

Belt misalignment switch Type HESEX and SELEX



OPERATING INSTRUCTIONS

Legal notice

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CE conformity certificate

The device complies with the relevant European and national regulations.
CE conformity has been certified; the relevant records and documents are in the hands of the manufacturer.

Protective note (as per DIN ISO 16016:2002-5)

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www.kiepe-elektrik.com

Vossloh Kiepe GmbH
Kiepe-Platz 1
40599 Düsseldorf
Germany

Tel.: +49 (0) 211 / 74 97 – 0
Fax: +49 (0) 211 / 74 97 – 420
E-mail: info@vkd.kiepe-elektrik.com

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1 For your safety

1.1 Intended use

The HESEX and SELEX Belt misalignment switches are used in conveyor systems for monitoring the true running of continuous conveyors. The switches serve to protect the belts from being damaged or destroyed if the belt deviates from its designed running line. The device is intended for use in stationary installations and vehicles.

The belt misalignment switches are approved for use in the presence of combustible dust in accordance with EN 61241-0:2006 “Electrical apparatus for use in the presence of combustible dust” and EN 61241-1:2004 “Protection by enclosures”. Belt misalignment switches are marked with Ex II 2D Ex tD A21 IP 65 T 85 °C and can be used in Zones 21 and 22, Equipment Group II, Categories 2 and 3.

The belt misalignment switches may not be used below ground, nor may they be used in Zones 0, 1, 2, and 20.

The documentation at hand is to be considered part of the product and must be retained and be available to the respective owner/user for the entire service life of the product. The documentation must be passed on to each subsequent owner of the product.

The manufacturer is **not liable** for personal injury and property damage arising from non-intended use of the device or unauthorized modifications to the device and its components. Make sure that the intended use is not impaired in any way even after unexpected outside influence on the device.

Intended use refers specifically to the operation of the device in accordance with these **operating instructions**. Work on this device may only be carried out by **qualified personnel** who are familiar with **accident prevention regulations** as well as other generally recognized safety regulations.

By using the equipment as intended, you protect yourself and prevent damage to the equipment and its components.

1.2 Design of warnings

Risks are classified in accordance with ISO 3864-2 and ANSI Z535.6 using the keywords

- “Danger,” “Warning,” and “Caution” in the case of bodily injury,
- “Beware” in the case of property damage, and
- “Note” to convey general information.

In this documentation, the Risks and Notes are classified and presented as follows:

Danger!

indicates the immediate threat of danger. Not avoiding this danger will result in death or extremely serious injury (crippling).

Warning!

indicates a possibly dangerous situation. Not avoiding this dangerous situation could result in death or extremely serious injury (crippling).

Caution!

indicates a possibly dangerous situation. Failure to avoid this dangerous situation can result in light or minor injuries.

Beware!

indicates a possibly harmful situation. If this harmful situation is not avoided, the product or something in its vicinity could be damaged.



Note!

“Note” indicates advice on use and other especially helpful information.

Icons

The following icons are used to more clearly define the sources of danger. The icons can appear in reference to any level of danger.




Icon	Type of danger
	Dangers of all types, except those that are labeled with the following icon
	Injuries caused by dangerous voltages and currents.
	Damage caused by electrostatic discharges (ESD protection)

Table 1-1: Icons for general sources of danger

2 Transport, storage and disposal

2.1 Transport and packaging

Select suitable packaging when sending the device or components of the device to Vossloh Kiepe GmbH, e.g. for repairs. In particular, ensure that the components are kept clean and protected from shock and moisture. This prevents damage to the components that may occur during transport, for which the manufacturer accepts no liability.

2.2 Storage

Avoid major temperature fluctuations, as these can lead to condensation that can cause damage to the device and its components.

Permissible storage temperature see *Chapter 4: "Technical data"*, page 11.



Damage caused by storage

Dirt or water getting into the device and exposure to weather (e.g. buildup of condensation in the device, sunlight) damage the device and lead to faster deterioration.

Protect the device by storing it in a clean, dry place under stable ambient conditions. If possible, store the device in its original packaging.

2.3 Disposal

Only materials that are not considered hazardous according to current engineering practice are used for Vossloh Kiepe GmbH products. Furthermore, we develop products that can be recycled after intended use. In our selection of raw materials and components, we favor reusable materials. This choice of materials used does not compromise product safety in any way.

3 Description

Belt misalignment switches are used in conveyor belt systems subjected to especially severe operating conditions for monitoring the true running of continuous conveyors (see section 1.1: "Intended use", page 5). The belt misalignment switches serve to protect the belts from being damaged or destroyed if the belt deviates from its designed running line. Upstream systems can be stopped in time to avoid material spillage or operational malfunctions.

The roller lever (3) of the belt misalignment switch is made of stainless steel and contains ball bearings for improved handling of lateral forces and impacts. The 48 mm roller diameter means the device can be used at high belt speeds. All external parts are either made of stainless steel or have a special galvanized coating.

The roller lever (3) of the belt misalignment switches can be moved in both directions (see fig. 3-1). By moving the roller lever (3) the cam disks (11) are turned. The cam disks (11) operate the switches (7). The cam disks (11) are adjustable and make it possible to adapt the switch points to local conditions.

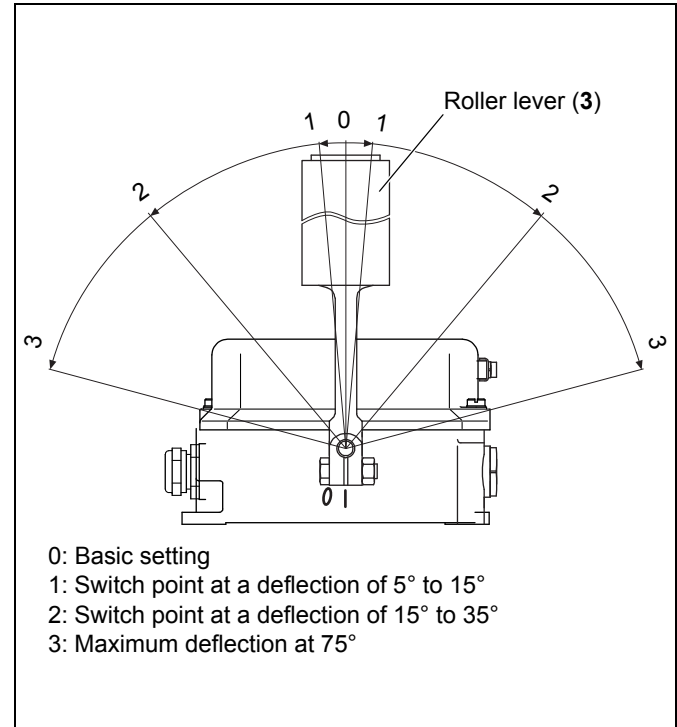


Fig. 3-1: Belt misalignment switch for conveyor belt system – Switch points (adjustable)

The belt misalignment switches can, for example, be adjusted in such a way that when they reach the first switch point, an advance warning (adjustment range: 5° to 15°) is triggered and when they reach the second switch point, the conveyor belt system is switched off (adjustment range: by prying out a cam by 15° to 35°). The mechanical stop of the roller lever (3) is reached at a deflection of 75° .

