

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_5. Sizes 0 – 3 (B.4.14.5.GB)

**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.

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## Safety and Guideline Signs

### CAUTION



Danger of injury to personnel and damage to machines.



**Please Observe!**  
Guidelines on important points.



According to German notation, decimal points in this document are represented with a comma (e.g. 0,5 instead of 0.5).

## 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 use 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<sup>®</sup>-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<sup>®</sup>-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 or foreign body impact.
- The clutch may not be put into operation without a limit switch unless *mayr*<sup>®</sup> has been contacted and has agreed otherwise.

**To prevent injury or damage, only professionals and specialists should work on the devices, following the relevant standards and directives. Please read the Installation and Operational Instructions carefully before installation and initial operation of the device.**

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

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_5\_\_ Sizes 0 – 3 (B.4.14.5.GB)

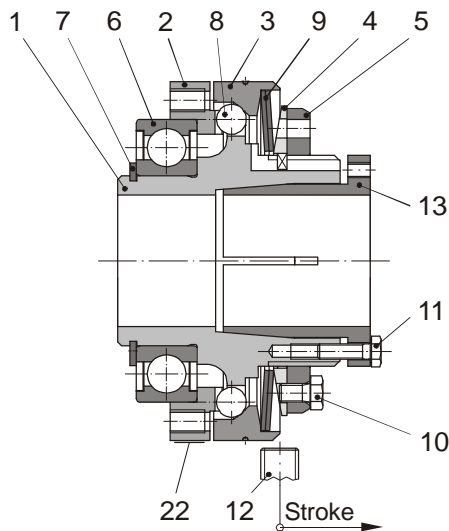


Fig. 1: Type 49A.615.0

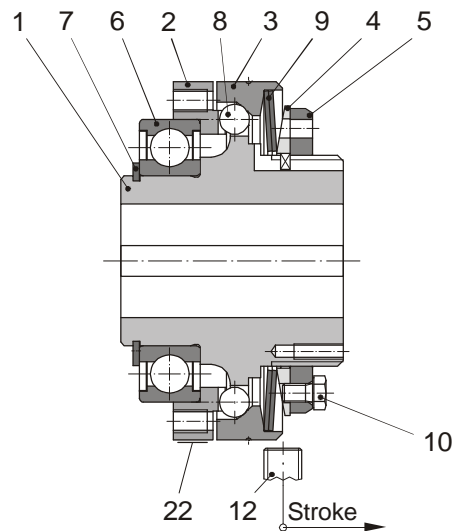


Fig. 2: Type 49A.625.0

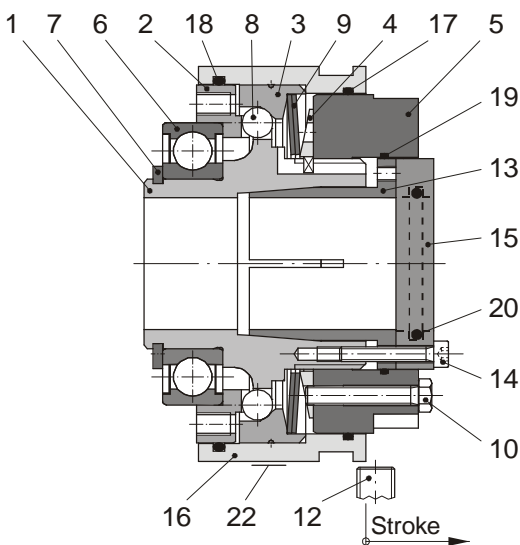


Fig. 3: Type 49A.615.C

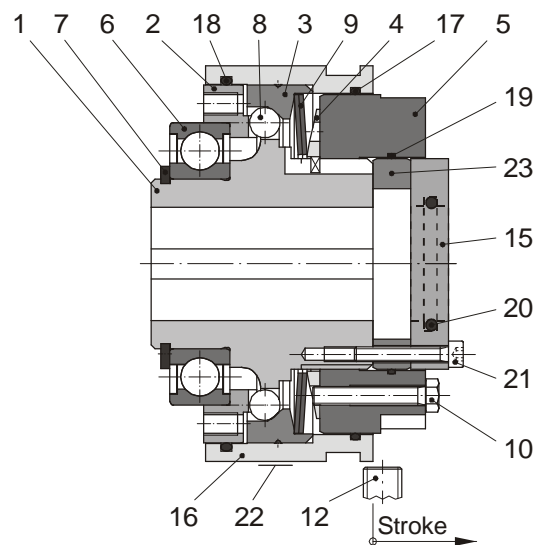


Fig. 4: Type 49A.625.C

## Parts List (Only use mayr<sup>®</sup> original parts)

Item	Name
1	Hub
2	Pressure flange
3	Thrust washer
4	Locking ring
5	Adjusting nut
6	Deep groove ball bearing
7	Locking ring
8	Steel ball

Item	Name
9	Cup spring
10	Hexagon head screw
11	Hexagon head screw
12	Limit switch
13	Cone bushing
14	Cap screw
15	Gauge cover
16	Sealing ring

Item	Name
17	O-ring
18	O-ring
19	O-ring
20	O-ring
21	Cap screw
22	Type tag
23	Hub extension



- The limit switch Item 12 is not included in the standard delivery.
- The hexagon head screw Item 10 must be secured using Loctite 243.

