Installation and Operational Instructions for EAS®-clutches Sizes 0 – 9

(B.4.0.EN)

Please read these Operational Instructions carefully and follow them accordingly!
Ignoring these Instructions may lead to malfunctions or to clutch failure, resulting in damage to other parts.

Contents:

Safety and Guideline Signs

CAUTION

Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

Safety Regulations

These Installation and Operational Instructions (I + O) are part of the clutch delivery.
Please keep them handy and near to the clutch at all times.

It is forbidden to start initial operation of the product until you have ensured that all applicable EU directives and directives for the machine or system, into which the product has been installed, have been fulfilled.
At the time these Installation and Operational Instructions go to print, the EAS®-clutches accord with the known technical specifications and are operationally safe at the time of delivery.
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the ATEX directive.

CAUTION

- ❒ If the EAS®-clutches are modified.
- ❒ If the relevant standards for safety and / or installation conditions are ignored.

User-implemented Protective Measures

- ❒ Cover all moving parts to protect against seizure, dust impacts or foreign body impact.
- ❒ The clutches may not be put into operation without a limit switch unless *mayr*® has been contacted and has agreed otherwise.

To prevent injury or damage, only specialist personnel are allowed to work on the components. They must be familiar with the dimensioning, transport, installation, initial operation, maintenance and disposal according to the relevant standards and regulations.
Please read the Installation and Operational Instructions carefully prior to installation and initial operation of the device.

These Safety Regulations are user hints only and must not be complete!

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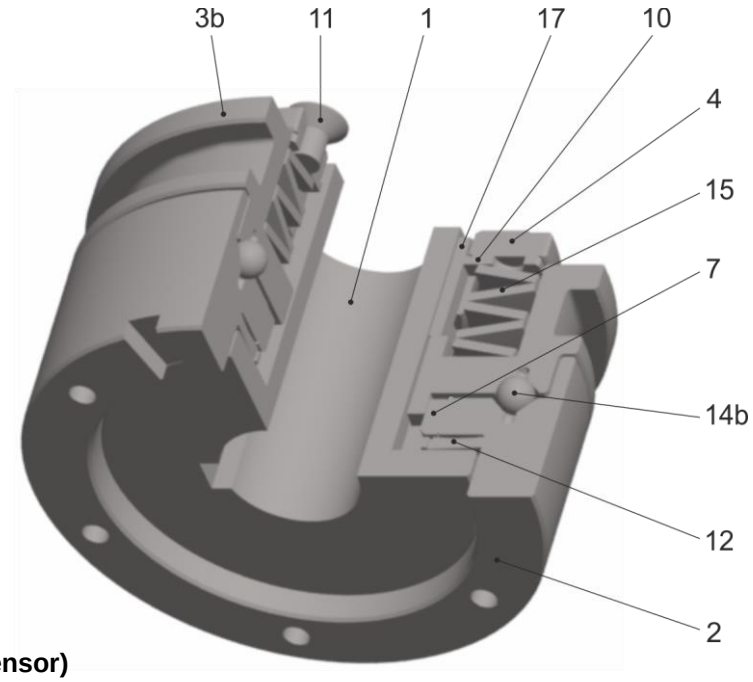

Fig. 1 (EAS®-torque sensor)