Belt misalignment switches are mounted in pairs on the upper belt in front of the drive roller, on the lower belt in front of the deflection roller and also at critical points where the axis distances are larger or material is transferred (see fig. 3-3).

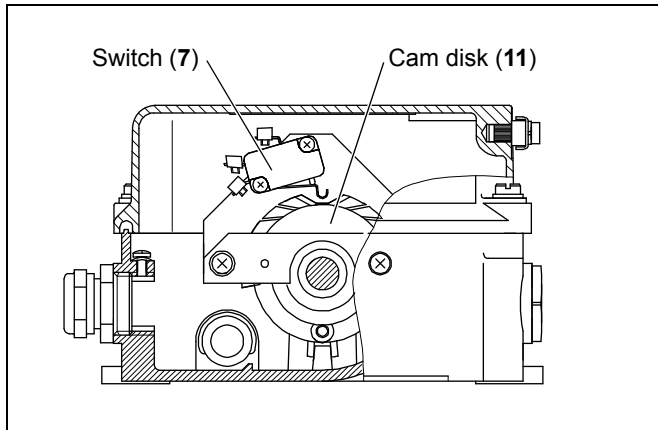


Fig. 3-2: Belt misalignment switch – illustration with roller lever removed

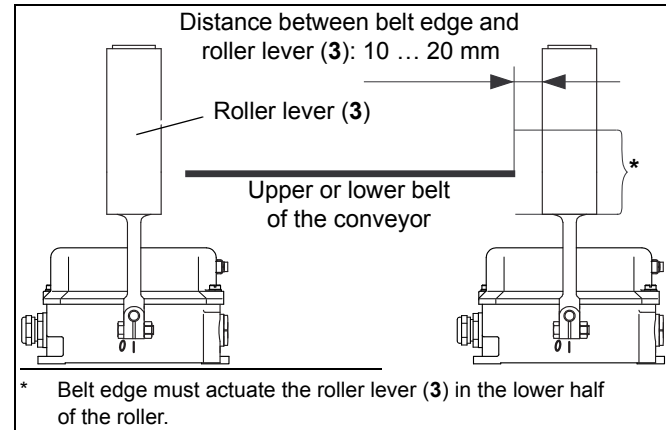


Fig. 3-3: Paired belt misalignment switches mounted on the conveyor

4 Technical data

4.1 General technical data

In compliance with the following standards and regulations	EN 61241-0:2006, EN 61241-1:2004 EN 60947-5-1 VDE 0110 – Pollution degree 2 (inside), 4 (outside)
Suitable for	Controls and installations according to EN 60204
Enclosure	HESEX: Aluminum SELEX: Gray cast iron
Finish	DD enamel
Mounting	HESEX: 2 slotted holes for M 8 screws SELEX: 2 slotted holes for M 10 screws
Permissible Ambient Temperature (VDE 0660)	– 25 °C to + 75 °C, <i>see also Section 4.3, page 14</i>
Max. operating temperature of enclosure	85 °C
Max. altitude above sea level	2.000 m (contact manufacturer for installation on sites at higher altitudes)
Protection standard	IP 65 according to EN 60529
Type of drive	Cylindrical roller made of stainless, acid-proof steel, \varnothing 48 mm
Switch points	Adjustable: 5° to 15° and 15° to 35° Default setting: 2 x 10°
Deflection of the roller lever	Max. 75°
Switching system	Snap-acting switch, max. 4 change-over contacts
Rated insulation voltage U_i	AC 380 V, DC 250 V

Conventional thermal current I_{th}	6 A
Breaking capacity	AC-15: $U_e = AC\ 240\ V$, $I_e = 1.5\ A$ DC 24 V, $T = 2\ ms\ to\ 3\ ms$, to 3 A
Contact service life	0.5×10^6 switching cycles
Mechanical service life	$> 10^5$ Switching cycles

**Warning!**

Use only screwed cable glands and dummy plugs recommended by the manufacturer and supplied with the device. These screwed cable glands and dummy plugs are designed in compliance with EU design sample test certification. If other screwed cable glands and dummy plugs are used, the device type approval may be rendered void.

Wiring arrangement	Threaded hole for 2 x M 25 x 1.5 1 x Screwed cable gland M25 x 1.5; sealing area $\varnothing\ 11.5\ mm\ to\ \varnothing\ 15.5\ mm$ 1 x dummy plug M25 x 1.5
Line connection cross-section	$0.75\ mm^2\ to\ 1.5\ mm^2$
Potential equalization connection	Connectable lines: $4\ mm^2$ fine-strand, $6\ mm^2$ unifilar
Protective conductor connection	In the enclosure, M 4
Protective conductor cross-section	Max. $2.5\ mm^2$, but at least the width of the connection lead

4.3 Device variants¹

Variant number	Type	Technical data (see section 4.1)
0xx, 1xx	Basic device without/with signal lamp	–
2xx	Basic device with DUPLINE module	also see the “DUPLINE module for belt misalignment switches” operating instructions: HESEX 21x: 94.063896.101 HESEX 22x, HES 23x: 94.063897.101 SELEX 21x: 94.063898.101 SELEX 22x, SEL 23x: 94.063899.101
3xx	Basic device	additional screwed cable gland
4xx	Basic device	additional switch configuration
5xx	–	–
6xx	Roller lever limit switch	–
7xx	Basic device with extended temperature range	–
8xx	–	–
9xx	Special devices	–