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_ 5. Sizes 0 – 3 (B.4.14.5.GB)

## Technical Data

Table 1:

Size	Limit torques for overload $M_G$			Max. speed [rpm]	Thrust washer stroke on overload (Item 3) [mm]	Hub bore (Item 1)	
	Type 49A.5_5_ [Nm]	Type 49A.6_5_ [Nm]	Type <sup>1)</sup> 49A.725_ [Nm]			Cone bushings design from - to [mm]	Key design from - to [mm]
0	10 – 25	20 – 50	40 – 100	3000	1,5	15 – 25	15 – 25
1	20 – 50	40 – 100	80 – 200	2500	1,8	22 – 35	22 – 30
2	40 – 100	80 – 200	160 – 400	2000	2,0	32 – 45	28 – 40
3	70 – 175	140 – 350	280 – 700	1200	2,2	35 – 55	32 – 50

<sup>1)</sup> Maximum torque range only for hubs with keyway.

Table 2:

Size	Type 49A.5_5.0		Type 49A.6_5.0		Type 49A.725.0	
	Maximum torque $M_G$ [Nm]	Inspection dimension "a" (Fig. 7) at approx. 70 % $M_G$ [mm]	Maximum torque $M_G$ [Nm]	Inspection dimension "a" (Fig. 7) at approx. 70 % $M_G$ [mm]	Maximum torque $M_G$ [Nm]	Inspection dimension "a" (Fig. 7) at approx. 70 % $M_G$ [mm]
0	25	5,9	50	6,9	100	8,9
1	50	5,8	100	7,0	200	9,4
2	100	7,9	200	9,3	400	12,1
3	175	7,0	350	8,8	700	12,5

Table 3:

Size	Type 49A.5_5.C		Type 49A.6_5.C		Type 49A.725.C	
	Maximum torque $M_G$ [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % $M_G$ [mm]	Maximum torque $M_G$ [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % $M_G$ [mm]	Maximum torque $M_G$ [Nm]	Inspection dimension "a" (Fig. 10) at approx. 70 % $M_G$ [mm]
0	25	9,4	50	10,4	100	12,4
1	50	11,8	100	13,0	200	15,4
2	100	10,9	200	12,3	400	15,1
3	175	16,5	350	18,3	700	22,0

Table 4:

Size	Thread in the pressure flange (Item 2)	Max. screw-in depth in the pressure flange (Item 2) [mm]	Connection dimensions (Fig. 2, page 4)		Max. permitted		
			a <sup>+0,1</sup> [mm]	e <sup>3)</sup> [mm]	Axial forces [N]	Radial forces [N]	Transverse force torques <sup>2)</sup> [Nm]
0	8 x M5	7	7	62 h5	1000	1000	10
1	8 x M6	9	9	75 h5	1500	1500	20
2	8 x M6	10	10	90 h5	2400	2400	30
3	8 x M8	12	10	100 h5	4200	4200	40

<sup>2)</sup> Torques, which put strain on the deep groove ball bearings due to the non-centric axial forces having an effect on the pressure flange.

