# Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49_._ _4._ Sizes 4 and 5

**(B.4.14.6.ATEX.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.
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.

**The product must be specially marked for use in areas where there is a danger of explosion.**
**The product will only be marked if it is ordered especially for an Ex-area.**

### Contents






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## Safety and Guideline Signs

**DANGER**

Immediate and impending danger, which can lead to severe physical injuries or to death.

**CAUTION**

Danger of injury to personnel and damage to machines.

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

**Guidelines on explosion protection**

## 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.

**DANGER**

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

The EAS®-clutch is permitted for use in areas where there is a danger of explosion.
For application in Ex-areas, please observe the special safety-related guidelines and directives on pages 17 and 21. The product must be especially marked for this area.
The product will only be marked if it is ordered especially for an Ex-area.

### *User-implemented Protective Measures*

- ❒ Cover all moving parts to protect against seizure, dust or foreign body impact.
- ❒ The clutches may not be put into operation without a limit switch (for Ex-areas) 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.**



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## EAS®-Compact® overload clutch, Type 490._ _4.2

**Type 490._24.2 Design with keyway**

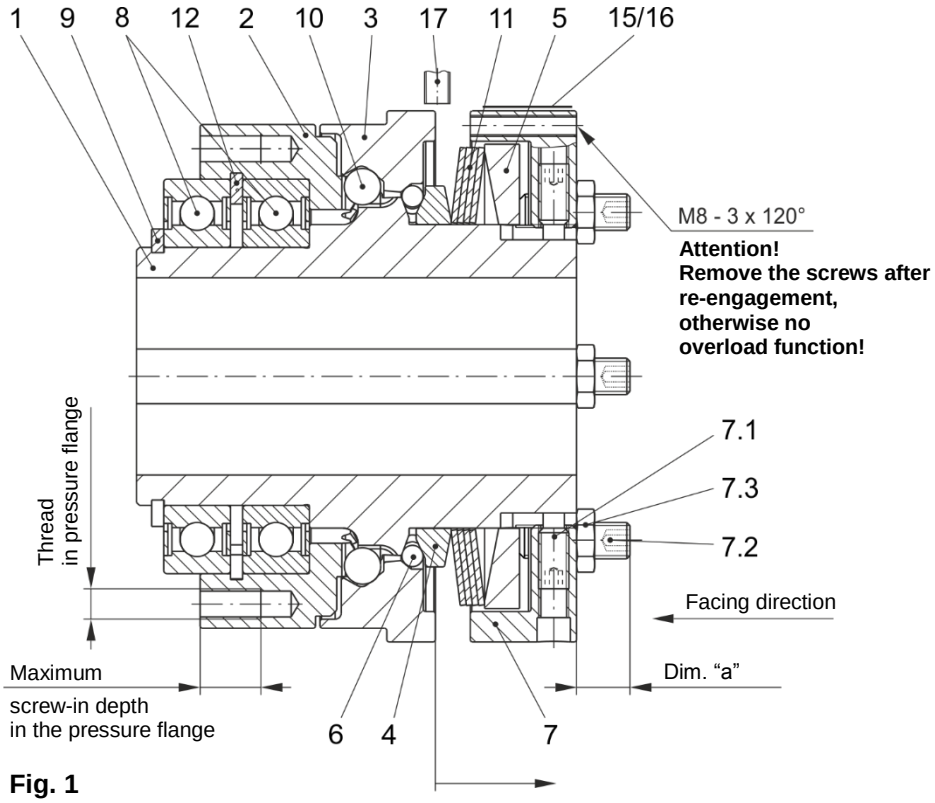


**Fig. 1**

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

| Item | Name |
|---|---|
| 1 | Hub |
| 2 | Pressure flange |
| 3 | Thrust washer |
| 4 | Thrust ring FRSH |
| 5 | Thrust ring |
| 6 | Steel ball |
| 7 | Adjusting nut |
| 7.1 | Set screw |
| 7.2 | Set screw |
| 7.3 | Hexagon nut |
| 8 | Deep groove ball bearing |
| 9 | Locking ring |
| 10 | Steel ball |
| 11 | Cup spring |
| 12 | Locking ring |
| 13 | Cone bushing |
| 14 | Hexagon head screw |
| 15 | Adjustment table |
| 16 | Type tag |
| 17 | Limit switch |

The limit switch Item 17 is not part of the standard scope of delivery.

**Type 490._14.2 Design with cone bushing**

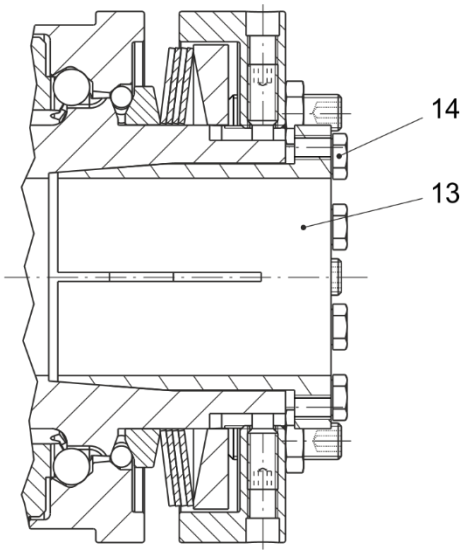


**Fig. 2**


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## EAS®-Compact® overload clutch, lastic backlash-free, Type 494._ _4.$^{3}_{4}$ Size 4

**Type 494._04.$^{3}_{4}$**
Lastic-side: Clamping hub
EAS®-side: Cone bushing

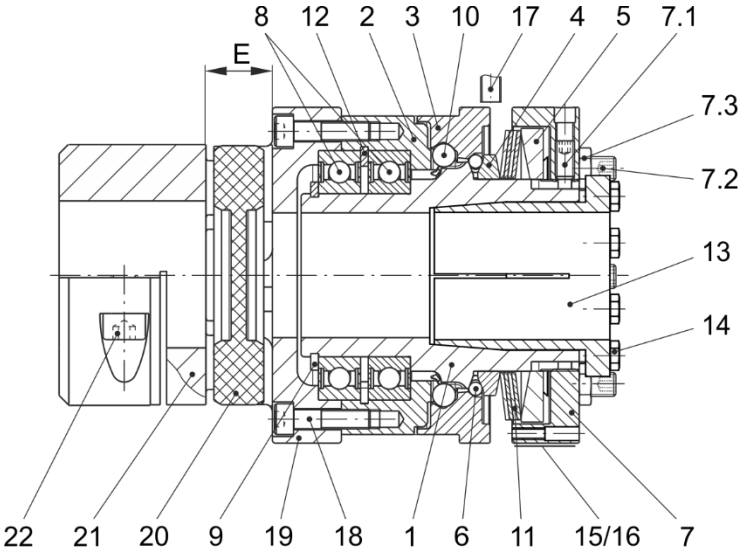



**Fig. 3**

**Type 494._14.$^{3}_{4}$**
Lastic-side: Shrink disk
EAS®-side: Cone bushing

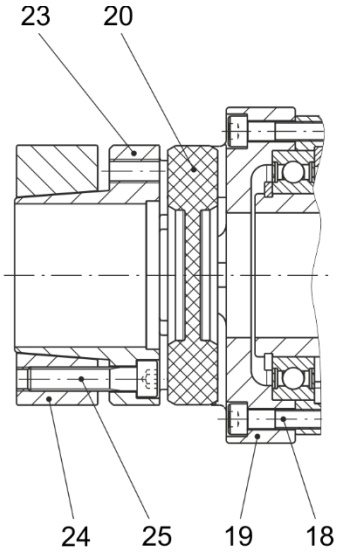


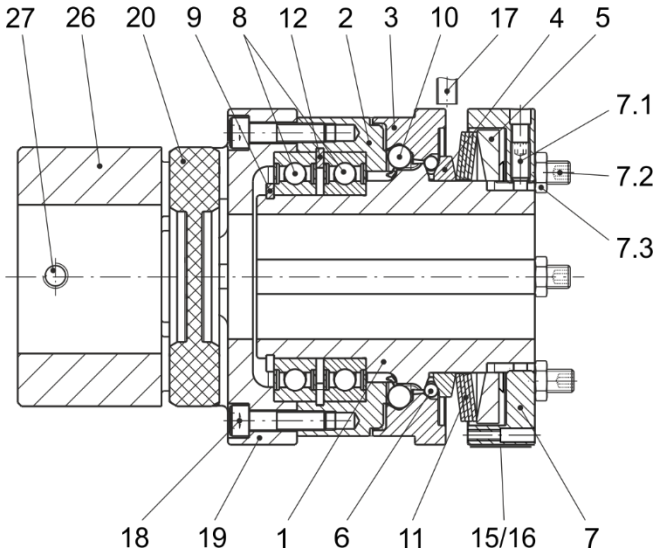

**Fig. 4**

## Parts List

(Only use *mayr*® original parts)

| Item | Name |
|---|---|
| 1 | Hub |
| 2 | Pressure flange |
| 3 | Thrust washer |
| 4 | Thrust ring FRSH |
| 5 | Thrust ring |
| 6 | Steel ball |
| 7 | Adjusting nut |
| 7.1 | Set screw |
| 7.2 | Set screw |
| 7.3 | Hexagon nut |
| 8 | Deep groove ball bearing |
| 9 | Locking ring |
| 10 | Steel ball |
| 11 | Cup spring |
| 12 | Locking ring |
| 13 | Cone bushing |
| 14 | Hexagon head screw |
| 15 | Adjustment table |
| 16 | Type tag |
| 17 | Limit switch |
| 18 | Cap screw |
| 19 | Flange |
| 20 | Elastomeric element |
| 21 | Clamping hub |
| 22 | Cap screw |

**Type 494._24.$^{3}_{4}$**
Lastic-side: Keyway
EAS®-side: Keyway




| Item | Name |
|---|---|
| 23 | Shrink disk hub |
| 24 | Shrink disk |
| 25 | Cap screw |
| 26 | Key hub |
| 27 | Set screw |

The limit switch Item 17 is not part of the standard scope of delivery.