1. Deviations are possible for certain types.

4.4 Dimensions

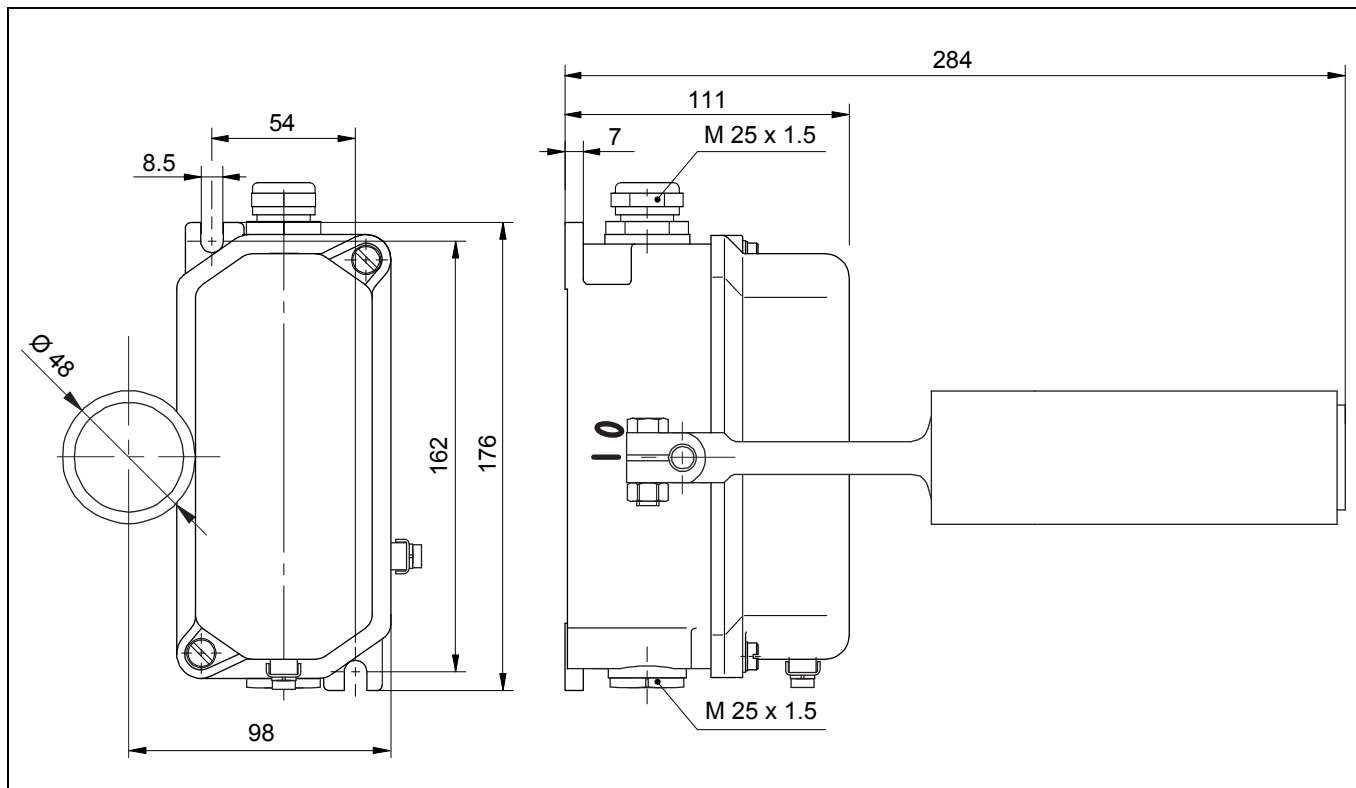


Fig. 4-2: Dimensions of the HESEX (in mm)

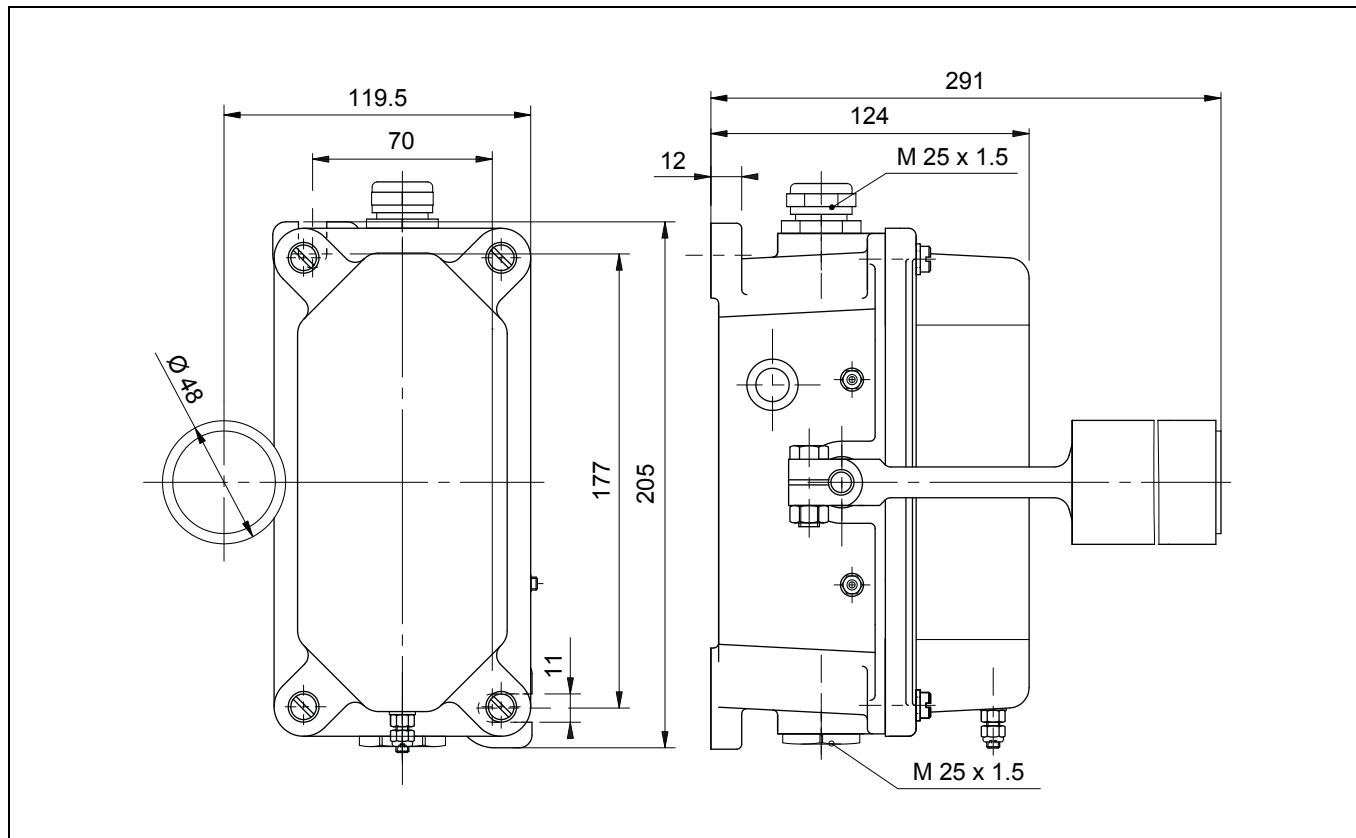


Fig. 4-3: Dimensions of the SELEX (in mm)

5 Mounting and dismounting

5.1 Scope of delivery

The belt misalignment switches are delivered ready to operate. The screws for mechanical fastening are not included in the scope of delivery. One screwed cable gland (6) and one dummy plug (25) are included in the scope of delivery (see fig. 5-1).