<sup>3)</sup> User-side tolerance H7

Table 5:

Size	Screw tightening torques [Nm]				
	Item 10 on Type 49A. __ 5.0	Item 10 on Type 49A. __ 5.C	Item 11	Item 14	Item 21
0	2	2	2,7	2,9	2,9
1	1,9	4,1	2,7	2,9	2,9
2	3,3	3,3	5,4	5,8	5,8
3	3,3	3,3	9,5	10,1	10,1

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_5. Sizes 0 – 3 (B.4.14.5.GB)

## Design

The EAS<sup>®</sup>-Compact<sup>®</sup> clutch is designed as a mechanical disengaging overload clutch according to the ball detent principle.

EAS<sup>®</sup>-Compact<sup>®</sup> clutch in rustproof design:

- EAS<sup>®</sup>-Compact<sup>®</sup>-R clutch (Type 49A.\_\_5.0) completely made of rustproof stainless steel. The cup springs have a high-quality corrosion protection.
- EAS<sup>®</sup>-Compact<sup>®</sup>-RA clutch (Type 49A.\_\_5.C) completely rustproof, enclosed in a rustproof cover.

## State of Delivery

The clutch is manufacturer-assembled and set to the torque stipulated in the order.

Unless the customer requests a particular torque setting, the clutch will be pre-set and calibrated to approx. 70 % of the maximum torque.

The hexagon head screw (10) is not secured with Loctite on a calibrated clutch. Before initial operation of the clutch, please secure the locking screw (10) with Loctite 243.

**Please check state of delivery!**

## Function

The clutch protects the drive line from excessively high, unpermitted torque impacts which can occur due to unintentional blockages.

## Function in Normal Operation

The EAS<sup>®</sup>-Compact<sup>®</sup> clutch transmits the torque from the input shaft onto the output element, which can be mounted onto the ball bearing supported pressure flange (2) of the clutch.

The torque is transmitted backlash-free over the entire service lifetime of the clutch.

## Function on Overload

If the set limit torque is exceeded (overload), the clutch disengages, the thrust washer (3) carries out an axial stroke movement, a customer-side mounted limit switch (12) recognizes this stroke movement and emits a signal to switch off the drive. The residual torque is approx. 5 to max. 15 % of the set torque. Therefore, the EAS<sup>®</sup>-Compact<sup>®</sup> clutch is not load-holding. Once the overload has been removed, the clutch is ready for operation again after reaching an engagement position.

## Re-engagement:

The ratchetting pitch of the EAS<sup>®</sup>-Compact<sup>®</sup> synchronous clutch Type 49A.\_\_5. is 360°

## Installation of the Output Elements (Fig. 5)

The output elements are centred on the deep groove ball bearing (6) (tolerance H7/h5) and screwed together with the pressure flange (2).



Please observe the maximum screw-in depth in the pressure flange (2) acc. Table 4, page 3.



Please observe the connection dimensions "a" and "e" for the output elements acc. Fig. 5 and Table 4, page 3.

If the resulting radial force from the output element is anywhere near the centre of the ball bearing and under the max. permitted radial load acc. Table 4, an additional bearing for the output element is not necessary.

**No appreciable axial forces (see Table 4) should be transferred from the output element onto the clutch pressure flange (2).**

On very small diameters, the output element is screwed together with the clutch pressure flange (2) via a customer-side intermediate flange.

Ball bearings, needle bearings or bearing bushings are suitable as bearings for the output element, depending on the installation situation and the installation space.

Please make sure that the output element bearing is designed as a **location bearing** (Fig. 5).