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## EAS®-Compact® overload clutch, lastic, Type 494._ _4.2 Size 5

**Type 494._24.2**
Lastic-side: Keyway
EAS®-side: Keyway

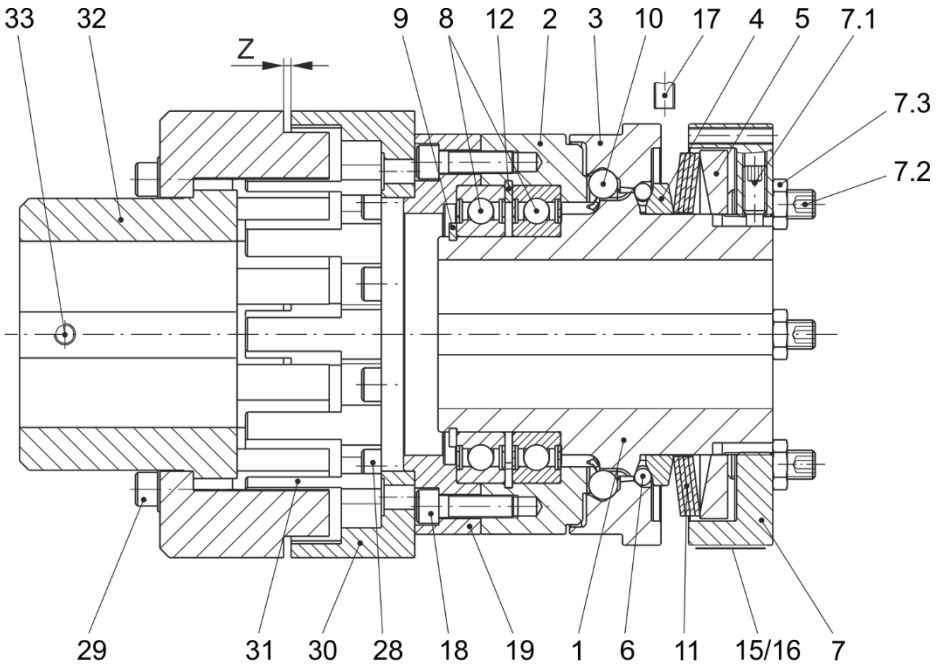
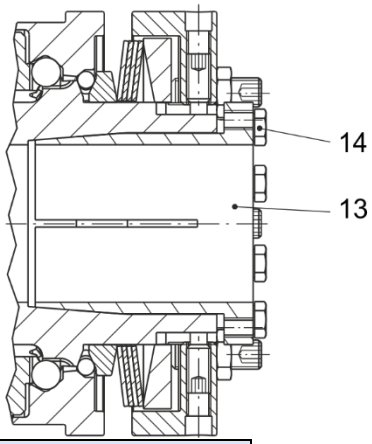



**Fig. 6**

**Type 494._14.2**
Lastic-side: Keyway
EAS®-side: Cone bushing




### Parts List

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

| Item | Name |
|---|---|
| 1 | Hub |
| 2 | Pressure flange |
| 3 | Thrust washer |
| 4 | Thrust ring FRSH |
| 5 | Thrust ring |
| 6 | Steel ball |
| 7 | Adjusting nut |
| 7.1 | Set screw |
| 7.2 | Set screw |
| 7.3 | Hexagon nut |
| 8 | Deep groove ball bearing |
| 9 | Locking ring |
| 10 | Steel ball |
| 11 | Cup spring |
| 12 | Locking ring |
| 13 | Cone bushing |
| 14 | Hexagon head screw |
| 15 | Adjustment table |
| 16 | Type tag |
| 17 | Limit switch |

| Item | Name |
|---|---|
| 18 | Cap screw |
| 19 | Flange |
| 28 | Cap screw |
| 29 | Cap screw |
| 30 | Cam ring |
| 31 | Flexible intermediate ring (elastomeric element) |
| 32 | Hub |
| 33 | Set screw |

The limit switch Item 17 is not part of the standard scope of delivery.

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## EAS®-Compact® overload clutch, torsionally rigid, Type 496._ _4.2

### Parts List

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

| Item | Name |
|---|---|
| 1 | Hub |
| 2 | Pressure flange |
| 3 | Thrust washer |
| 4 | Thrust ring FRSH |
| 5 | Thrust ring |
| 6 | Steel ball |
| 7 | Adjusting nut |
| 7.1 | Set screw |
| 7.2 | Set screw |
| 7.3 | Hexagon nut |
| 8 | Deep groove ball bearing |
| 9 | Locking ring |
| 10 | Steel ball |
| 11 | Cup spring |
| 12 | Locking ring |
| 13 | Cone bushing |
| 14 | Hexagon head screw |
| 15 | Adjustment table |
| 16 | Type tag |
| 17 | Limit switch |
| 18 | Cap screw |
| 19 | Flange |
| 34 | Shrink disk |
| 35 | Hexagon head screw |
| 36 | Shrink disk hub |
| 37 | Disk pack |
| 38 | Connection plate |
| 39 | Key hub |
| 40 | Set screw |
| not shown: | |
| 41 | Hexagon head screw |
| 42 | Hexagon nut |
| 43 | Washer |
| 44 | Hexagon head screw |

The limit switch Item 17 is not part of the standard scope of delivery.

**Type 496._14.2**
Lastic-side: Shrink disk hub
EAS®-side: Cone bushing

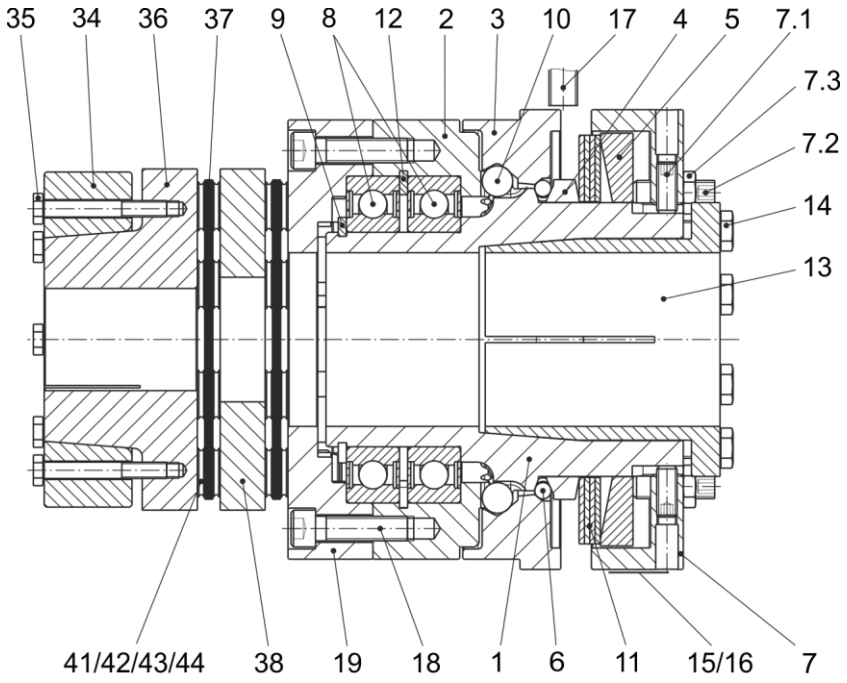


**Fig. 8**

**Type 496._24.2**
Lastic-side: Keyway
EAS®-side: Keyway

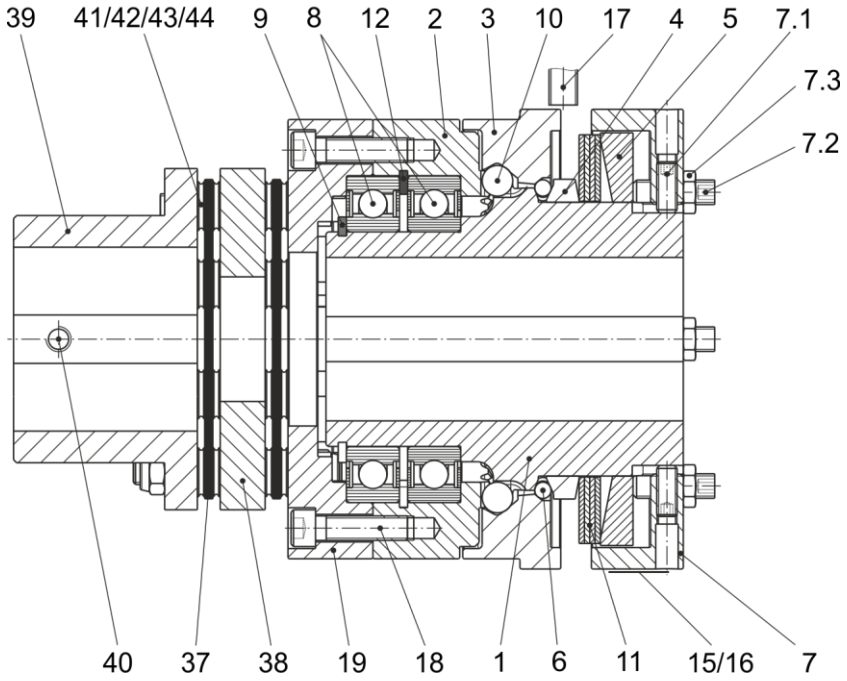


**Fig. 9**




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## Technical Data

### Table 1

| Sizes | Limit torques for overload $M_G$ Type 490.5_4.2 [Nm] | Type 490.6_4.2 [Nm] | Type 490.7_4.2 [Nm] | Type 490.8_4.2 [Nm] | Max. speed [rpm] | Thrust washer (Fig. 1; Item 3) stroke on overload [mm] | Bore from – to Type 490._14.2 [mm] | Type 490._24.2 [mm] |
|---|---|---|---|---|---|---|---|---|
| 4 | 120 – 300 | 240 – 600 | 480 – 1200 | 600 – 1500 | 3500 | 5.5 | 40 – 65 | 40 – 65 |
| 5 | 240 – 600 | 480 – 1200 | 960 – 2400 | 1200 – 3000 | 3000 | 6.5 | 45 – 85 | 45 – 80 |

### Table 2

| Sizes | Thread in pressure flange (2) (Fig. 1) | Max. screw-in depth in the pressure flange (2) (Fig. 1) [mm] | Thread "M" in the adjusting nut (7) (Fig. 1) | Screw tightening torque Item 14 [Nm] | Max. permitted axial forces [N] | radial forces [N] | transverse force torques [1] [Nm] |
|---|---|---|---|---|---|---|---|
| 4 | 8 x M10 | 20 | 3 x M8 | 25 | 5000 | 7500 | 50 |
| 5 | 8 x M12 | 20 | 3 x M8 | 71 | 7700 | 11500 | 70 |

[1] Torques, which put strain on the deep groove ball bearing due to the non-centric axial forces having an effect on the pressure flange.