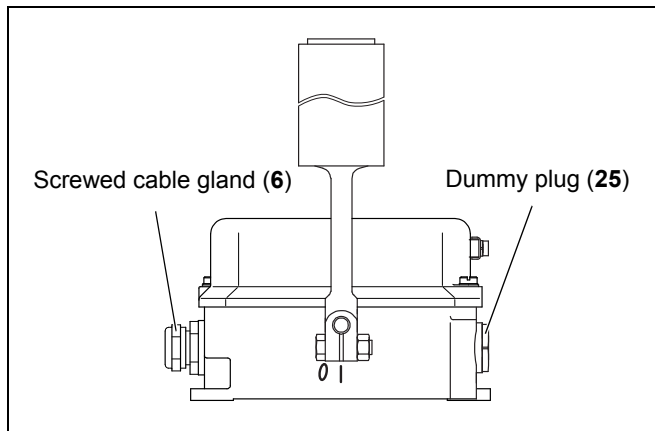


Fig. 5-1: Scope of delivery



Warning!

The device must only be operated when all three holes are closed with the supplied screwed cable gland (6) and the dummy plug (25).

Use only screwed cable glands (6) and dummy plugs (25) recommended by the manufacturer and supplied with the device. These screwed cable glands (6) and dummy plugs (25) are designed in compliance with EU design sample test certification. If other screwed cable glands (6) and dummy plugs (25) are used, the device type approval may be rendered void.

5.2 Mounting



Danger of fatal electric shock

Work on the device may be performed only by a qualified electrical technician.

Prior to working, switch off the power supply to the system. Ensure that the system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.



Beware!

The belt misalignment switches are to be used in control circuits only.

5.2.1 Mechanical mounting



Beware!

Make sure to mount the belt misalignment switch so that the belt edge actuates the roller lever (3) in the lower half of the roller when the belt deviates from its designed running line. This prevents the belt from sliding over the roller lever (3) (see fig. 5-2).

Belt misalignment switches are mounted in pairs on the upper belt in front of the drive roller, on the lower belt in front of the deflection roller and also at critical points where the axis distances are larger or material is transferred (see fig. 5-2).

1. Prior to working, switch off the power supply to the system. Ensure that the conveyor system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.

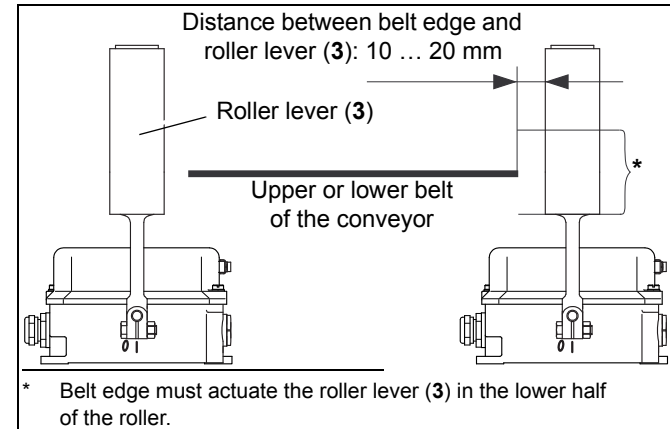


Fig. 5-2: Mounting paired belt misalignment switches on the conveyor

- Secure the belt misalignment switches on the conveyor structure (see section 4.4: "Dimensions", page 15). Secure the belt misalignment switches by screwing two screws through the slotted holes (10) (see fig. 5-4).

In order to minimize roller lever (3) wear, mount the roller lever (3) in such a way that it is located approximately 10 to 20 mm in front of the belt edge (see figures 5-2 and 5-5).

- Fit the roller lever (3) onto the shaft (14).

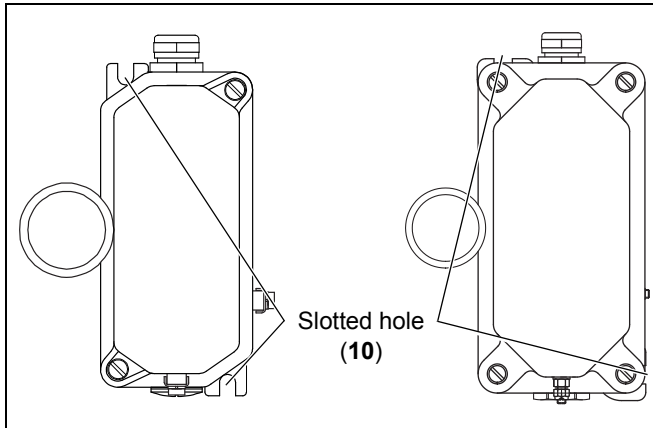


Fig. 5-3: Mounting the belt misalignment switch onto the conveyor



Beware!

When tightening the nut (9), make sure the distance to the cover (2) is sufficient for the roller lever (3) not come into contact with the cover (2) when the roller lever (3) is moving.

- Set the roller lever (3) to the required position and tighten the self-locking nut (9) using a 16 mm open-end wrench.

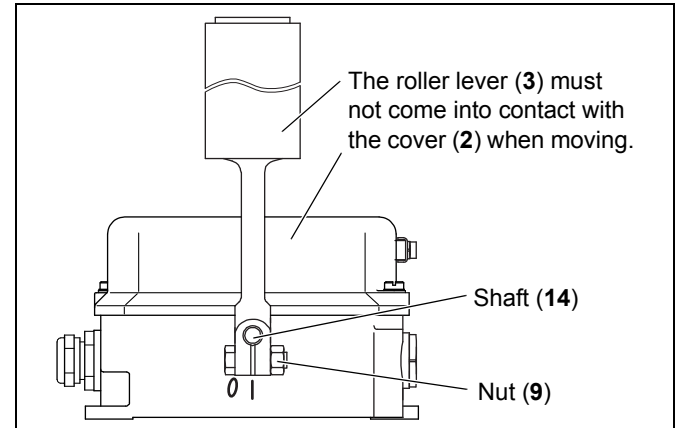


Fig. 5-4: Mounting the roller lever on the belt misalignment switch

5.2.2 Electrical connection



Risk of explosion!