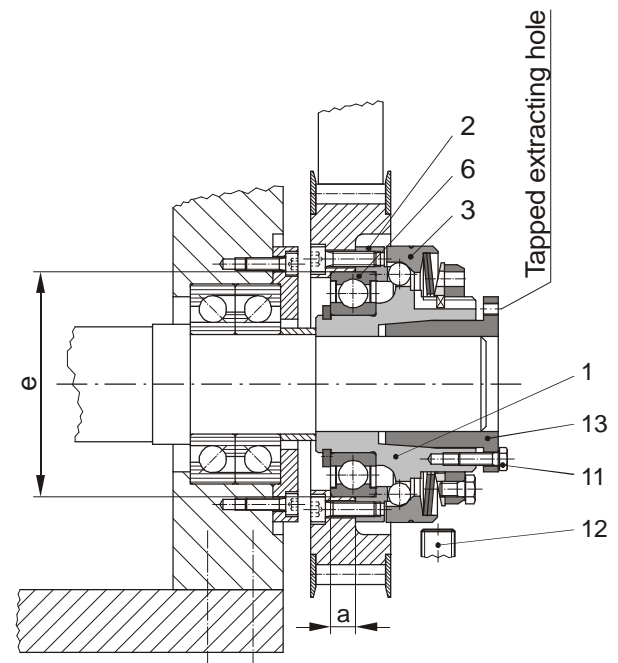


Fig. 5

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_ 5. Sizes 0 – 3 (B.4.14.5.GB)

## Mounting onto the Shaft

EAS<sup>®</sup>-Compact<sup>®</sup> clutches include manufacturer-installed cone bushings or keyways as part of the standard delivery.

**Please observe the following when mounting cone bushings:**

- ❑ Shaft tolerances  
Up to diameter 38 h6 to k6  
Over diameter 38 h8 to k6
- ❑ Shaft surface:  
finely turned or ground (Ra = 0,8 µm)
- ❑ Shaft material: yield point at least 350 N/mm<sup>2</sup>,  
e.g. St 60, St 70, C 45, C 60.
- ❑ Degrease or remove preservation layers on the shafts and bores before installing the clutch or the clutch hubs.  
**Greasy or oily bores or shafts do not transmit the torque T<sub>R</sub> specified on order.**
- ❑ Mount the clutch onto the shaft using a suitable device and bring it into the correct axial position.
- ❑ **The gauge cover (Item 15, Type 49A. \_\_ 15.C) must not be turned as otherwise the calibration will be incorrect.**
- ❑ Tighten the tensioning screws in steps (in 3 to max. 6 tightening sequences) and cross-wise evenly using a torque wrench to the torque stated in Table 5.



The clutch carries out an axial movement in the direction of the cone bushing (13) when tightening the cone bushing (13).

## De-installation on Type 49A. \_\_ 15. \_\_

In the cone bushing, tapped extracting holes are located next to the tensioning screws (11 or 14).

1. Loosen all tensioning screws (11) by several thread turns.  
**On Type 49A. \_\_ 15.C:** Screw out all tensioning screws (14) and remove the gauge cover (15).



Please observe the position of the marking grooves of the gauge cover (15) to the adjusting nut (5), and keep to these positions on re-installation.

2. Screw out the tensioning screws located next to the tapped extracting holes and screw them into the tapped extracting holes up to their limits.
3. Tighten the tensioning screws (11 or 14) evenly and in steps so that the cone bushing (13) is loosened from the hub.
4. Screw the tensioning screws out of the tapped extracting holes.

## Shaft Installation via Key Connection

On the EAS<sup>®</sup>-Compact<sup>®</sup> with keyway, the clutch must be secured axially after mounting onto the shaft, e.g. using a press cover and a screw screwed into the shaft threaded centre hole and/or a set screw.



The gauge cover (Item 15, Type 49A. \_\_ 25.C) must not be turned as otherwise the calibration will be incorrect.

## Cup Spring Layering

Correct cup spring layering is a prerequisite for problem-free clutch function and torque adjustment.