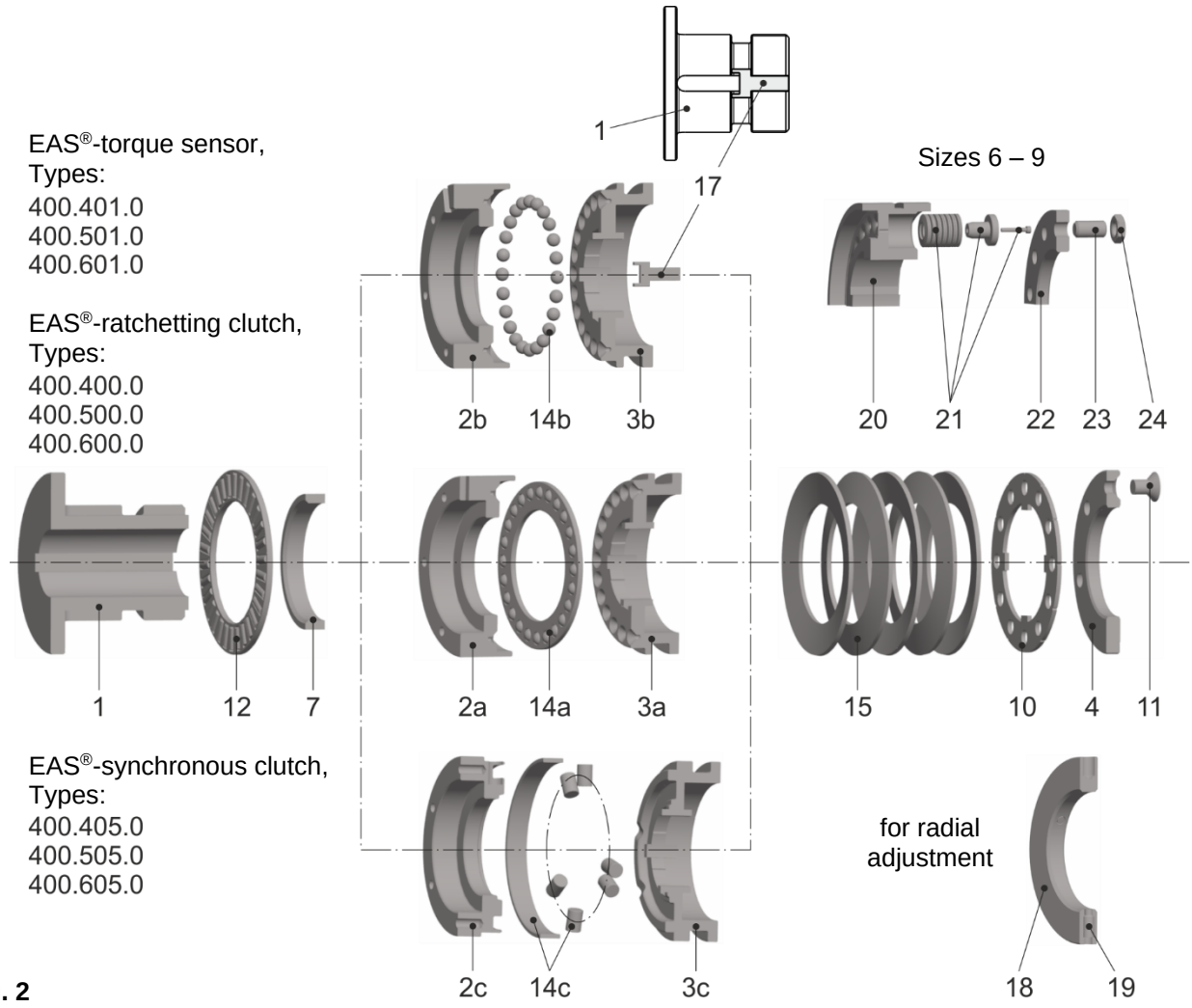

Fig. 2

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Parts List (Only use *mayr*® original parts)

Item	Name
1	Hub
2a	Pressure flange (ratchetting design)
2b	Pressure flange (torque sensor design)
2c	Pressure flange (synchronous design)
3a	Control element (ratchetting design)
3b	Control element (torque sensor design)
3c	Control element (synchronous design)
4	Adjusting nut (standard)
7	Bushing
10	Lock washer
11	Locking screw
12	Axial needle bearing (steel balls for Sizes 0 and 6 – 9)

Item	Name
14a	Ball cage assembly with steel balls (ratchetting design)
14b	Steel balls (torque sensor design)
14c	Cylinder roller with cover (only assembly with pressure flange)
15	Cup springs
17	Clamping piece
18	Adjusting nut for radial adjustment
19	Set screw
20	Control element (Sizes 6 – 9)
21	Cup spring pack with thrust piece (Sizes 6 – 9)
22	Adjusting nut (Sizes 6 – 9)
23	Set screw
24	Counter nut

Boring the Hub

For this procedure, the clutch must be dismantled.
While boring the hub, please observe the maximum permitted bore diameter, the specified keyway shape (see catalogue) and the permitted radial run-out (radial run-out: bore to hub diameter).
Offset the keyway by 45° to the hub outer keyway.
Radial run-out for Sizes 0 – 6 = 0.05 mm,
radial run-out for Sizes 7 – 9 = 0.08 mm.

Clutch De-installation

1. Remove the adjusting nut

a) On standard adjusting nut (4)

- Remove the locking screw (11)
- Screw out the adjusting nut (4) from the hub (1)
- Remove the lock washer (10) from the hub (1)

a) On adjusting nut (18) for radial adjustment

- Remove the set screw (19)
- Screw out the adjusting nut (18) from the hub (1)

c) On Sizes 6 – 9

- Loosen the counter nut (24)
- Reposition the set screws (23)
- Screw out the adjusting nut (22) from the hub (1)

2. Take the cup springs (15) out of the control element (3). This is not necessary from Size 6 upward. Please observe the cup spring layering for later installation.