Never open the belt misalignment switch in an explosive, dust-polluted area.

The penetration of dust and moisture into the belt misalignment switch must be prevented at all costs. As required, remove any dust which has entered the unit. Seal the cover immediately after making the electrical connection.



Danger of fatal electric shock

Work on the device may be performed only by a qualified electrical technician.

Prior to working, switch off the power supply to the system. Ensure that the system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.



Danger!

Only use connection cables with a diameter of between 11.5 mm and 15.5 mm. The permissible conductor cross-sections are found in *Chapter 4: "Technical data", page 11*.



Beware!

The belt misalignment switches are to be used in control circuits only.

1. Prior to working, switch off the power supply to the system. Ensure that the conveyor system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.
2. Open the cover (2) of the belt misalignment switch by loosening the two screws (5) (see *fig. 5-5*).

- Loosen the nut on the screwed cable gland (6) and thread the connection cable ($\text{Ø}11.5 \text{ mm}$ to 15.5 mm) through it (see fig. 5-6).
- Connect the connection cable to the terminals of the switch (7) in the cover (2) of the belt misalignment switch according to the connection diagram (see figures 5-7 and 5-8).
- Connect the protective conductor (max. 2.5 mm^2) to the protective conductor connection M 4 (8). The factory setting for the switch points of the belt misalignment switches is 10° in both directions. The

switch points of the belt misalignment switches can be adjusted as required.

- Adjust the switch point of the roller lever (3) on the cam disk (11), if a different switch point is required (see section 5.2.3: "Adjusting the switch points", page 23).
- Tighten the nuts of the screwed cable gland (6) with a **tightening torque of 6.7 Nm**.

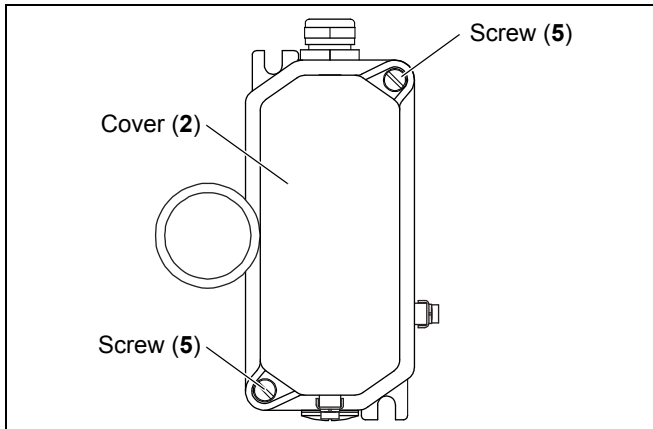


Fig. 5-5: Connecting the belt misalignment switch

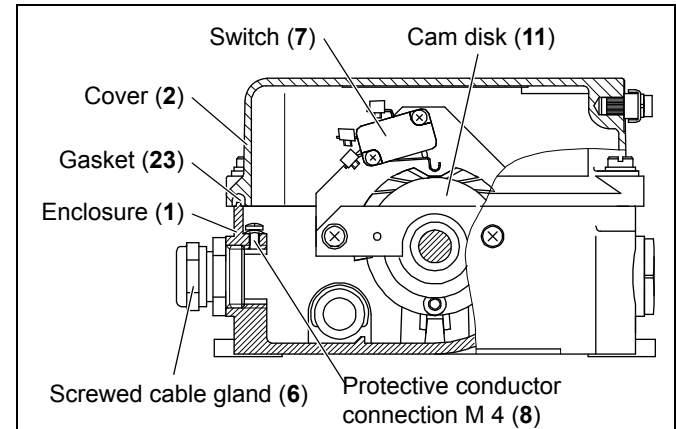


Fig. 5-6: View of the belt misalignment switch connections

! Risk of explosion!

A device with a damaged gasket (23) must not be used. Remove any dust that may have entered the enclosure (1).

8. Check the gasket (23) of the cover (2) for damage.
9. Close the cover (2) of the belt misalignment switch.
10. Secure the cover (2) with the screws (5) (see fig. 5-9).

Tighten the screws (5) **evenly** to a **tightening torque of 1.5 Nm**.

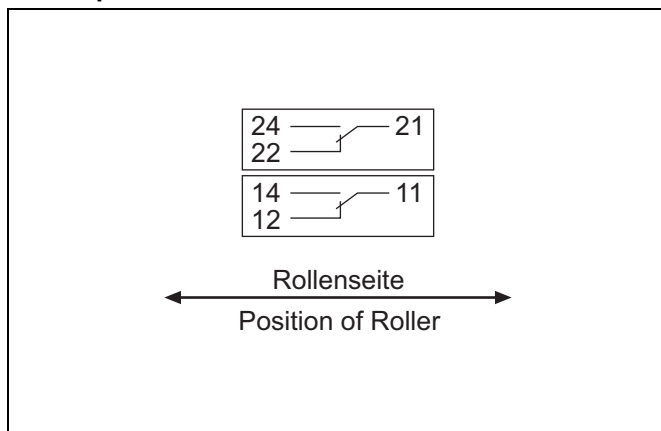


Fig. 5-7: Connection diagram in the belt misalignment switch cover

11. Connect each potential equalization conductor with a cross-section of at least 4 mm^2 to the potential equalization connections (22) on the cover (2) and the enclosure (1).
12. Connect the potential equalization conductor to your conveyor belt system.
13. Commission the belt misalignment switch (see section 5.2.4: "Commissioning", page 26).

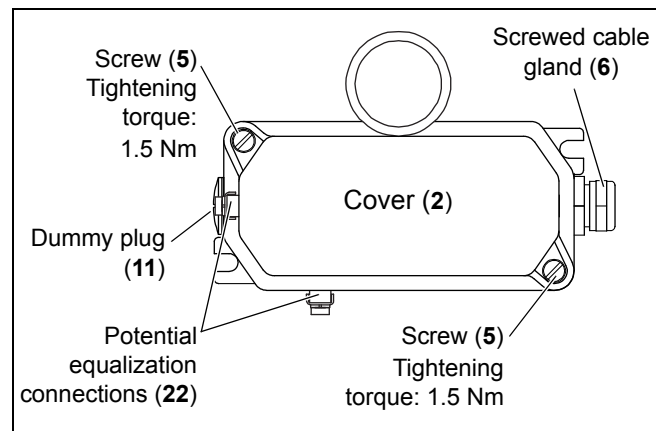


Fig. 5-8: Mounting the belt misalignment switch onto the conveyor

5.2.3 Adjusting the switch points

The factory setting for the switch points of the belt misalignment switches is 10° in both directions. The “Advance Warning” and “Switch Off” switch points can be adjusted as required.