On all sizes, the lower torque range has **one** cup spring (Type 49A.5\_5.\_), the medium torque range has **two** cup springs (Type 49A.6\_5.\_) and the high torque range (not possible on designs with cone bushing) has **four** cup springs (Type 49A.725.\_), see Fig. 6.

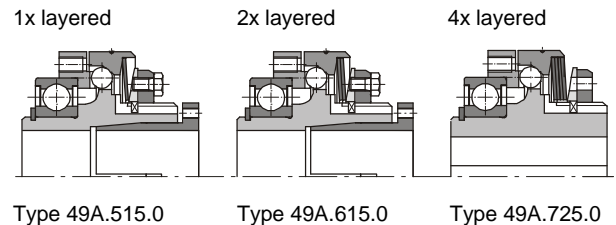


Fig. 6

## Torque Adjustment

In order to guarantee low-wear clutch operation, it is essential to adjust the torque to a sufficiently high service factor (overload torque to operating torque). Our experience has shown that an adjustment factor of 1,3 to 3 gives good results. For very high load changes, high accelerations and uneven operation, please set the adjustment factor higher.

The respective torque adjustment range is printed onto the Type tag (22). Torque adjustment is carried out by turning the adjusting nut (5). The installed cup springs (9) are operated in the negative range of the characteristic curve (see Fig. 9). This means that tightening the adjusting nut (5) causes the spring force to decrease, and loosening the adjusting nut (5) causes the spring force to increase.

If no particular torque adjustment is requested customer-side, the clutch will always be **pre-set** and **marked** (calibrated) manufacturer-side to approximately 70 % of the maximum torque.



Turning the adjusting nut (5) clockwise causes a reduction in torque.  
Turning it anti-clockwise causes an increase in torque.  
You should be facing the adjusting nut (5) as shown in Fig. 8 and Fig. 11.



If no changes to the pre-set clutch torque are required customer-side, the hexagon head screws (10) must nevertheless be screwed out, painted with Loctite 243 and screwed back in again by the customer.

It is possible to check the "**Spring operation in the operating range**" (Fig. 9) using the dimension "a".

Please see Tables 2 and 3 for the respective values.

### Type 49A. \_\_ 5.0:

Dimension "a" is the distance from the adjusting nut facing side (5) to the thrust washer facing side (3), see Fig. 9, Table 2.

### Type 49A. \_\_ 5.C:

Dimension "a" is the distance from the adjusting nut facing side (5) to the sealing ring facing side (16), see Fig. 12, Table 3.

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_5\_\_ Sizes 0 – 3 (B.4.14.5.GB)

## Changing the Torque on Type 49A. \_\_5.0

- a) Please convert the required torque using the formula below into percent of the maximum adjustment value (see Table 2).

Required torque adjustment	x 100 = adjustment
Max. torque adjustment (Table 2)	in %

- b) Loosen the hexagon head screw (10) in the adjusting nut (5).  
c) Turn the adjusting nut (5) using the engraved adjustment scale (Fig. 7) clockwise or anti-clockwise using a face wrench until the required torque is reached.  
d) The required torque results from the marking (D) overlap on the locking ring (4) and the percent value (C) on the adjusting nut (5), see Fig. 8.  
e) Paint the hexagon head screw (10) with Loctite 243 and turn it into the adjusting nut (5); the 4 notches (A) in the adjusting nut (5) and the notches (B) in the locking ring (4) must be in the same position (Fig. 8). Slight corrections may be necessary.

### Examples:

#### Example 1 - EAS<sup>®</sup>-Compact<sup>®</sup> Size 3, Type 49A.610.0:

Torque pre-adjustment = 70 % von  $M_{G \max.} = 245 \text{ Nm}$ .  
The adjustment should be increased from 245 Nm to 280 Nm.  
Calculate the torque adjustment in % of  $M_{G \max.}$  using the formula below:

$$\frac{280 \text{ Nm}}{350 \text{ Nm}} \times 100 = 80\%$$

**Open** the adjusting nut (5) using the facing-side graduation (Fig. 8) **anti-clockwise** using a face wrench and adjust from 70 % to 80 %.