### Table 3

| Sizes | Flexible backlash-free shaft coupling Type 494._ _4. 3 4 Bore hub from – to Clamping hub Item 21 [mm] | Shrink disk hub Item 23 [mm] | Key hub Item 26 [mm] | Screw tightening torques Item 18 [Nm] | Item 22 [Nm] | Item 25 [Nm] |
|---|---|---|---|---|---|---|
| 4 | 45 – 80 | 45 – 75 | 38 – 80 | 75 | 200 | 120 |

### Table 4

| Sizes | Flexible backlash-free shaft coupling Type 494._ _4. 3 4 Nominal and maximum torques yellow elastomeric element $T_{KN}$ [Nm] | $T_{K\,max.}$ [Nm] | red elastomeric element $T_{KN}$ [Nm] | $T_{K\,max.}$ [Nm] | Max. permitted shaft misalignments Axial ΔKa [mm] | yellow elastomeric element Radial ΔKr [mm] | Angular ΔKw [°] | red elastomeric element Radial ΔKr [mm] | Angular ΔKw [°] |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 900 | 1800 | 1040 | 2080 | ±2.6 | 0.25 | 1.0 | 0.18 | 0.9 |

### Table 5

| Sizes | Elastomeric element (Item 20) of the flexible backlash-free shaft coupling Type 494._ _4. 3 4 Elastomeric element hardness [Shore] | Colour | Permitted temperature range Permanent temperature | Max. temporary temperature |
|---|---|---|---|---|
| 4 | 92 Sh A | yellow | -40 to +90 °C | -50 to +120 °C |
| | 98 Sh A | red | -30 to +90 °C | -40 to +120 °C |


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## Technical Data

### Table 6

| Sizes | Flexible shaft coupling Type 494._ _ 4.2 | | | |
|---|---|---|---|---|
| | Bore hub from – to | Screw tightening torques | | |
| | Item 32 [mm] | Item 18 [Nm] | Item 28 [Nm] | Item 29 [Nm] |
| 5 | 60 – 100 | 122 | 122 | 122 |

### Table 7

| Sizes | Flexible shaft coupling Type 494._ _ 4.2 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Nominal and maximum torques | | | | Max. permitted shaft misalignments | | |
| | 5<br>Type 494. 6 _4.2<br>7<br>Flexible intermediate ring Pb 72 Sh A | | Type 494.8_4.2<br>Flexible intermediate ring Pb 82 Sh A | | | | |
| | $T_{KN}$ [Nm] | $T_{K\ max.}$ [Nm] | $T_{KN}$ [Nm] | $T_{K\ max.}$ [Nm] | Axial ΔKa [mm] | Radial ΔKr [mm] | Angular ΔKw [°] |
| 5 | 2400 | 4800 | 3700 | 8650 | ± 2 | 0.3 | 0.07 |

### Table 8

| Sizes | Torsionally rigid shaft misalignment compensation coupling Type 496._ _4.2 | | | | |
|---|---|---|---|---|---|
| | Bore hub from – to | | Screw tightening torques | | |
| | Item 36 [mm] | Item 39 [mm] | Item 18 [Nm] | Item 35 [Nm] | Item 41/44 [Nm] |
| 4 | 55 – 90 | 35 – 70 | 75 | 25 | 35 |
| 5 | 50 – 85 | 45 – 90 | 122 | 35 | 120 |

### Table 9

| Sizes | Torsionally rigid shaft misalignment compensation coupling Type 496._ _4.2 | | | | |
|---|---|---|---|---|---|
| | Nominal and maximum torques | | Max. permitted shaft misalignments | | |
| | $T_{KN}$ [Nm] | $T_{K\ max.}$ [Nm] | Axial [2] ΔKa [mm] | Radial [3] ΔKr [mm] | Angular [4] ΔKw [°] |
| 4 | 1600 | 2400 | ± 1.5 | 0.30 | 0.7 |
| 5 | 3500 | 5250 | ± 1.2 | 0.25 | 0.5 |

[2] The values refer to couplings with 2 disk packs. Only permitted as a static or virtually static value.
[3] The values refer to couplings with 2 disk packs and connection plate.
[4] The values refer to 1 disk pack.


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## Design

The EAS®-Compact® overload clutch is designed as a mechanically disengaging overload clutch according to the ball detent principle.

## Scope of Delivery / State of Delivery

- ❑ The clutch is manufacturer-assembled ready for installation.
- ❑ The torque is set manufacturer-side according to the customer's request (please compare the torque stipulated in the order with the torque imprinted/engraved in the identification).
  Unless the customer requests a particular torque setting when ordering, the clutch will be pre-set to approx. 70 % of the maximum torque.
  The adjusting nut (7) is marked with dimension “a” (70% of the maximum torque, see Figs. 1 and 18).

Please check the scope of delivery according to the Parts List as well as the state of delivery immediately after receiving the goods.
*mayr* ® will take no responsibility for belated complaints.
Please report transport damage immediately to the deliverer.
Please report incomplete delivery and obvious defects immediately to the manufacturer.

## Function

The clutch protects the drive line from excessively high, unpermitted torque impacts which can occur due to unintentional blockages. After overload has taken place, the transmitting mechanism is completely disconnected. Only the bearing friction continues to have an effect.
This means that no re-engagement impacts or metallic sliding movements occur on the clutch torque transmission geometries when using this clutch variant.
When in operation, the set torque is transmitted backlash-free onto the output from the motor shaft via the EAS®-Compact® overload clutch (pressure flange (2)). If the set limit torque is exceeded (overload), the clutch disengages. The input and the output are separated residual torque-free.
A **limit switch with ATEX-approval** (not included in the standard scope of delivery) must be installed. The limit switch registers the disengagement movement and switches off the drive.
**After-acting masses can run free.**

**CAUTION**

After overload occurrence, the clutch has no load-holding function.

## Re-engagement

Re-engagement must only take place when the device is not running or at low differential speed (< 10 rpm).

EAS®-Compact® overload clutch re-engagement is carried out by applying axial pressure onto the thrust washer (3).
For this, different procedures are possible:

- ❒ By evenly screwing three screws M8 (not included in the standard scope of delivery) into the adjusting nut (7).

**CAUTION**

After re-engagement has taken place, the three screws must be removed immediately, as they could stop the clutch functioning (blockage).

- ❒ By using two screwdrivers, applied opposite each other and supported by the cup springs (11), see Fig. 10.
- ❒ By using an engagement mechanism.
  The engagement procedure can also be automated using pneumatic or hydraulic cylinders.

On all variants, it may be necessary to turn between the clutch input and output sides slightly.

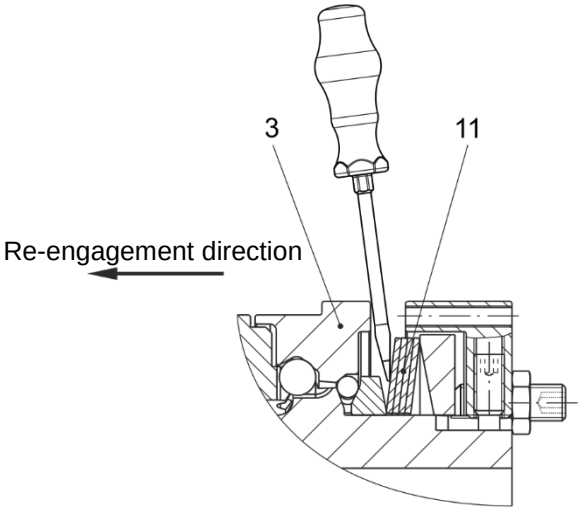


**Fig. 10**

## General Installation Guidelines

As standard the bores in the hubs (1, 23, 26, 32, 36, 39) are provided with a H7 tolerance. The bores in the clamping hubs (21) are provided with a F7 tolerance.
The surface roughness depth in the bores is produced to Ra = 1.6 µm.




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## Installation of the Output Elements (Fig. 11)

The output element is centred on a deep groove ball bearing (8) (tolerance H7/h5) and bolted together with the pressure flange (2).

Please observe the maximum screw-in depth in the pressure flange (2) (Fig. 1, page 3 and Table 2, page 7).

If the resulting radial force from the output element is anywhere near the centre of the ball bearing (8) and under the max. permitted radial load acc. Table 2, an additional bearing for the output element is not necessary.
**No appreciable axial forces (see Table 2) 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.
**In order to prevent the output element (pressure flange (2)) from moving axially in the direction of the thrust washer (3) during overload, please make sure that the bearing of the output element is designed as a locating bearing (Fig. 11).**

Please observe the connection dimensions “a” and “e” for the output elements (Fig. 11 and Table 10).