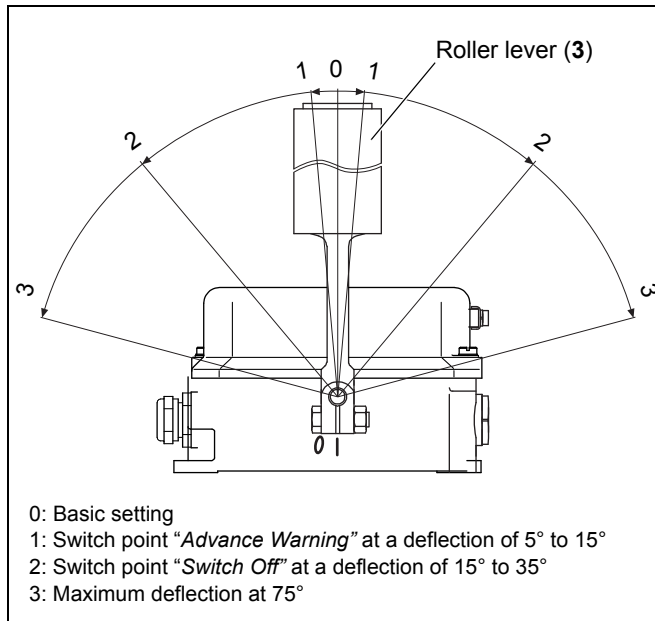


Fig. 5-9: Belt misalignment switch - switch points (adjustable)



Risk of explosion!

Never open the belt misalignment switch in an explosive, dust-polluted area.

The penetration of dust and moisture into the belt misalignment switch must be prevented at all costs. As required, remove any dust which has entered the unit.



Danger of fatal electric shock

Work on the device may be performed only by a qualified electrical technician.

Prior to working, switch off the power supply to the system. Ensure that the system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.

1. Prior to working, switch off the power supply to the system. Ensure that the conveyor system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.
2. If necessary, open the cover (2) of the belt misalignment switch by loosening the two screws (5) (see fig. 5-12).

 Note!

There are two screws (15) in each of the two cam disks (11) (see figure 5-10, page 24). With one screw (15), the cam disk (11) is fixed in its basic setting. The second screw (15) is screwed into the cam disk (11).

To adjust the cam disk (11), the first screw (15) is loosened just enough that the cam disk (11) can be turned. The screw (15) can remain in the device. After being adjusted, the cam disk (11) is fixed with the second screw (15).

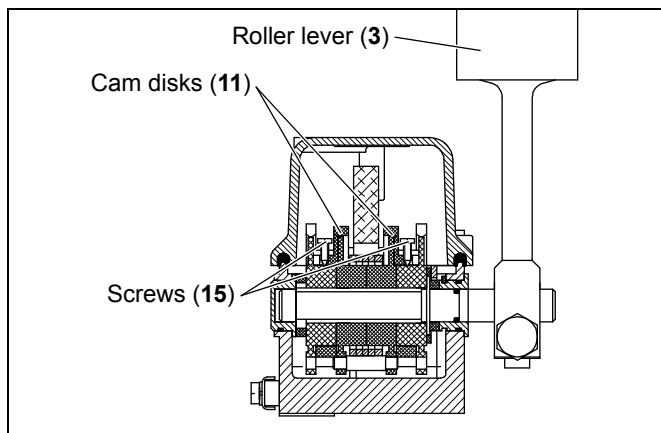


Fig. 5-10: Adjusting the switch points – Loosening screws in the cam disks

Especially with small changes in the setting, this prevents the cam disk (11) from being turned back to its original position when the screw (15) is tightened.

3. Adjust the switch point 1 (advance warning) (see figures 5-9 and 5-10):

Adjustment range: 5° to 15°

- a. Loosen the screw (15) in the cam disk (11) enough that you can turn the cam disk (11).
- b. Adjust the switch point 1 (advance warning) by turning the cam disk (11).
- c. Tighten the second screw (15) so that the cam disk (11) is fixed in the newly set position.

4. Adjust the switch point 2 (switch off):

Adjustment range: 15° to 35°

- a. Pry the cam (12) out of the cam disk (11) to obtain a larger adjustment range.
- b. Loosen the screw (15) in the cam disk (11) enough that you can turn the cam disk (11).
- c. Adjust the switch point 2 (switch off) by turning the cam disk (11).

5. Tighten the second screw (15) so that the cam disk (11) is fixed in the newly set position.
6. Check the set switch points.



Risk of explosion!

A device with a damaged gasket (23) must not be used. Remove any dust that may have entered the enclosure (1).

7. Check the gasket (23) of the cover (2) for damage (see fig. 5-11).

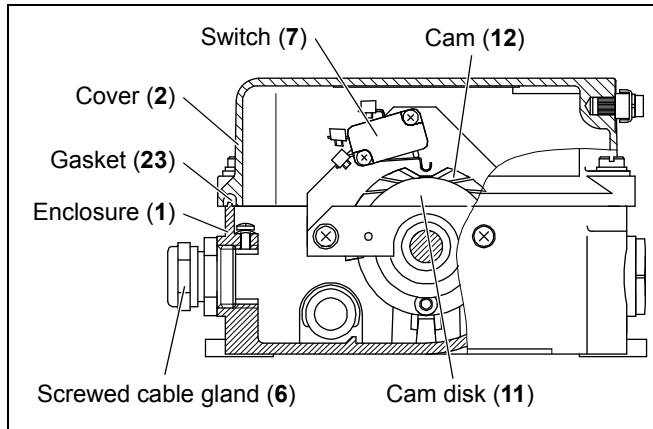


Fig. 5-11: Adjusting the switch points – Prying out the cam

8. Close the cover (2) of the belt misalignment switch.
9. Secure the cover (2) with the screws (5) (see fig. 5-12).
10. Tighten the screws (5) **evenly** with a **tightening torque of 1.5 Nm**.
11. Commission the belt misalignment switch (see section 5.2.4: “Commissioning”, page 26).