#### Example 2 - EAS<sup>®</sup>-Compact<sup>®</sup> Size 2, Type 49A.525.0:

The torque adjustment should be reduced from 75 Nm to 60 Nm.  
Calculate the torque adjustment in % of  $M_{G \max.}$  :

$$\frac{60 \text{ Nm}}{100 \text{ Nm}} \times 100 = 60\%$$

**Close** the adjusting nut (5) using the facing-side graduation (Fig. 8) **clockwise** using a face wrench and adjust from 70 % to 60 %.



Adjusting the adjusting nut (5) or distorting the cup springs (9) out of the cup spring characteristic curve (see Fig. 9) stops the clutch functioning.

After de-installing the clutch (e.g. due to cup spring replacement or changes to the cup spring layering), the clutch must be re-adjusted and calibrated using dimension "a" (see Table 2 and Fig. 7).

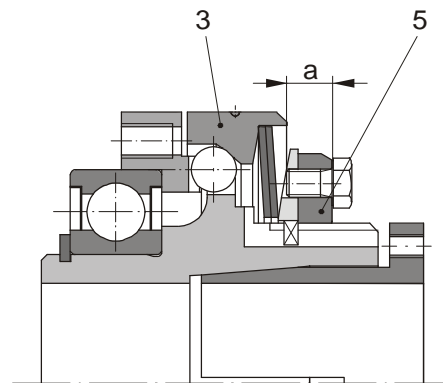


Fig. 7

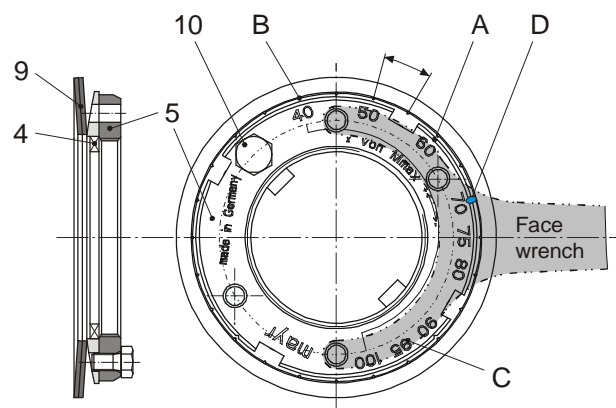


Fig. 8

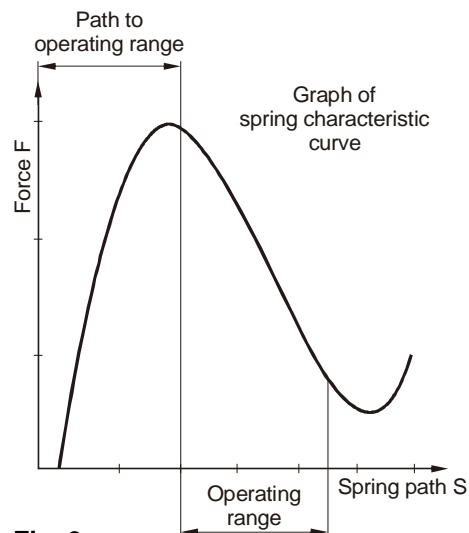


Fig. 9

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_5. Sizes 0 – 3 (B.4.14.5.GB)

## Changing the Torque on Type 49A. \_\_5.C

- a) Please convert the required torque using the formula below into percent of the maximum adjustment value (see Table 3).

Required torque adjustment	x 100 = adjustment
Max. torque adjustment (Table 3)	in %

- b) Loosen the hexagon head screw (10) in the adjusting nut (5).  
c) Turn the adjusting nut (5) using the engraved adjustment scale (Fig. 11) clockwise or anti-clockwise using a hook wrench until the required torque is reached.  
d) The required torque results from the marking (D) overlap on the gauge cover (15) and the percent value (C) on the adjusting nut (5), see Fig. 11.  
e) Paint the hexagon head screw (10) with Loctite 243 and turn it into the adjusting nut (5); the 4 notches (A) in the adjusting nut (5) and the notches (B) in the gauge cover (15) must be in the same position (Fig. 11). Slight corrections may be necessary.