**Table 10**

| Sizes | Connection dimensions | |
|---|---|---|
| | a | e |
| 4 | 12 $^{+0.1}$ | 130 h5 |
| 5 | 13 $^{+0.1}$ | 160 h5 |

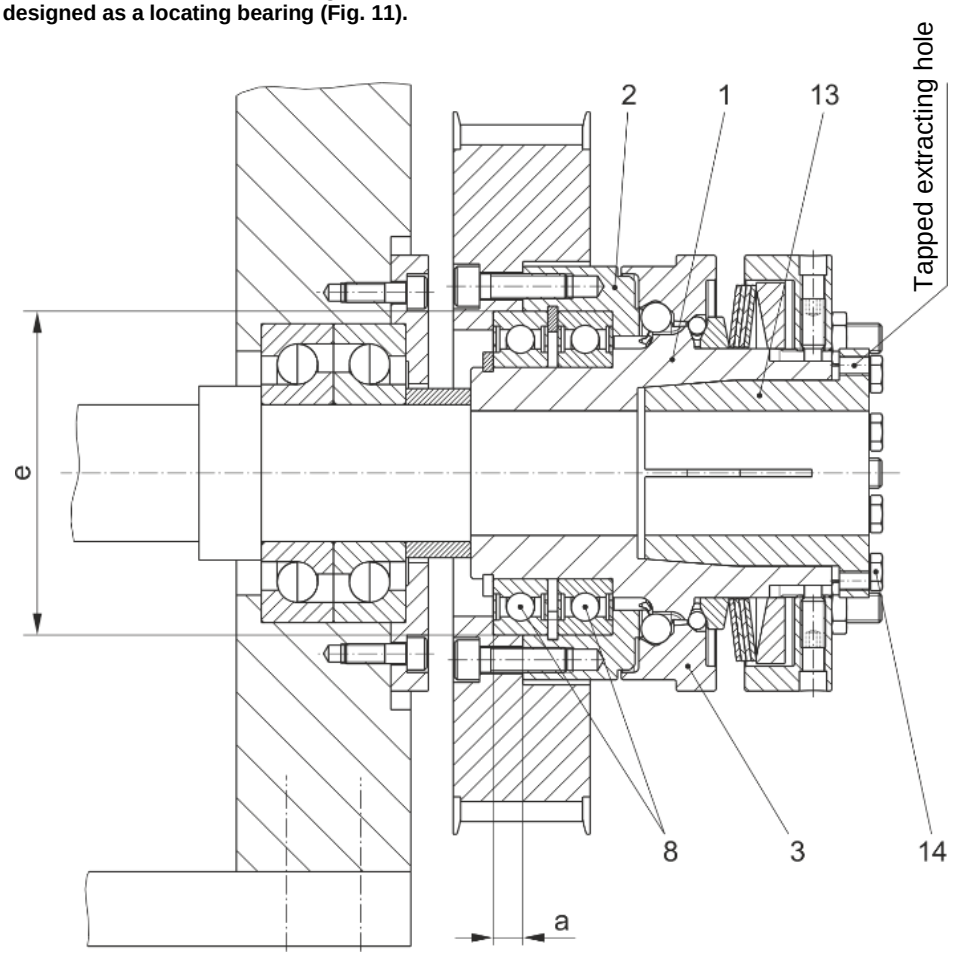


**Fig. 11**


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## Cup Spring Layering (Fig. 12)

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

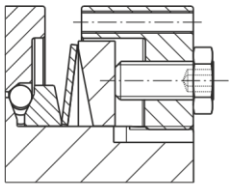
For the lower torque range, **one** cup spring (Type 49_.**5**_4._),

for the medium torque range, **two** cup springs (Type 49_.**6**_4._),

for the high torque range, **four** cup springs (Type 49_.**7**_4._)

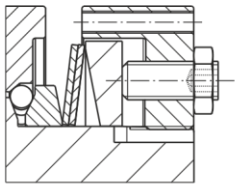
and for the maximum torque range **five** cup springs (Type 49_.**8**_4._) are installed.

**1x layered**



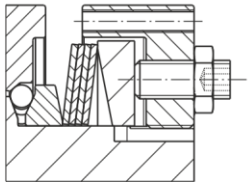
Type 49_.5_4._

**2x layered**



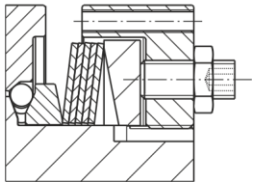
Type 49_.6_4._

**4x layered**



Type 49_.7_4._

**5x layered**



Type 49_.8_4._

**Fig. 12**

## Mounting onto the Shaft

EAS®-Compact® clutches include cone bushings or keyways as part of the standard delivery.
**During installation of cone bushings, please observe the following:**

- ❒ Shaft tolerances from h8 to k6 are permitted.
- ❒ Shaft surface: finely turned or ground (Ra = 0.8 µm).
- ❒ Shaft material: Yield point at least 400 N/mm², e. g. St 60, St 70, C 45, C 60.
- ❒ Degrease or remove conserving layers on the shafts and bores before installing the clutch.
  **Greasy or oily bores or shafts do not transmit the torques defined in the catalogue.**
- ❒ Mount the clutch or clutch hubs onto both shaft ends using a suitable device and bring it / them into the correct position.
- ❒ Tighten the tensioning screws (hexagon head screws Item 14) in 2 steps cross-wise and then in 3 to max. 6 tightening sequences evenly using a torque wrench to the torque stated in Table 2.
- ❒ The transmittable torques of the shaft-hub connection are dependent on the bore diameter and the quality of the drive shafts used. Please observe the respective transmission tables in the valid and applicable product catalogue.

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

## De-installation

There are tapped extracting holes next to the tensioning screws (hexagon head screws Item 14) in the cone bushings (13).

1) Loosen all tensioning screws (14).
2) Screw out the tensioning screws (14) located next to the tapped extracting holes and screw them into the tapped extracting holes up to their limits.
   Then tighten these screws until the tensioning connection loosens.



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### Shaft Installation via Key Connection

On the EAS®-Compact® with a keyway, the clutch must be axially secured both EAS®-side and lastic-side after mounting onto the shaft.
This securing procedure can be carried out on the EAS®-side via a press cover and a screw, screwed into the threaded centre hole of the shaft, and on the lastic-side via a set screw. Please see Figs. 5, 6, 9 and 13.

### Joining Both Clutch Components EAS®-Compact® Type 494._ _4._ Size 4
(Figs. 3 to 5)

The flexible elastomeric element (20) is pre-tensioned between the metal claws by joining components 21/23/26 with component 19. To do this, an axial installation force is required.
The force required can be reduced by lightly greasing the elastomeric element.

Use PU-compatible lubricants (e. g. Mobilith SHC460)!
No unpermittedly high axial pressure should be placed on the elastomeric element (20) in completely assembled condition.
**Keep to the distance dimension "E" = 35 mm, see Fig. 3.**

### Joining Both Clutch Components EAS®-Compact® Type 494._ _4.2 Size 5
(Figs. 6 and 7)

The flexible intermediate ring (31) is pre-tensioned between the metal claws by joining component 32 with component 19. To do this, an axial installation force is required.
The amount of force required can be reduced by lightly greasing the intermediate ring (31).

Use PU-compatible lubricants (e. g. Mobilith SHC460)!
No unpermittedly high axial pressure should be placed on the intermediate ring (31) in completely assembled condition.
**Keep to the distance dimension "Z" = 4 mm, see Fig. 6.**

### Joining Both Clutch Components EAS®-Compact® Type 496._ _4.2
(Figs. 8 and 9)

Join the misalignment-flexible part and the overload clutch and screw together with cap screws (Item 18) to the tightening torque given in Table 8.

**The cap screws (Item 18) must be protected using a screw-securing product, e.g. Loctite 243.**

The clutch or clutch hub carries out an axial movement in the direction of the cone bushing (13) when tightening the cone bushing (Item 13, Fig. 8).
Because of this effect, please ensure that on the EAS®-Compact® clutch with disk pack (Type 496._ _4.2), first the cone bushing (13) is completely tightened, then the other (disk pack) side.

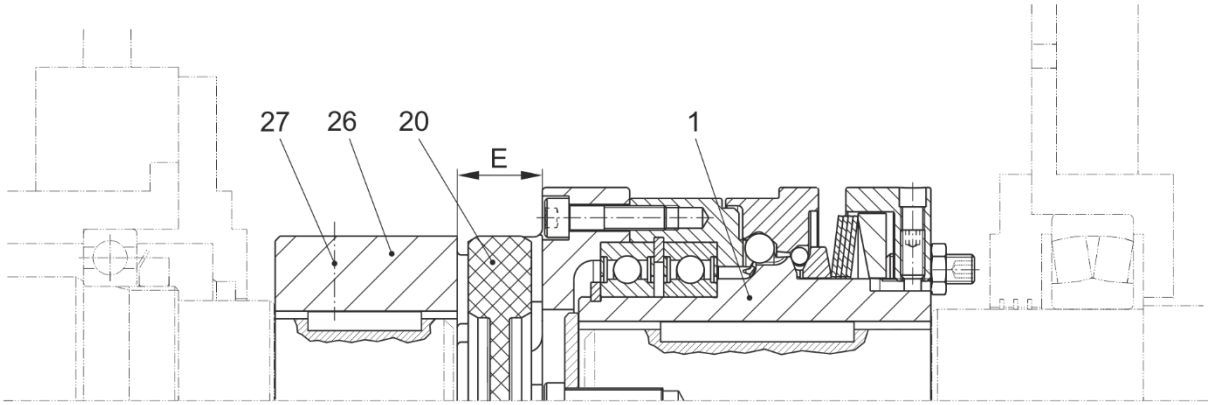


**Fig. 13**


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## Permitted Shaft Misalignments Type 494._ _4._ and 496._ _4._

The EAS®-Compact® clutches Types 494._ _4._ and 496._ _4._ compensate for radial, axial and angular shaft misalignments (Figs. 15 – 17).
However, the permitted shaft misalignments indicated in Tables 4, 7 and 9 must not simultaneously reach their maximum value. If more than one kind of misalignment takes place simultaneously, they influence each other. This means that the permitted misalignment values are dependent on one another, see Fig. 13. The sum total of the actual misalignments in percent of the maximum value must not exceed 100 % (see example, below).
The permitted misalignment values given in Tables 4, 7 and 9 refer to coupling operation at nominal torque, an ambient temperature of +30 °C and an operating speed of 1500 rpm. If the clutch is operated in other or more extreme operating conditions, please contact the manufacturers.

**Example: Type 496. _ _4.2, Size 4:**

Axial displacement occurrence $K_a$ = 0.6 mm equals 40 % of the permitted maximum value $K_{a\,max}$ = 1.5 mm.
Angular misalignment occurrence in the disk pack $K_w$ = 0.21° equals 30 % of the permitted maximum value $K_{w\,max}$ = 0.7°.
=> permitted radial misalignment $K_r$ = 30 % of the maximum value
$K_{r\,max}$ = 0.3 mm => $K_r$ = 0.09 mm

## Clutch Alignment Type 494._ _4._ and 496._ _4._

Exact alignment of the clutch increases the clutch service lifetime and reduces the load on the shaft bearings.
We recommend alignment of the clutch using a dial gauge or special alignment devices on drives operating at very high speeds. However, clutch alignment using a straight edge in two levels vertical to each other is usually sufficient.