3. Remove the control element (3) from the hub (1) (on the EAS®-torque sensor, Sizes 1 – 5, please take out the clamping pieces (17) first).

On the EAS®-torque sensor, the steel balls (14b) lie loose between the control element (3) and the pressure flange (2).

4. Remove the pressure flange (2) from the hub (1).

On Size 0 and on Sizes 6 – 9, steel balls lie between the hub collar and the pressure flange (2) instead of the axial needle bearing (12).

5. Remove the bushing (7) and the axial needle bearing (12) or the steel balls from the hub (1).

Clutch Assembly

To assemble the clutch, please follow the instructions for disassembly or the exploded drawing (Fig. 2) backwards.
It may be necessary to re-grease components which have been greased manufacturer-side.

Permitted Ambient Temperature

-20 °C to +80 °C

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Installation of the Drive Elements

On the EAS® design with short bearing-supported hub and the EAS® design with long protruding hub, the drive elements are installed onto the clutch hub and screwed together with the EAS®-clutch pressure flange (2). Afterwards, the clutch is mounted onto the shaft using a suitable device.

On EAS® flange designs, the drive element with bearing is installed onto the shaft, then the clutch is attached to the shaft and screwed to the drive element, see Figs. 3 and 4.
For operation in impact and vibrating conditions, an additional transverse key should be fitted between the drive element and the pressure flange.

Please observe the following for all EAS® designs:

- ❑ Do not install the clutch by hammering it.
- ❑ Install the clutch so that it is axially backlash-free, e.g. using a press cover, Fig. 4 (for limit switch accuracy).
- ❑ Do not exert any axial pressure on the clutch, e.g. through offset chain tension or axial distortion during installation of the drive element, Fig. 4.
- ❑ The resulting radial force on the drive element should be on the bearing level in order to avoid tilting of the drive element and therefore the pressure flange (2) (Fig. 5).

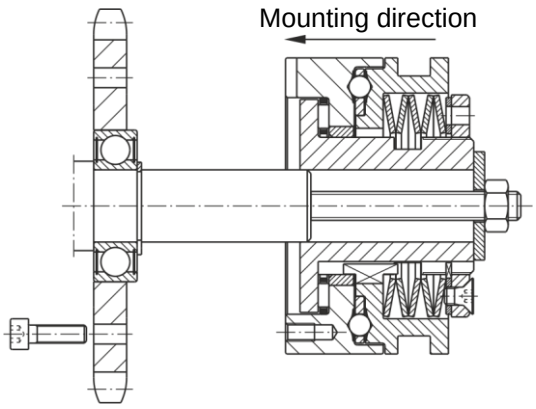

Fig. 3

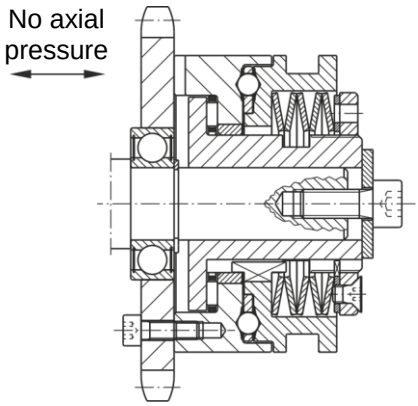

Fig. 4

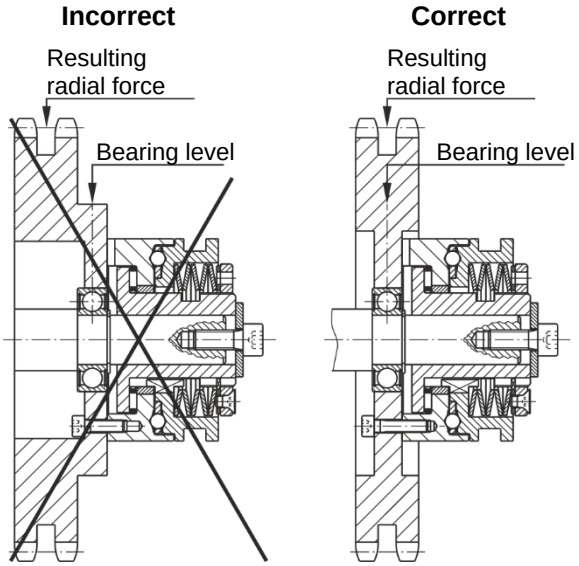

Fig. 5

Removing the Clutch

Depending on the installation position, please use either the tapped holes in the adjusting nut or in the pressure flange in order to remove the clutch.
On the EAS® flanged design, the drive element has to be screwed off before removing it from the pressure flange, Fig. 6.