The gauge cover (15) must not be turned as otherwise the calibration will be incorrect.

### Examples:

#### Example 1 - EAS<sup>®</sup>-Compact<sup>®</sup> Size 3, Type 49A.610.C:

Torque pre-adjustment = 70 % of  $M_{G \max.} = 245 \text{ Nm}$ .  
The adjustment should be increased from 245 Nm to 280 Nm.  
Calculate the torque adjustment in % of  $M_{G \max.}$  using the formula below:

$\frac{280 \text{ Nm}}{350 \text{ Nm}} \times 100 = 80\%$
---

**Open** the adjusting nut (5) using the facing-side graduation (Fig. 11) **anti-clockwise** using a hook wrench and adjust from 70 % to 80 %.

#### Example 2 - EAS<sup>®</sup>-Compact<sup>®</sup> Size 2, Type 49A.525.C:

The torque adjustment should be reduced from 70 Nm to 60 Nm.  
Calculate the torque adjustment in % of  $M_{G \max.}$  :

$\frac{60 \text{ Nm}}{100 \text{ Nm}} \times 100 = 60\%$
--

**Close** the adjusting nut (5) using the facing-side graduation (Fig. 11) **clockwise** using a hook wrench and adjust from 70 % to 60 %.



Adjusting the adjusting nut (5) or distorting the cup springs (9) outside of the cup spring characteristic curve (see Fig. 9) stops the clutch functioning.

After de-installing the clutch (e.g. due to cup spring replacement or changes to the cup spring layering), the clutch must be re-adjusted and calibrated using dimension "a" (see Table 3 and Fig. 10).

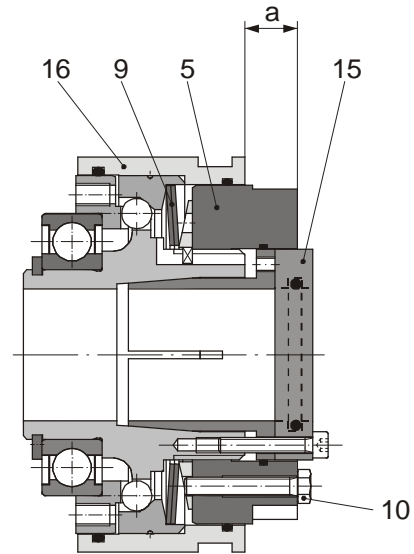


Fig. 10

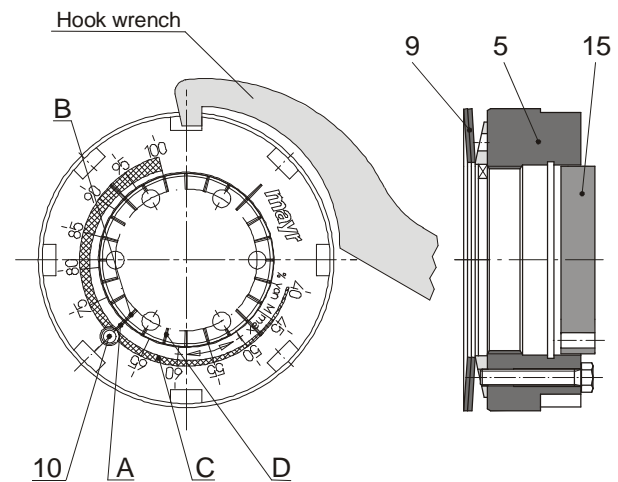


Fig. 11

# Installation and Operational Instructions for EAS<sup>®</sup>-Compact<sup>®</sup>-R, EAS<sup>®</sup>-Compact<sup>®</sup>-RA rustproof synchronous clutch Type 49A. \_\_5\_\_ Sizes 0 – 3 (B.4.14.5.GB)

## Limit Switch Installation

The switching direction arrow on the mechanical limit switch housing cover points in the direction of the adjusting nut (5) or in the stroke direction of the thrust washer (3), Fig. 13.