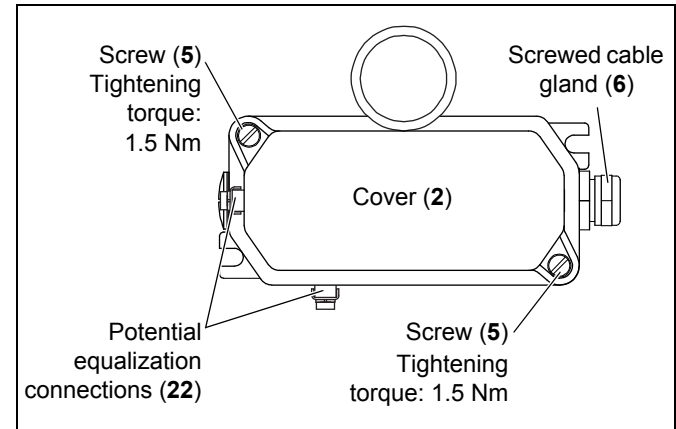


Fig. 5-12: Mounting the belt misalignment switch onto the conveyor

5.2.4 Commissioning

Risk of explosion!

The belt misalignment switch should only be commissioned if the device is free of dust and moisture.

1. Before commissioning the belt misalignment switch, ensure that it is sealed:
 - Ensure that the screws (5) on the cover (2) are tightened with a **tightening torque of 1.5 Nm**.
 - Check that the screwed cable gland (6) is tightened with a **tightening torque of 6.7 Nm**.

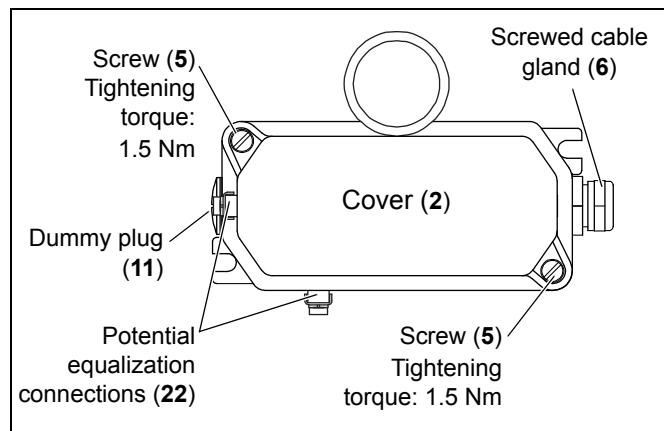


Fig. 5-13: Commissioning the belt misalignment switch

- Check that the dummy plug (11) is fastened tightly.

Risk of explosion!

Damaged belt misalignment switches or damaged components (e. g. screw connections, gaskets) are not to be used in explosion hazard areas. Always replace damaged belt misalignment switches.

2. Check the entire belt misalignment switch and its components for damage.

5.3 Dismounting



Risk of explosion!

Never open the belt misalignment switch in an explosive, dust-polluted area.
Open the belt misalignment switch only after it is de-energized.



Danger of fatal electric shock

Work on the device may be performed only by a qualified electrical technician.
Prior to working, switch off the power supply to the system. Ensure that the system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.

1. Prior to working, switch off the power supply to the system. Ensure that the conveyor system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.
2. Loosen the potential equalization connections (22) on the cover (2) and the enclosure (1) (see *fig. 5-13*).
3. Open the cover (2) by loosening the two screws (5).

4. Remove the screwed cable gland (6).
5. Disconnect all electrical connections and pull the cables out of the screwed cable gland (6).
6. Loosen both M 8 screws (4) that fasten the belt misalignment switch through the slotted holes (10) to the conveyor belt system (see *figure 5-3, page 19*) and remove the belt misalignment switch.

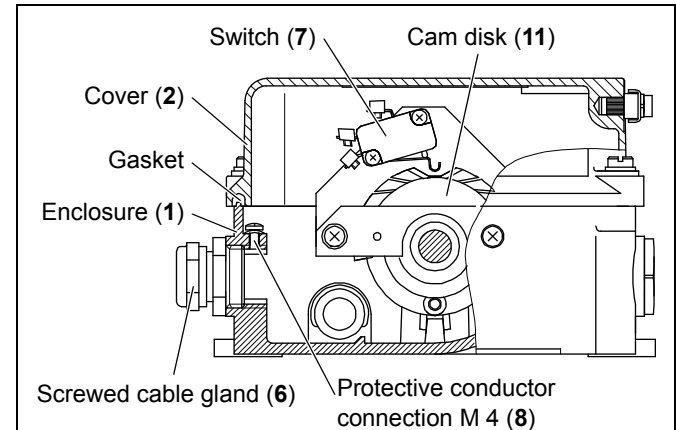


Fig. 5-14: Dismounting the belt misalignment switch from the conveyor

6 Maintenance

Check the belt misalignment switch at regular intervals (approximately every three months) to make sure it is in order and functions without any problems.



Risk of explosion!

The belt misalignment switches are only to be used if the devices are free of dust and moisture.



Risk of explosion!

Damaged belt misalignment switches or damaged components (e. g. screw connections, gaskets) are not to be used in explosion hazard areas!

Always replace damaged belt misalignment switches.

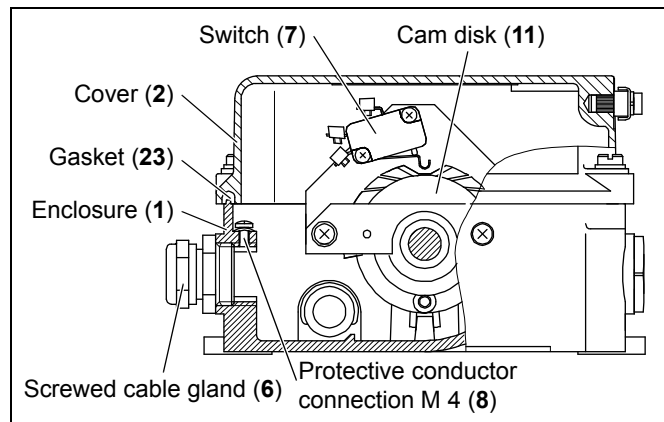


Fig. 6-1: Checking the belt misalignment switch

7 Repairs

7.1 Replacing the roller lever



Danger of fatal electric shock

Work on the device may be performed only by a qualified electrical technician.

Prior to working, switch off the power supply to the system. Ensure that the system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.