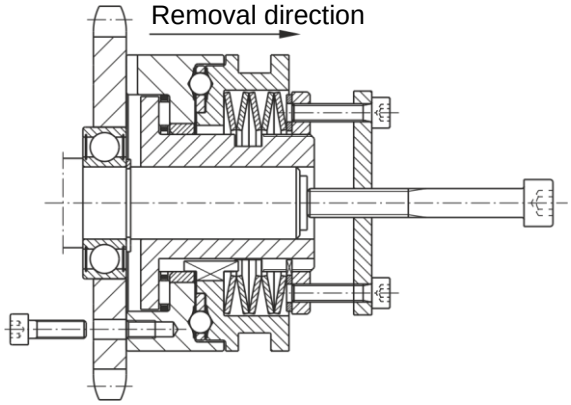

Fig. 6

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Limit Switch Installation

The switching direction of the mechanical limit switch faces in the direction of the adjusting nut or in the stroke direction of the control element, Fig. 7.
Adjust the switch distances for the mechanical and contactless limit switches acc. Fig. 7 or Fig. 8.
The axial dimension 0.5 mm or 1.5 mm (distance of the control element (3) to the switching point) can be adjusted using a hexagon head screw, wrench opening 7 (Fig. 7 or Fig. 8).

Mechanical Limit Switch

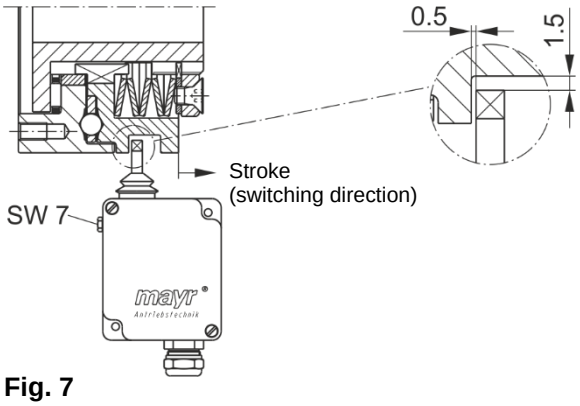


Fig. 7

Contactless Limit Switch

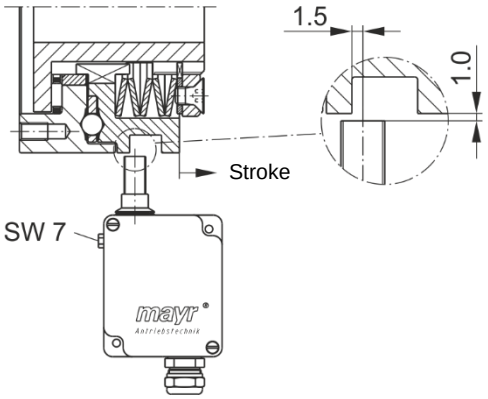


Fig. 8

Cup Spring Layering

Correct cup spring layering is a prerequisite for problem-free clutch function. Only the manufacturer-side installed cup spring layering guarantees that the torques specified in the catalogue can be achieved and that the torque can be adjusted problem-free.
Please see section “Torque Ranges” and Fig. 9 for the correct cup spring layering. The cup spring layering depends on the clutch size and type.

Torque Ranges

Type 400.4_ _._: Torque range up to 25% of maximum torque
Type 400.5_ _._: Torque range up to 50% of maximum torque
Type 400.6_ _._: Torque range up to maximum torque

Size 0

Type 400.4_ _._:	thin cup spring	6 x single layer
Type 400.5_ _._:	thick cup spring	6 x single layer
Type 400.6_ _._:	thick cup spring	4 x double layer

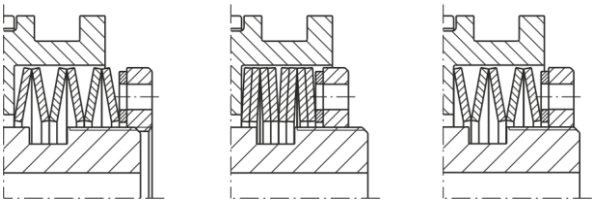
Sizes 1 – 5

Type 400.4_ _._:	thin cup spring	6 x single layer
Type 400.5_ _._:	moderately thick cup spring	5 x single layer
Type 400.6_ _._:	thick cup spring	5 x single layer

