **Type designation of the belt misalignment switch**  
(see nameplate on the casing lid): HES xxx

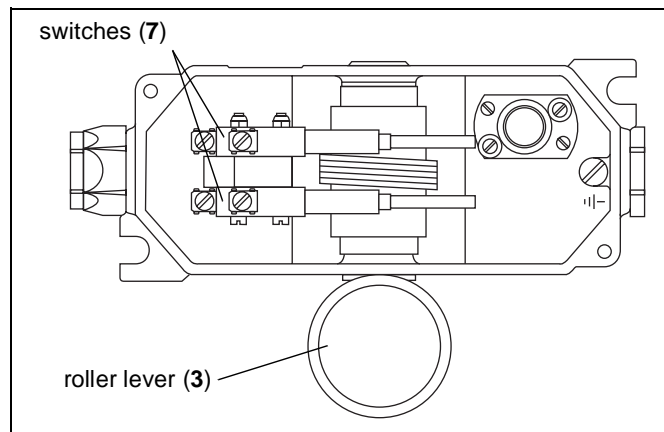


Fig. 8-1: Spare parts

2. **Device identification No.** (see nameplate on the casing lid)

### 8.2 Ordering Spare Parts

Please always quote the following data when you place a purchase order with KIEPE ELEKTRIK (see company address on back cover):

1. **Type designation of the belt misalignment switch**  
(see nameplate on the casing lid): HES xxx
2. **Order text** (see table): e.g. roller lever
3. **Order No.** (see table): e.g. 93.045 910.001

Pos.	Order text	Order No.
3	roller lever $\varnothing$ 48 mm	93.045 910.001
7	switch	
	standard	215.15.09.04.04
	with gold contacts	215.15.09.04.06



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