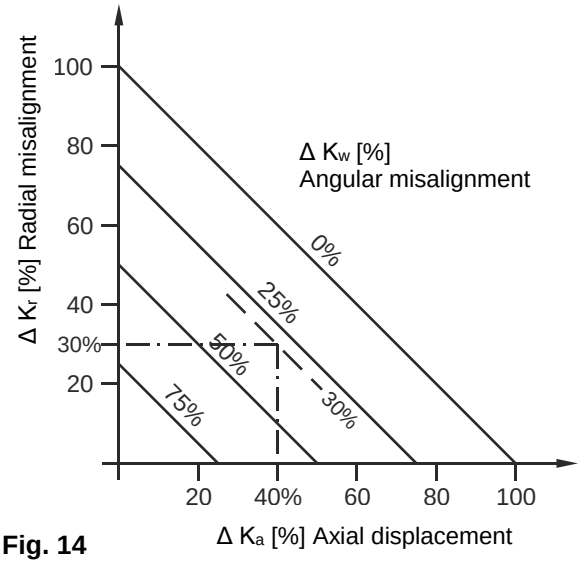
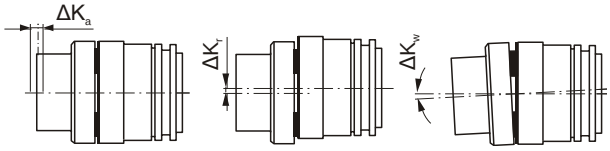



**Fig. 14**

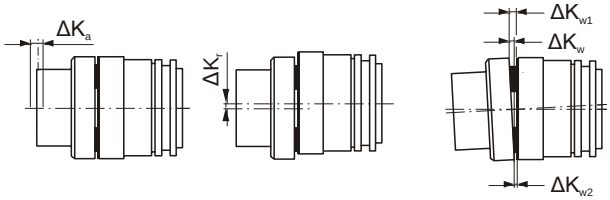
**Type 494._ _4._ (Size 4)**




Axial displacement | Radial misalignment | Angular misalignment

**Fig. 15**

**Type 494._ _4.2 (Size 5)**

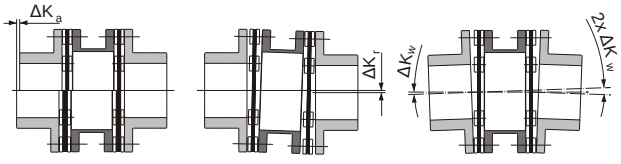



Difference dimension $\Delta K_w = \Delta K_{w1} - \Delta K_{w2}$
Please measure dimensions $\Delta K_{w1}$ and $\Delta K_{w2}$ vertically and horizontally offset by 180°.

Axial displacement | Radial misalignment | Angular misalignment

**Fig. 16**

**Type 496._ _4.2 (Size 5)**




Axial displacement | Radial misalignment | Angular misalignment

**Fig. 17**

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## Torque Adjustment

The torque is set manufacturer-side according to the customer's request.
Adjustment is carried out via dimension "a" by turning the set screws (Item 7.2, Fig. 18).
The adjusting nut (7) remains turned in flush position with the hub (1).
The installed cup springs (11) are operated in the negative range of the characteristic curve (see Fig. 19); this means that a stronger pre-tensioning of the cup spring results in a decrease of the spring force.

Turning the set screws (7.2) clockwise causes a reduction in torque (Fig. 19, dimension “a -” acc. adjustment table (Item 15) and Fig. 20).
Turning it anti-clockwise causes an increase in torque (Fig. 19, dimension “a +” acc. adjustment table (Item 15) and Fig. 20).
You should be facing the adjusting nut (7) as shown in Fig. 18.

### Changing the Torque

The torque is changed exclusively via the set screws (7.2) and not via the adjusting nut (7).

a) Loosen all hexagon nuts (6 pieces, Item 7.3).
b) For dimension “a”, see the adjustment table (Item 15, Fig. 20) (The adjustment table (15) is glued onto the outer diameter of the adjusting nut (7), see Fig. 18).
c) Adjust all set screws (6 pieces, Item 7.2) evenly to the required dimension “a” using a hexagon socket wrench, wrench opening 6.
d) Counter (secure) the set screws (6 pieces, Item 7.2) again with hexagon nuts (7.3).

Adjusting the adjusting nut (7) or distorting the cup spring (11) outside of the cup spring characteristic curve (see Fig. 19) stops the clutch functioning.
The inspection dimension “a” (markings on adjusting nut) can show deviations due to construction tolerances or to clutch wear. 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” (acc. markings on the adjusting nut and the adjustment table).

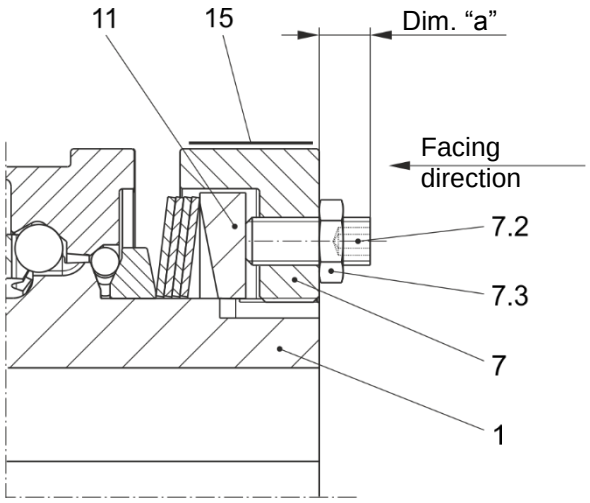


**Fig. 18**

The adjusting nut (Item 7) is marked with dimension "a" (70% of the maximum torque). The adjusting nut (7) is turned in flush position with the hub (1).

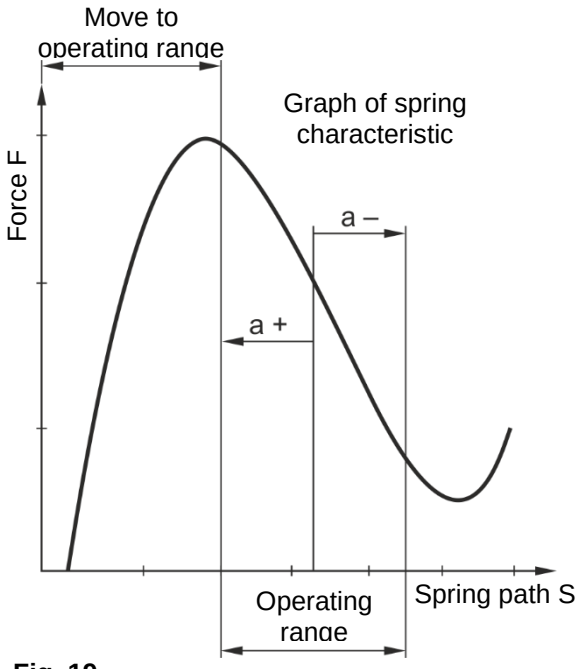


**Fig. 19**


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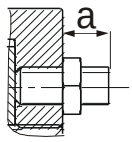
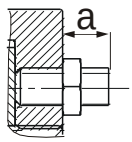
### Adjustment Tables (Item 15)




| Größe / Size 4 FRSH | Tellerfeder Cup springs | M-Bereich Torque range | "a" [mm] 100 % | 90 % | 80 % | 70 % | 60 % | 50 % | 40 % |
|---|---|---|---|---|---|---|---|---|---|
| 49-.5-4._ | 1x1 / | 120-300 Nm | a + 1.0 | a + 0.6 | a + 0.3 | a | a – 0.2 | a – 0.5 | a – 0.8 |
| 49-.6-4._ | 1x2 // | 240-600 Nm | | | | | | | |
| 49-.7-4._ | 1x4 //// | 480-1200 Nm | | | | | | | |
| 49-.8-4._ | 1x5 ///// | 600-1500 Nm | | | | | | | |




| Größe / Size 5 FRSH | Tellerfeder Cup springs | M-Bereich Torque range | "a" [mm] 100 % | 90 % | 80 % | 70 % | 60 % | 50 % | 40 % |
|---|---|---|---|---|---|---|---|---|---|
| 49-.5-4.2 | 1x1 / | 240-600 Nm | a + 1.5 | a + 0.9 | a + 0.4 | a | a – 0.4 | a – 0.8 | a – 1.2 |
| 49-.6-4.2 | 1x2 // | 480-1200 Nm | | | | | | | |
| 49-.7-4.2 | 1x4 //// | 960-2400 Nm | | | | | | | |
| 49-.8-4.2 | 1x5 ///// | 1200-3000 Nm | | | | | | | |

**Fig. 20**

## Limit Switch (Item 17; Figs. 1 and 21)

In order to limit run-out times after overload has taken place, a limit switch must be mounted onto the overload clutch.
Limit switches with appropriate explosion protection certification are suitable.
Grinding, mechanically actuated limit switches are only permitted for application in areas where there is a danger of explosion if it can be proved that there is no danger of ignition caused by the grinding movement of the mechanical limit switch on the clutch.
The contactless limit switch is to be mounted onto the switching edge of the clutch (Fig. 21) so that no signal changes are caused during normal operation on the limit switch by the usual clutch run-out errors.
In case of overload, the thrust washer (3) carries out a stroke (see Table 1, page 7) in the direction of the adjusting nut (7) (Fig. 1), which is used to signal change on the limit switch.
The signal change should take place at the latest after an axial thrust washer (3) stroke of 0.5 mm. At the same time, please maintain a radial minimum distance of 0.5 mm in order to prevent rubbing of the contactless limit switch, meaning a danger of ignition.

### Limit Switch Installation

Adjust the switch distances for the contactless Ex-limit switch acc. Fig. 21. The distance of the thrust washer (3) to the switching point can be adjusted using a hexagon head screw, wrench opening 7.

The correct switch adjustment must be checked and guaranteed by manually disengaging the overload clutch.
In order to secure limit switch function, please keep it free from oil, grease and other dirt particles.