Sizes 6 – 9

The difference between the 3 torque ranges is the number of cup spring packs:

Type 400.4_ _._:	3 cup spring packs
Type 400.5_ _._:	6 cup spring packs
Type 400.6_ _._:	9 cup spring packs (on Sizes 7 – 9) 10 cup spring packs (on Size 6)



6 x single layer **4 x double layer** **5 x single layer**

Fig. 9: Cup Spring Layering

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Torque Adjustment Sizes 0 – 5

If no particular torque adjustment is requested customer-side (or for pilot bored clutches), the EAS® clutches will be delivered without adjustment.
Torque adjustment is carried out by turning the adjusting nut. Turning clockwise causes an increase in torque, turning anti-clockwise causes a reduction in torque (facing the adjusting nut, as shown in Fig. 10).

Standard adjusting nut
After clutch installation, the torque is adjusted as follows:

1. Grease the thread and contact surfaces on the adjusting nut (4), the lock washer (10) and the hub (1).
2. The adjusting nut (4) is adjusted by hand up to contact on the cup springs.
3. Continue to turn until the 4 notches on the adjusting nut (4) and the notches in the control element (3) align, Fig. 10.
4. Turn the adjusting nut (4) further using a face wrench to the number of graduation lines which equal the required torque, Fig. 10 (number of graduation lines in the Adjustment Diagram).
5. Screw in the locking screw (11) (the notches on the adjusting nut (4) and on the control element (3) must be in the same position).

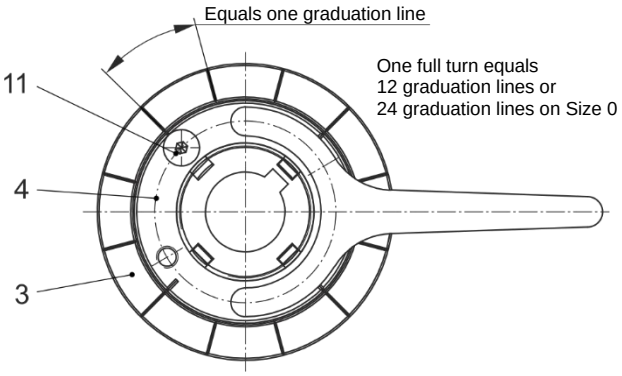

Fig. 10

Changing the torque:

The overload torque on the clutch is adjusted to 300 Nm.
The overload torque should now be increased to 350 Nm.

If an overload torque of 300 Nm is achieved with 36 graduation lines and 350 Nm is achieved with 46 graduation lines according to the torque Adjustment Diagram, the adjusting nut (4) must be moved in a clockwise direction by 10 graduation lines.

To do this, please remove the locking screw (11) and adjust the graduation lines using a face wrench, Fig. 10. Afterwards, the locking screw (11) is screwed in again. Here it is essential to ensure that the 4 notches on the adjusting nut (4) and the notches of the control element (3) are aligned.

Adjusting nut for radial adjustment
On this design, the control element (3) must be shortened. Please contact the manufacturers if retrofitting is necessary. Adjustment takes place using a hook wrench, see Fig. 11.

Adjusting the torque:

1. Remove the set screw (19).
2. Determine dimension “a” using the Adjustment Table, according to the required torque.
3. Adjust dimension “a” by turning the adjusting nut (18) according to Fig. 12.
4. If necessary, correct the adjustment until a threaded hole for the set screw (19) meets one of the 4 hub keyways.
5. Screw the set screw (19) into the hub keyway.

The hub and the adjusting nut are positively locked via the set screw. Clamping onto the hub thread, as shown on Fig. 13, is not allowed.