Adjust the switch distances for the contactless and mechanical limit switch acc. Fig. 12 or Fig. 13. The distance of the thrust washer (3) to the switching point can be finely adjusted using a hexagon head screw, wrench opening 7 (Figs. 12 and 13).

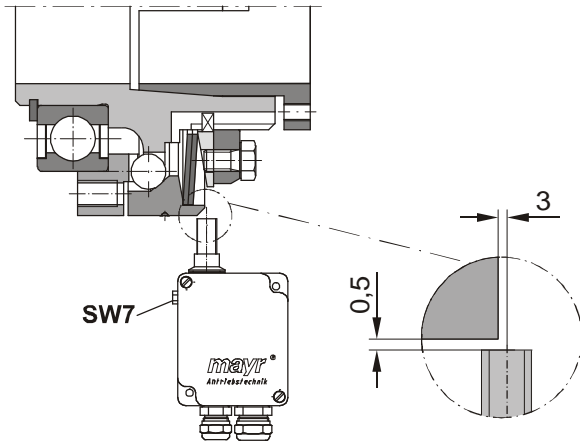


Fig. 12: Contactless Limit Switch

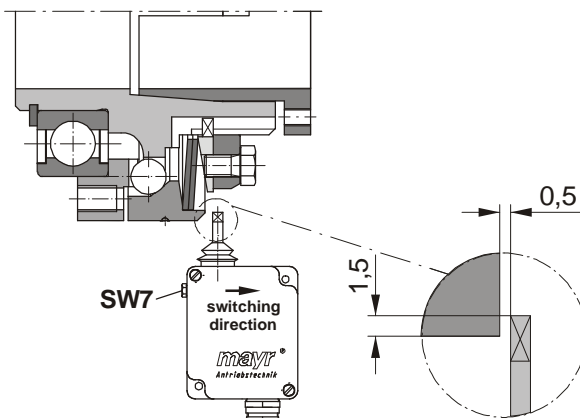


Fig. 13: Mechanical Limit Switch

## Maintenance

The maintenance intervals refer to the set clutch torque, hub-shaft connection and screw tightening torque inspections. The specified tightening torques, see page 4, must be maintained. Re-greasing work on the clutch may only be carried out by specially-trained personnel and is only required in extreme operating conditions such as very dusty or dirty conditions or at very high operating speeds. In this case, the ball transmission geometries must be re-greased.

The following maintenance and inspection intervals are to be maintained:

- 1.) Visual inspections, installation parameter inspections (tightening torques), clutch running behaviour, clutch release, set torque and switch function of the sensor **before initial operation.**
- 2.) Visual inspections, tightening torque inspections, clutch release inspections, torque inspections and, if necessary, re-greasing **after 2000 hours, after 100 overload occurrences or at the latest every 6 months.**

## 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)



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## Malfunctions / Breakdowns

Malfunction	Possible Causes	Solutions
Premature clutch release	Incorrect torque adjustment	<ol style="list-style-type: none"> <li>1) Set the system out of operation</li> <li>2) Check the torque adjustment</li> <li>3) Secure the adjusting nut</li> <li>4) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture</li> </ol>
	Adjustment nut has changed position	
	Worn clutch	
Clutch does not release on overload	Incorrect torque adjustment	<ol style="list-style-type: none"> <li>1) Set the system out of operation</li> <li>2) Check whether foreign bodies influence the function of the disengagement mechanism</li> <li>3) Check the torque adjustment</li> <li>4) Secure the adjusting nut</li> <li>5) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture</li> </ol>
	Adjustment nut has changed position	
	Worn clutch	
Running noises in normal operation	Insufficient clutch securement	<ol style="list-style-type: none"> <li>1) Set the system out of operation</li> <li>2) Check the clutch securement</li> <li>3) Check the screw tightening torques</li> <li>4) Check the torque adjustment and that the adjusting nut sits securely</li> </ol>