**Contactless limit switch (mounting example)**

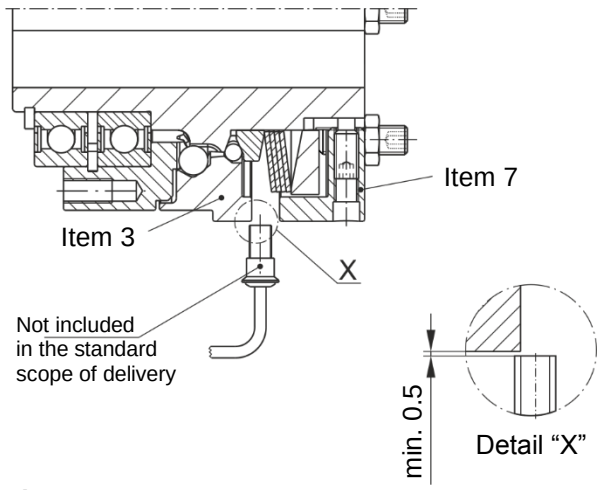



**Fig. 21**

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## Maintenance and Maintenance Intervals

Maintenance work, which should be carried out after 2000 operating hours, after 1000 disengagements or at the latest after 1 year, includes:

- ➔ Visual inspection
- ➔ Functional inspection
- ➔ Inspection of the shaft-hub connection
- ➔ Inspection of the screw tightening torques
  The specified tightening torques (see Technical Data, pages 7 and 8) must be maintained.
- ➔ Inspection of the set torque
- ➔ Clutch release inspection
- ➔ Bearing or bearing pre-tension inspection

**We recommend that this maintenance work is carried out at the site of manufacture.**

- ➔ Re-greasing of the transmission geometries, balls, recesses and sealing elements.

**Clutch re-greasing must only be carried out at the place of manufacture or by specially trained personnel.**
For greasing, please use NLGI Class 1.5 grease with a basic oil viscosity of 460 $mm^2/s$ at 40 °C, e.g. Mobilith SHC460.

When re-installing the clutch, please secure all screws with Loctite 243 (medium hard).

If large amounts of dirt or dust are present or in extreme ambient conditions, it may well be necessary to carry out inspections at shorter intervals.

## 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)

**All aluminium components:**
Non-ferrous metals (Code No. 160118)

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



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## Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

### Conditions to Observe in Ex Areas Where There is a Danger of Explosion

For malfunction-free clutch operation, it is necessary to keep to the clutch characteristic values (Technical Data) indicated on pages 7 and 8 and in the catalogue.

#### Clutch Dimensioning

A suitable adjustment factor (service factor) is required so that the clutch can protect the drive line from overload without excessive wear over a long lifetime. The service factor is the relationship between the maximum load torque on the system in normal operation and the set clutch torque. This factor must be at least 1.5 and is selected depending on the complex of loads acting on the system. Adjustment factors of up to 3 may be necessary for very severe impacts and load peaks or alternating loads.
Regular functional inspections on the clutch (see Maintenance Intervals) confirm the functioning, unworn condition of the clutch. Wear on the clutch can lead to changes in the switch-off torque, or even to clutch blockage.
On overload, the clutch run-out times must be limited via a limit switch capable of recognising a clutch overload occurrence (usually with an inductive proximity switch for Ex-areas). Max. permitted run-out time: 3 minutes, with reference to an average speed of 1750 rpm. After overload has been registered, the sensor must emit a signal to stop the drive line. The blockage or malfunction must be removed.

**CAUTION**

Operation outside of the indicated characteristic data is not permitted. There is a danger of clutch destruction and of ignition.

#### Torque Adjustment

The clutch must only be adjusted within the specified torque range. The torque range is defined through the adjustment dimension “a” from 40 % to 100 %.
If the clutch is set outside of the permitted adjustment range, it is possible that the clutch will not actuate in case of overload. This means that the overload protection will be blocked. This does not mean that the clutch can directly cause ignition. However, if the system torque increases to an unpermitted value, component breakage can be expected.
The user must ensure via simulated disengagement of the clutch before initial operation that the clutch actuates at the required torque value after torque adjustment or torque changes have taken place.

**CAUTION**

Danger of ignition!

### Table 11 (Max. permitted bearing loads)

| Sizes | Axial forces [N] | Radial forces [N] | Transverse force torques [Nm] |
|---|---|---|---|
| **4** | 5000 | 7500 | 50 |
| **5** | 7700 | 11500 | 70 |

#### Re-engagement

Attention: Impacts using metal tools made of steel or aluminium are not to be used for re-engagement, as there is a danger of impact sparks. Tools made of plastic or bronze are suitable. Please observe the danger of electrostatic charging when using plastic tools. In general, please observe the Guidelines in EN 1127-1. When using an automatic re-engagement mechanism, a locking device must be provided which guarantees free stroke on the thrust washer (3) in case of overload, even if re-engagement is actuated. Interfering contours which prevent the thrust washer (3) from disengaging or which are mounted especially for this purpose are not permitted. Free rotation of the clutch and free movement of the clutch components must be ensured before initial operation.

**CAUTION**

Danger of ignition!

### Initial Operation

If no stipulations regarding lacquering or other surface treatments have been made customer-side on order, the clutch surface is protected by a phosphate coating. The clutch must only be used in areas protected from the weather. Additional corrosion protection is required for use in the open air or if the device is subject to weather conditions. Severely corroded clutch components mean a danger of ignition.
The functional components of the clutch must not be stuck together due to paint coatings or other sticky media, and electrostatic charges must not be caused (see EN 13463-1 7.4).
A functional inspection must be carried out before initial operation.
The penetration of dirt or dust influences the grease condition of the clutch and therefore its lifetime. Organic dust binds the grease filling and the lubrication qualities of the grease are lost.
The clutch must be axially secured onto the shaft. Correct securement must be checked before initial operation.
**Do not allow bending torques to be transmitted onto the pressure flange (2) when output elements (toothed belt wheel, sprocket wheels, flanges) are mounted onto the pressure flange (2).**
**Please observe the permitted thread screw-in depths (Table 2, page 7). If the screws inserted into the pressure flange (2) are too long, there is a danger of component destruction and therefore of ignition.**
Overload clutches are rotating parts, which can cause danger of injury due to striking foreign bodies or can cause danger of ignition, should they not be secured properly by a cover. The user is responsible for providing covers for these parts (we recommend rustproof steel). The minimum distance of 5 mm must be observed. The covers must not be made of aluminium.
The respective guidelines and standards must be observed.
Operation in dust layers or in piles of dust is not permitted.
**Only minor radial and axial forces or transverse force torques are permitted to be transferred onto the clutch bearing (Table 11).**
Modifications of the clutch are not permitted. This also refers to changes to the cup spring layering.




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# Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49_._ _4._ Sizes 4 and 5

**(B.4.14.6.ATEX.EN)**

## Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

**EAS®-Compact® overload clutch without a mounted coupling Type 490._ _4.2 and EAS®-Compact® overload clutch with a ROBA®-DS mounted coupling Type 496._ _4.2**

## Classification of Ex Areas Where There is a Danger of Explosion and Permitted Types

**Torque transmission via a key connection acc. DIN 6885/1:**
Dimensioning according to the requirements shaft diameter, transmittable torque and operating conditions must be carried out. For this, the corresponding user data must be known or the customer must carry out the dimensioning according to the valid calculation basis DIN 6892. For the calculation, a hub quality of Re = 400 N/mm$^2$ should be used.
For the dimensioning of the key connections, the permitted tensions common in machine construction must be considered.
During initial operation, check whether the key is inserted correctly and whether the clutch is secured axially.
According to the described clutch combinations and if the measures and guidelines described in the Installation and Operational Instructions are observed, the EAS®-Compact® overload clutch is suitable for use in areas where there is a danger of explosion according to the category:

CE Ex II 2G c T5 –15°C≤Ta≤+80°C D110°C

Permitted Types: 490.524.2 / 490.624.2 / 490.724.2 / 490.824.2
496.524.2 / 496.624.2 / 496.724.2 / 496.824.2

If they are professionally mounted according to the regulations, **backlash-free cone-shaft-hub connections** on the overload clutch are secure connections.
Malfunctions are to be expected if parameters which cannot be influenced by the manufacturers affect the device (surface quality, strength class, shaft tolerance quality) and affect each other. Designs with backlash-free cone-shaft-hub connections are suitable without an additional keyway or without inspection of the transmittable torque in the system (the calculatory transmission guarantee of at least S = 2 must be maintained) for application in areas in which there is a danger of explosion, category:

CE Ex II 3G c T5 –15°C≤Ta≤+80°C D110°C

Permitted Types: 490.514.2 / 490.614.2 / 490.714.2/ 490.814.2
496.514.2 / 496.614.2 / 496.714.2/ 496.814.2

Please observe the guidelines referring to the transmittable torque on cone bushing hubs in the currently valid EAS®-Compact® overload clutch catalogue.

Expected malfunctions can be avoided if the respective customer-side application constellation is checked as to whether the torque transmission capability of the shaft-hub connection can be sufficiently guaranteed (at least 1.5 to the maximum torque on the system). This inspection must be repeated at regular intervals during maintenance work (see maintenance intervals). Furthermore, the transmission guarantee is maintained if a positive locking e.g. a key connection is used in addition to a clamping connection.
In these conditions, clutch application is possible in the following areas:

CE Ex II 2G c T5 –15°C≤Ta≤+80°C D110°C

Permitted Types: 490.514.2 / 490.614.2 / 490.714.2/ 490.814.2
496.514.2 / 496.614.2 / 496.714.2/ 496.814.2

## Conditions to Observe in Ex Areas Where There is a Danger of Explosion

**Clutch Dimensioning**

**Type 496._ _4.2 (ROBA®-DS mounted coupling):**

For suitable clutch dimensioning, please observe the following points:

a) Coupling nominal torque
b) Coupling peak torque
c) Max. speed
d) Max. misalignment compensation capability
e) Ambient conditions (see currently valid ROBA®-DS catalogue)

Despite technical clutch dimensioning, system-dependent vibration excitations may occur during operation, which might lead to resonances and therefore to destructions on the ROBA®-DS coupling. In principle, the coupling is for operation in the subcritical speed range. The total load profile of the system must be run through during initial operation in order to confirm the suitability of the coupling in the system.
Furthermore, clutch malfunctions must be expected if the Installation Guidelines are not observed. The data stated in these Installation and Operational Instructions must be observed.
All tightening torques must be observed.
After having reached the specified Maintenance and Inspection Intervals, the tightening torques must be inspected using a torque wrench. If the specified torques are not observed, component movements due to metal contact and therefore warming up and formation of sparks must be expected.
Constructional modifications of the coupling are not permitted.