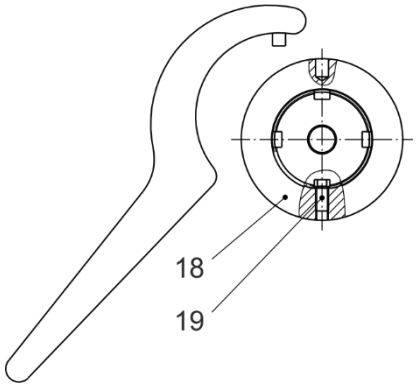

Fig. 11

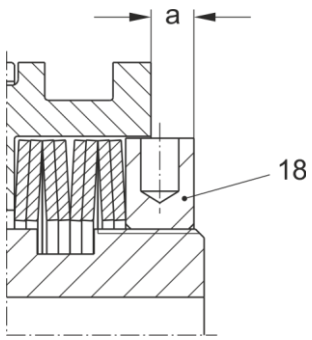

Fig. 12

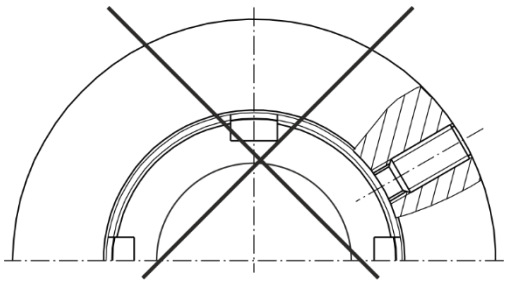

Fig. 13

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Torque Adjustment Sizes 6 – 9

On these sizes, no central cup springs are installed. Instead, individual cup spring packs with a thrust piece (21) are installed, with 3, 6 or 9 packs depending on the Type.

Adjusting the torque:

1. Loosen the counter nut (24).
2. Reposition the set screws (23), Fig. 14.
3. Tighten the adjusting nut (22) so that it is flush with the hub front face, see Fig. 15..
4. Screw out one set screw (23).
5. Align the adjusting nut (22), until the set screws (23) are in the same position as the cup spring packs with the thrust piece (21), Fig. 16
6. All set screws (23) should be screwed to the same depth according to dimension “a”, according to the required torque, see Adjustment Diagram and Fig. 15.
7. Lock the set screws (23) with counter nuts (24) against loosening.

The set screws lie in the recesses of the thrust pieces. This positive locking connection stops the adjusting nut from turning.

CAUTION

If the set screws are screwed in too deeply (springs are pressed together to their minimum length), the clutch cannot function.

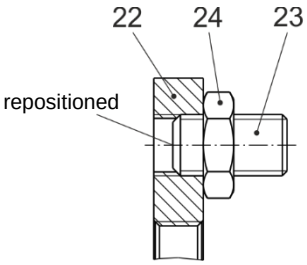

Fig. 14

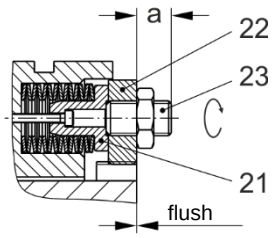

Fig. 15

Maintenance

EAS®-clutches have a grease filling and therefore require no greasing for the rest of their service lifetime. The axial backlash on the clutch-supporting shaft should be inspected at regular intervals. Too much bearing backlash can misalign the clutch axially. This leads to changes in switch distance and therefore to changes in the disengaging torque. Apart from this, the EAS®-clutch needs no further maintenance. Special maintenance work may be necessary, however, if the device is subject to large amounts of dirt or dust or is operating in extreme ambient conditions. In this case, please contact the manufacturers.

Disposal

Electronic components
(Limit switch):
Products which have not been disassembled can be disposed of under Code No. 160214 (mixed materials) or components under Code No. 160216, or can be disposed of by a certified disposal firm.

All steel components:
Steel scrap (Code No. 160117)

Seals, O-rings, V-seals, elastomers:
Plastic (Code No. 160119)

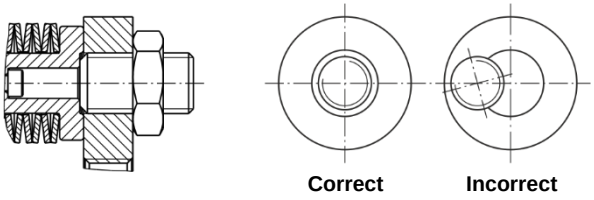

Fig. 16

Malfunctions / Breakdowns

Type of Malfunction:	Possible Cause:
Uneven running, bearings overheat during running	Axial pressure on the drive element; the resulting radial force on the drive element does not lie in the bearing level.
Clutch does not disengage on overload	Torque set too high; cup springs layered incorrectly; axial pressure of the drive element higher than the cup spring pre-tension.
Clutch disengages too early	Torque set too low; large amount of wear on the ball or roller recesses.
Clutch does not switch on overload or switches too late	Limit switch set incorrectly.
Control element (3) constantly performs axial movements during operation	Torque on clutch set too low (the difference between the operating torque and the overload torque is too low); low-energy torque peaks (please contact the manufacturers).

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