1. Prior to working, switch off the power supply to the system. Ensure that the conveyor system cannot be accidentally switched on. Mask any neighboring components that may be live to prevent contact.
2. Loosen the nuts (9) using a 16 mm open-end wrench and remove the roller lever (3) from the shaft (14) (see fig. 7-1).
3. Fit the new roller lever (3) onto the shaft (14).

In order to minimize new roller lever (3) wear, mount the roller lever (3) in such a way that it is located approximately 10 to 20 mm in front of the belt edge (see fig. 5-2).



Beware!

When tightening the nut (9), make sure the distance to the cover (2) is sufficient for the roller lever (3) not to come into contact with the cover (2) when the roller lever (3) is moving.

4. Set the roller lever (3) to the required position and tighten the self-locking nut (9) using a 16 mm open-end wrench.

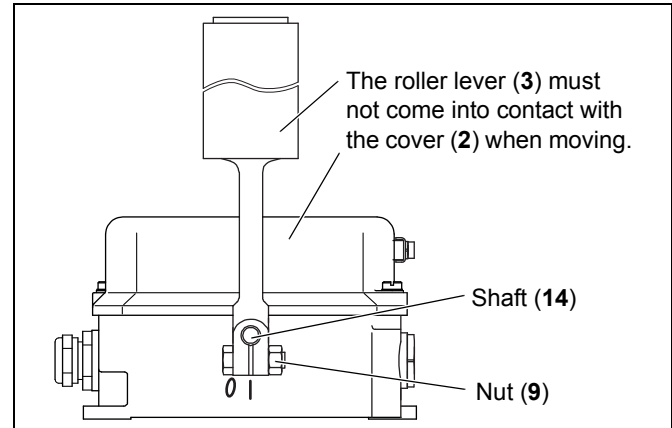


Fig. 7-1: Replacing the roller lever

8 Ordering devices, replacement parts and accessories

8.1 Ordering devices

Please provide the following data with every order (see *legal notice for company address*):

- 1. Belt misalignment switch model**
(see *rating plate on enclosure*):
e. g. HESEX 011

- 2. Product number** (see *rating plate on enclosure cover*): e. g. 92.058 645.011 (see *section 4.2, page 13*).

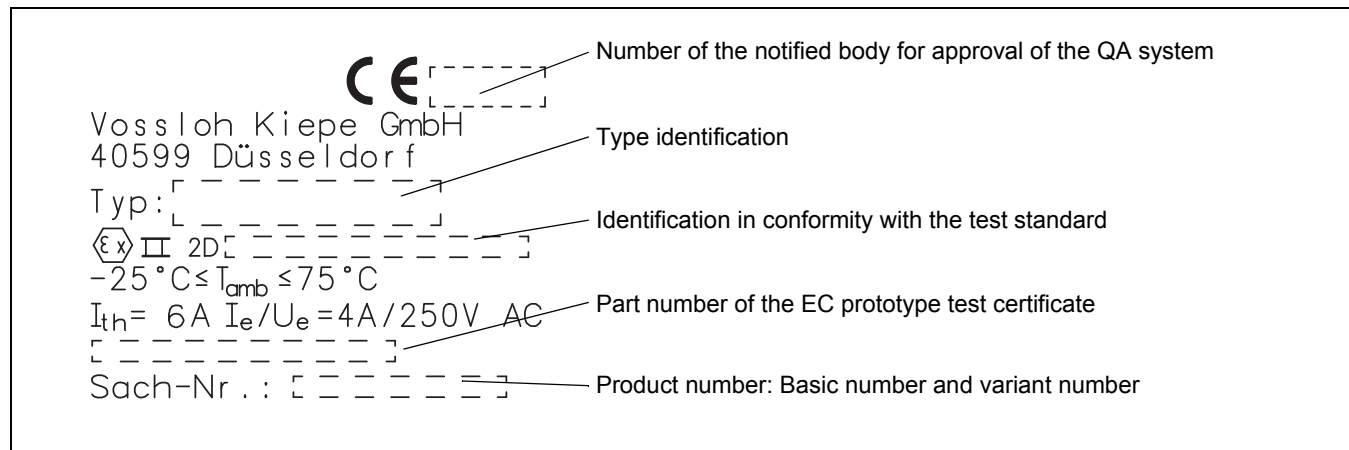


Abb. 8-1: Printed image

8.2 Ordering replacement parts and accessories

Please provide the following data with every order (see reverse for address):

1. **Belt misalignment switch model** (see rating plate on enclosure):
e. g. HESEX 011
2. **Product number** (see rating plate on enclosure cover): e. g. 92.058 645.011 (see section 4.2, page 13)
3. **Order information and order number:** (see table)

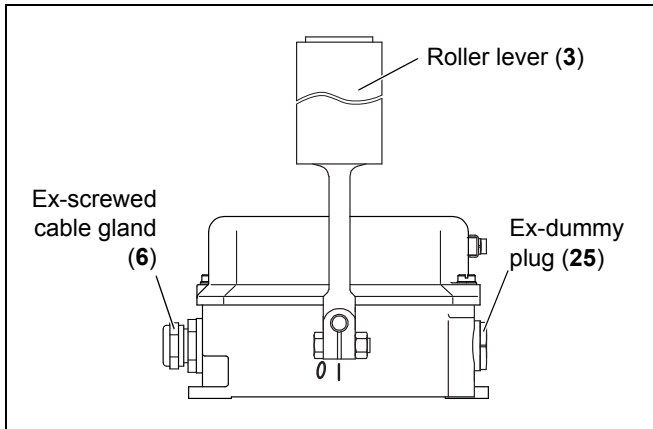


Fig. 8-2: Replacement parts and accessories

Item	Order information	Order number
3	Control lever with roller (roller lever)	93.058 650.001
6	Ex-screwed cable gland	113.52.01.20.01
25	Ex-locking screw (dummy plug)	113.52.87.20.01



Warning!

The device must only be operated when all three holes are closed with the supplied screwed cable gland (6) and the dummy plug (25).

Use only screwed cable glands (6) and dummy plugs (25) recommended by the manufacturer and supplied with the device. These screwed cable glands (6) and dummy plugs (25) are designed in compliance with EU design sample test certification. If other screwed cable glands (6) and dummy plugs (25) are used, the device type approval may be rendered void.

www.kiepe-elektrik.com

Vossloh Kiepe GmbH
Kiepe-Platz 1
40599 Düsseldorf
Germany

Tel.: +49 (0) 211 / 74 97 – 0
Fax: +49 (0) 211 / 74 97 – 420
E-mail: info@vkd.kiepe-elektrik.com