**Please observe the applicable ATEX Installation and Operational Instructions for ROBA®-DS couplings.**



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# Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49_._ _4._ Sizes 4 and 5

**(B.4.14.6.ATEX.EN)**

## Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

**EAS®-Compact® overload clutch with a mounted elastomer coupling Type 494._ _4._**

## Classification of Ex Areas Where There is a Danger of Explosion and Permitted Types

**ROBA®-ES and Nor-Mex® mounted coupling with key hub**

According to the described clutch combinations and if the measures and guidelines described in the Installation and Operational Instructions are observed, the EAS®-Compact® overload clutch with a mounted elastomer coupling is suitable for use in areas where there is a danger of explosion according to the category:

CE Ex II 2G c T4/T5
–15°C≤Ta≤+80/60°C D110°C

Permitted Types:

Size 4: 494.524.$\frac{3}{4}$ / 494.624.$\frac{3}{4}$ / 494.724.$\frac{3}{4}$ / 494.824.$\frac{3}{4}$.

Size 5: 494.524.2 / 494.624.2 / 494.724.2 / 494.824.2

For the dimensioning of the key connections, the permitted tensions common in machine construction must be considered. During initial operation, check whether the key is inserted correctly and whether the clutch is secured axially.

**ROBA®-ES mounted coupling with clamping hub and shrink disk huband Nor-Mex® mounted coupling with EAS®-side cone bushing**

The designs with backlash-free shaft-hub connections are in the standard design suitable for application in areas where there is a danger of explosion according to the category:

CE Ex II 3G c T4/T5
–15°C≤Ta≤+80/60°C D110°C

Permitted Types:

Size 4: 494.504.$\frac{3}{4}$ / 494.604.$\frac{3}{4}$ / 494.704.$\frac{3}{4}$ / 494.804.$\frac{3}{4}$.

Size 4: 494.514.$\frac{3}{4}$ / 494.614.$\frac{3}{4}$ / 494.714.$\frac{3}{4}$ / 494.814.$\frac{3}{4}$.

Size 5: 494.514.2 / 494.614.2 / 494.714.2 / 494.814.2

Please observe the guidelines referring to the transmittable torque on clamping and shrink disk hubs in the currently valid ROBA®-ES catalogue.

For the bore diameters on the lastic hubs shown in Table 12, an additional keyway can be used in these designs for secure torque transmission. Furthermore, secure torque transmission is guaranteed if the respective customer-side application constellation is checked as to whether the torque transmission capability of the shaft-hub connection can be sufficiently guaranteed (at least 1.5 to the maximum torque on the system). This inspection must be repeated at regular intervals during maintenance work (see maintenance intervals).
In these conditions, clutch application is possible in the following areas:

CE Ex II 2G c T4/T5
–15°C≤Ta≤+80/60°C D110°C

Permitted Types:

Size 4: 494.504.$\frac{3}{4}$ / 494.604.$\frac{3}{4}$ / 494.704.$\frac{3}{4}$ / 494.804.$\frac{3}{4}$.

Size 4: 494.514.$\frac{3}{4}$ / 494.614.$\frac{3}{4}$ / 494.714.$\frac{3}{4}$ / 494.814.$\frac{3}{4}$.

Size 5: 494.514.2 / 494.614.2 / 494.714.2 / 494.814.2

For the EAS®-compact® overload clutch Size 5 / Type 494._ _4.2 (Nor-Mex® mounted coupling), please observe the guidelines in the valid Nor-Mex® Installation and Operational Instructions for application in areas where there is a danger of explosion.



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# Installation and Operational Instructions for EAS®-Compact® overload clutch Type 49_._ _4._ Sizes 4 and 5

**(B.4.14.6.ATEX.EN)**

## Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

**EAS®-Compact® overload clutch with a mounted elastomer coupling Type 494._ _4._**

## Conditions to Observe in Ex Areas Where There is a Danger of Explosion

**Type 494._ _4.$\frac{3}{4}$ / Size 4 (ROBA®-ES mounted coupling):**

For malfunction-free clutch operation, it is necessary to keep to the coupling characteristic values (Technical Data) indicated on pages 7/8 and in the ROBA®-ES catalogue.

Suitable clutch dimensioning according to the currently valid ROBA®-ES catalogue is necessary for a malfunction-free and extremely low-wear operation.
Large shaft misalignments, in particular with high speeds and an alternating overall load configuration with high frequency, strain and heat up the elastomer material.
Unpermittedly high overall load configuration, unpermittedly high speeds and unpermitted shaft misalignments can destroy the clutch.

**CAUTION**

Danger of ignition!

For suitable clutch dimensioning (see calculation in the currently valid catalogue), please observe the following points:

a) Coupling nominal torque
b) Coupling peak torque
c) Max. speed
d) Max. shaft misalignments
e) Ambient conditions (see currently valid ROBA®-ES catalogue)
f) Service factors (see currently valid ROBA®-ES catalogue)

**CAUTION**

Operation outside of the indicated characteristic data is not permitted. There is a danger of clutch destruction.

The number and type of start-up impacts must be taken into account according to the ROBA®-ES catalogue during coupling dimensioning. Furthermore, elastomer heating may occur due to speed resonance. This must also be taken into account according to the catalogue during coupling dimensioning. Changed operating parameters in the system require a renewed inspection of the clutch dimensioning. The maximum given ambient temperatures are to be kept to. The maximum surface temperature of the coupling changes in dependence of the ambient temperature, see coupling marking. Exceeding the permitted ambient temperature means a danger of elastomer destruction, or the maximum permitted surface temperature of the coupling is exceeded. With destroyed or heavily worn elastomer there is the danger that the metallic claws of the hubs hit each other.

**CAUTION**

Danger of ignition!

**Table 12**

| Type | Bore ranges [mm] for Size 4 | |
|---|---|---|
| 494._04.$\frac{3}{4}$ | $d_{min}$ | 45 |
| | $d_{max}$ | 80 |
| 494._14.$\frac{3}{4}$ | $d_{min}$ | 45 |
| | $d_{max}$ | 75 |

Electrical potential equalization on the coupling must be possible via the mounted shaft ends using the motor or gearbox.

All screws must be secured against loosening using a sealing lacquer, e.g. Loctite 243.

Despite technical clutch dimensioning, system-dependent vibration excitations may occur during operation, which might lead to resonances and therefore to destructions on the coupling. On critical applications, the total load profile of the system must be run through during initial operation in order to confirm the suitability of the coupling in the system.

Furthermore, clutch malfunctions must be expected if the Installation Guidelines are not observed. The data stated in these Installation and Operational Instructions must be observed.
All tightening torques must be observed.
After having reached the specified Maintenance and Inspection Intervals, the tightening torques must be inspected using a torque wrench. If the specified torques are not observed, component movements due to metal contact and therefore warming up and formation of sparks must be expected.
Constructional modifications of the coupling are not permitted.

## Initial Operation

Steel hubs and steel shrink disks have been phosphated manufacturer-side to form a basic corrosion protection. All other components are untreated.

The clutch must be axially secured onto the input and output shaft. Correct securement must be checked before initial operation.
In the key design, please secure the locking set screw with sealing lacquer, e.g. Loctite 243.

Layers of dust on the clutch or operation in piles of dust is not permitted.

The rotating clutch components must be protected against contact and against foreign body impacts.
Please mount a suitable cover onto the clutch.
We recommend using a clutch cover made of stainless steel.
The design must be arranged in such a way that no deformations occur by impacting parts which cause a rubbing of the cover at the clutch (danger of ignition).
The distance from the cover to the rotating components must be at least 5 mm.
The cover must be electrically conductible.
Covers made of aluminium are not permitted.



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## Guidelines and Directives for Operation in Ex Areas Where There is a Danger of Explosion

**EAS®-Compact® overload clutch with a mounted elastomer coupling Type 494._ _4._**

### Maintenance and Inspection Intervals for ROBA®-ES Couplings in Ex Areas Where There is a Danger of Explosion

The following maintenance and inspection intervals are to be maintained:

1.) Visual inspection, inspection of the installation parameters (misalignment and tightening torques) and the coupling running behaviour **before initial operation.**

2.) Visual inspection, torsional backlash and elastomer wear, inspection of the misalignment and the tightening torques, coupling running behaviour **after 1000 h, at the latest after 3 months.**

3.) If no irregularities or wear are found during the second maintenance and inspection interval, further inspection intervals can, with unchanged operating parameters, take place **after 4000 operating hours or after maximum 12 months.**

**Elastomer wear limit:**
No abraded particles are allowed on the elastomeric element (20), as the ROBA®-ES is a backlash-free coupling. The gap between two claws must be filled with the elastomer, with no room for backlash. You should not be able to insert a feeler gauge with a thickness of 0.1 mm (Fig. 22).

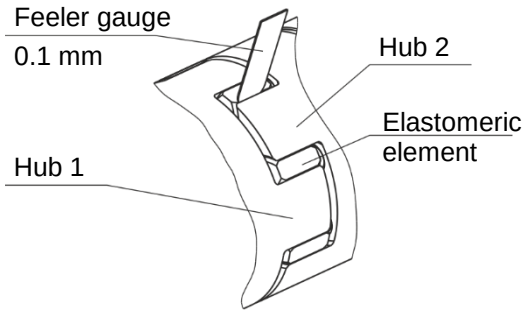


**Fig. 22**

If wear or damages are detected, the affected components must be replaced immediately and the cause of the malfunction must be determined.

Causes of malfunctions could be:

a.) Excessive misalignment
b.) Excessive load (load alternations, start-up impacts, overload)
c.) Ambient influences

Wear or damage on the elastomer coupling manifest themselves as:

a.) Noise development
b.) Troubled running behaviour, vibration occurrences
c.) Formation of cracks on the components
d.) Warming
e.) Loosening of the components
f.) Friction tracks

**CAUTION** Should any irregularities occur, the system must be stopped independently of imminent maintenance and inspection intervals, and the cause of the malfunction must be determined using the Malfunctions / Breakdowns Table.




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## Malfunctions / Breakdowns Type 490._ _4.2

| Result of Malfunction | Possible Causes | Danger Guidelines for Ex Areas | Solutions |
|---|---|---|---|
| Premature clutch release | Incorrect torque adjustment<br>Adjusting nut has changed position<br>Worn clutch | None | 1) Set the system out of operation<br>2) Check the torque adjustment<br>3) Secure the adjusting nut<br>4) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture |
| Clutch does not release on overload | Incorrect torque adjustment<br>Adjusting nut has changed position<br>Disengagement mechanism blocked by a foreign body<br>Worn clutch | Danger of component destruction and related danger of ignition | 1) Set the system out of operation<br>2) Check whether foreign bodies influence the disengagement mechanism function<br>3) Check the torque adjustment<br>4) Secure the adjusting nut<br>5) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture |
| Running noises on overload occurrence as clutch slows down | Bearing on output flange is worn or has been previously damaged<br>Worn disengagement mechanism | Bearing heat-up to bearing destruction<br>Danger of ignition | 1) Set the system out of operation<br>2) Inspect the clutch at the place of manufacture |
| Running noises in normal operation | Insufficient clutch securement<br>Loosened screws<br>Loosened adjusting nut | Danger of ignition | 1) Set the system out of operation<br>2) Check the clutch securement<br>3) Check the screw tightening torques<br>4) Check the torque adjustment and that the adjusting nut sits securely |


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## Malfunctions / Breakdowns Type 494._ _4._ / Size 4

| Result of Malfunction | Possible Causes | Danger Guidelines for Ex Areas | Solutions |
|---|---|---|---|
| Changes in running noise and / or vibration occurrence | Incorrect alignment | Increased temperature on the elastomeric element surface; Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Find / resolve the cause of incorrect alignment (e. g. loose foundation screws, motor securement breakage, heat expansion of system components, changes in the coupling installation dimension “E”)<br>3) Check the clutch for wear |
| | Wear on the elastomeric element, temporary torque transmission due to metal contact | Danger of ignition due to formation of sparks | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary |
| | Tensioning and clamping screws or locking set screw for axial hub securement are loose | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Check the clutch alignment<br>3) Tighten the tensioning and clamping screws for axial hub securement to the required torque or tighten the locking set screw and secure it against self-loosening using sealing lacquer<br>4) Check the clutch for wear |
| Cam breakage | Wear on the elastomeric element, torque transmission due to metal contact | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Replace the entire clutch<br>3) Check the alignment |
| | Cam breakage due to high impact energy / overload / excessively high shaft misalignments | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Replace the entire clutch<br>3) Check the alignment<br>4) Find the cause of overload |
| | Operating parameters are not appropriate for the clutch performance | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Check the operating parameters and select a suitable clutch (observe installation space)<br>3) Install a new clutch<br>4) Check the alignment |
| | Operational mistakes due to clutch characteristic data being exceeded | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Check clutch dimensioning<br>3) Replace the entire clutch<br>4) Check the alignment<br>5) Train and advise operating personnel |
| Premature wear on the elastomeric element | Incorrect alignment | Increased temperature on the elastomeric element surface; Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Find / resolve the cause of incorrect alignment (e. g. loose foundation screws, motor securement breakage, heat expansion of system components, changes in the coupling installation dimension “E”)<br>3) Check the clutch for wear |


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## Malfunctions / Breakdowns Type 494._ _4._ / Size 4 (continued)

| Result of Malfunction | Possible Causes | Danger Guidelines for Ex Areas | Solutions |
|---|---|---|---|
| Premature wear on the elastomeric element | e.g. contact with aggressive liquids / oils, ozone influences, excessively high ambient temperature etc., which lead to physical changes in the elastomeric element | Danger of ignition due to formation of sparks on metallic contact of the cams | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary<br>6) Make sure that further physical changes to the elastomeric element can be ruled out |
| | The ambient or contact temperatures permitted for the elastomeric element are exceeded see Table 5 | Danger of ignition due to formation of sparks on metallic contact of the cams | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary<br>6) Check the ambient or contact temperature and regulate them (if necessary, use other elastomeric element materials) |
| Premature wear on the elastomeric element (material liquidation inside the elastomeric element toothing) | Drive vibrations | Danger of ignition due to formation of sparks on metallic contact of the cams | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary<br>6) Find the cause of vibration (if necessary, use an elastomeric element with a lower or higher shore hardness) |


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## Malfunctions / Breakdowns Type 494._ _4.2 / Size 5

| Result of Malfunction | Possible Causes | Danger Guidelines for Ex Areas | Solutions |
|---|---|---|---|
| Changes in running noise and / or vibration occurrence | Incorrect alignment | Increased temperature on the elastomeric element surface; Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Find / resolve the cause of incorrect alignment (e. g. loose foundation screws, motor securement breakage, heat expansion of system components, changes in the clutch installation dimension “Z”)<br>3) Check the clutch for wear |
| | Wear on the elastomeric element, temporary torque transmission due to metal contact | Danger of ignition due to formation of sparks | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary |
| | Unbalance | Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Check the balance condition of the system components and correct if necessary<br>3) Check the clutch parts for wear<br>4) Check the alignment and correct if necessary |
| | Loose connection screws | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Check the clutch alignment<br>3) Tighten the connection screws to the required torque or tighten the locking set screw and secure it against self-loosening using sealing lacquer<br>4) Check the clutch for wear |
| Cam breakage | Wear on the elastomeric element, torque transmission due to metal contact | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Replace the entire clutch<br>3) Check the alignment |
| | Cam breakage due to high impact energy / overload | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Replace the entire clutch<br>3) Check the alignment<br>4) Find the cause of overload |
| | Operating parameters are not appropriate for the clutch performance | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Check the operating parameters and select a suitable clutch (observe installation space)<br>3) Install a new clutch<br>4) Check the alignment |
| | Operational mistakes on the system unit due to clutch characteristic data being exceeded | Danger of ignition due to hot surfaces and formation of sparks | 1) Set the system out of operation<br>2) Check clutch dimensioning<br>3) Replace the entire clutch<br>4) Check the alignment<br>5) Train and advise operating personnel |


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**Malfunctions / Breakdowns Type 494._ _4.2 / Size 5 (continued)**

| Result of Malfunction | Possible Causes | Danger Guidelines for Ex Areas | Solutions |
|---|---|---|---|
| Premature wear on the elastomeric element | Incorrect alignment | Increased temperature on the elastomeric element surface; Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Find / resolve the cause of incorrect alignment (e. g. loose foundation screws, motor securement breakage, heat expansion of system components, changes in the clutch installation dimension “Z”)<br>3) Check the clutch for wear<br>4) Insert a new elastomeric element |
| | e.g. contact with aggressive liquids / oils, ozone influences, excessively high ambient temperature etc., which lead to physical changes in the elastomeric element | Danger of ignition due to formation of sparks on metallic contact of the cams | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary<br>6) Make sure that further physical changes to the elastomeric element can be ruled out |
| | The ambient or contact temperatures permitted for the elastomeric element are exceeded | Danger of ignition due to formation of sparks on metallic contact of the cams | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary<br>6) Check the ambient or contact temperature and regulate them (if necessary, use other elastomeric element materials) |
| Premature wear on the elastomeric element (material liquidation inside the elastomeric element toothing) | Drive vibrations | Danger of ignition due to formation of sparks on metallic contact of the cams | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the elastomeric element<br>3) Check the clutch parts and replace if damaged<br>4) Insert a new elastomeric element, install clutch components<br>5) Check the alignment and correct if necessary<br>6) Find the cause of vibration (if necessary, use an elastomeric element with a lower or higher shore hardness) |



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## Malfunctions / Breakdowns Type 496._ _4.2

| Result of Malfunction | Possible Causes | Danger Guidelines for Ex Areas | Solutions |
|---|---|---|---|
| Changes in running noise and / or vibration occurrence | Incorrect alignment, incorrect installation | Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Find / resolve the cause of incorrect alignment<br>3) Check the clutch for wear |
| | Loose connecting screws, minor fretting corrosion under the screw head and on the disk pack | Danger of ignition due to hot surfaces | 1) Set the system out of operation<br>2) Check the clutch parts and replace if damaged<br>3) Tighten the connecting screws to the specified torque<br>4) Check the alignment and correct if necessary |
| | Tensioning screws or locking set screw for axial securement of the hubs are loose | Danger of ignition due to hot surfaces or impact sparks | 1) Set the system out of operation<br>2) Check the clutch alignment<br>3) Tighten the tensioning and clamping screws for axial hub securement to the required torque or tighten the locking set screw and secure it against self-loosening using sealing lacquer<br>4) Check the clutch for wear |
| Disk pack breakage | Disk pack breakage due to high load impacts / overload | Danger of ignition due to impact sparks | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the disk packs<br>3) Check the clutch parts and replace if damaged<br>4) Find the cause of overload and remove it |
| | Operating parameters are not appropriate for the clutch performance | Danger of ignition due to impact sparks | 1) Set the system out of operation<br>2) Check the operating parameters and select a suitable clutch (observe installation space)<br>3) Install a new clutch<br>4) Check the alignment |
| | Incorrect operation of the system unit | Danger of ignition due to impact sparks | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the disk packs<br>3) Check the clutch parts and replace if damaged<br>4) Train and advise operating personnel |
| Disk packs / connecting screws cracks or breakage | Drive vibrations | Danger of ignition due to impact sparks | 1) Set the system out of operation<br>2) Dismantle the clutch and remove the remainders of the disk packs<br>3) Check the clutch parts and replace if damaged<br>4) Check the alignment and correct if necessary<br>5) Find the cause of vibration and remove it |

**Please Observe!**
*mayr*® will take no responsibility or guarantee for replacement parts and accessories which have not been delivered by *mayr*®, or for damage resulting from the use of these products.


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# EU Declaration of Conformity

According to the EU Directive on the harmonisation of the laws of the Member States concerning devices and protective systems intended for use in areas where there is a danger of explosion (ATEX) 2014/34/EU, we:

**Chr. Mayr GmbH + Co. KG**
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**D-87665 Mauerstetten**

hereby declare that the product described in these Installation and Operational Instructions

**EAS®-Compact® overload clutch**
**Type 49_._ _4._X**
**Sizes 4 and 5**

has been developed, constructed and produced by us in accordance with the EU Directive named above.

## Applied Standards, Regulations and Inspections (ASRI)

1 DIN EN 1127-1: 2011-10
Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

2 DIN EN 13463-1: 2009-07
Non-electrical equipment intended for use in potentially explosive atmospheres - Part 1: Basic method and requirements

3 DIN EN 13463-5: 2011-10
Non-electrical equipment intended for use in potentially explosive atmospheres - Part 5: Protection by constructional safety “c”

Mauerstetten, June 01, 2016
Place / Date

Graduate Engineer (FH, University of Applied Science) Günther Klingler
(Managing Director ppa.)



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