Installation and Operational Instructions for EAS®-compact® overload clutch, Type 49_._ _4._ Sizes 4 and 5 (B.4.14.6.EN)

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

Contents

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Safety and Guideline Signs

CAUTION

Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

Safety Regulations

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

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

CAUTION

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

User-implemented Protective Measures

- ❒ Cover all moving parts to protect against seizure, dust impacts or foreign body impact.
- ❒ Replace self-locking hexagon nuts when they become ineffective after frequent loosening and tightening (for ROBA®-DS connection).
- ❒ The clutches may not be put into operation without a limit switch unless *mayr*® has been contacted and has agreed otherwise.

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

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

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EAS®-compact® overload clutch, Type 490. _ _ 4.2

Type 490. _ 24.2 Design with keyway

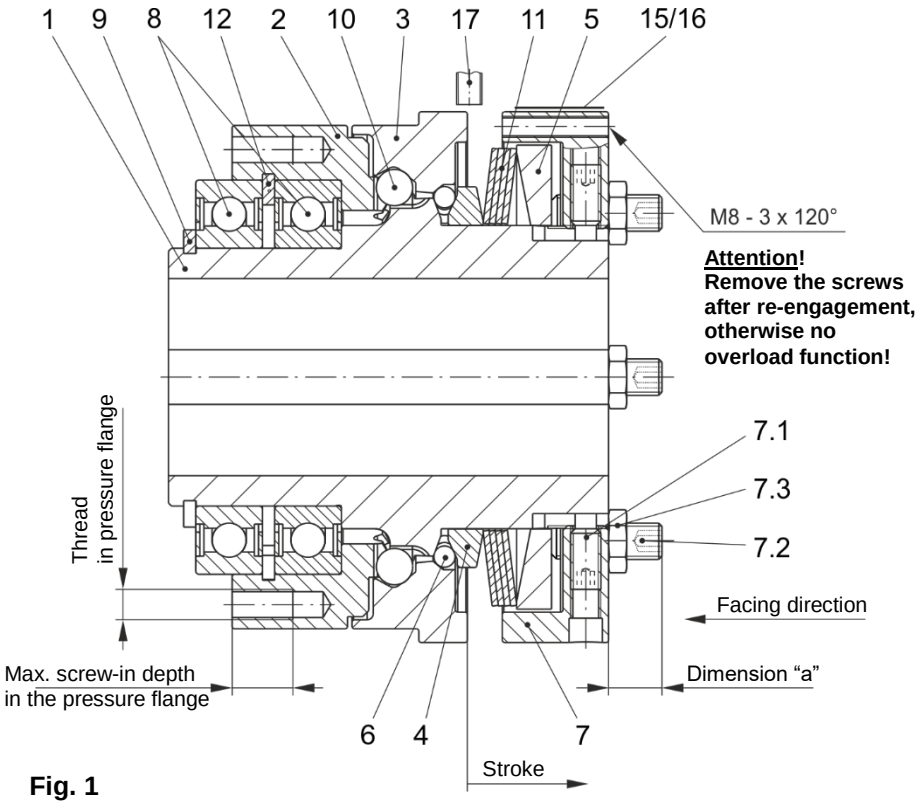

Fig. 1

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

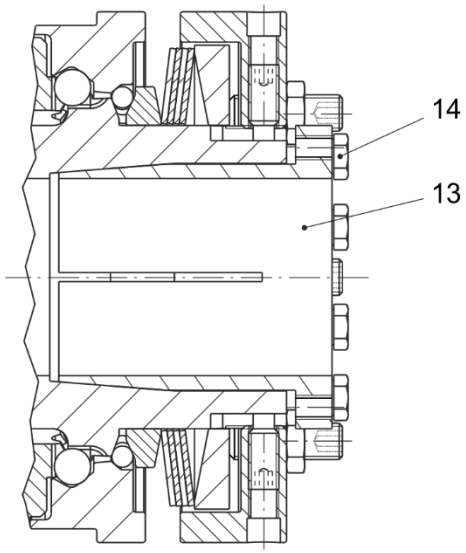

Fig. 2

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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

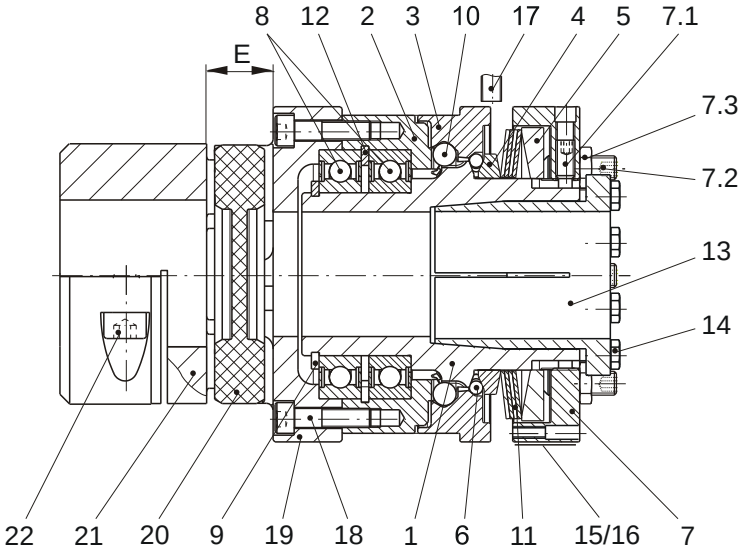

Fig. 3

Type 494. _ 14. 3/4
Lastic-side: Shrink disk
EAS®-side: Cone bushing

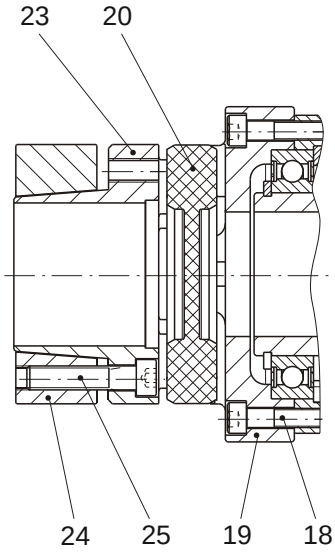

Fig. 4

Type 494. _ 24. 3/4
Lastic-side: Keyway
EAS®-side: Keyway

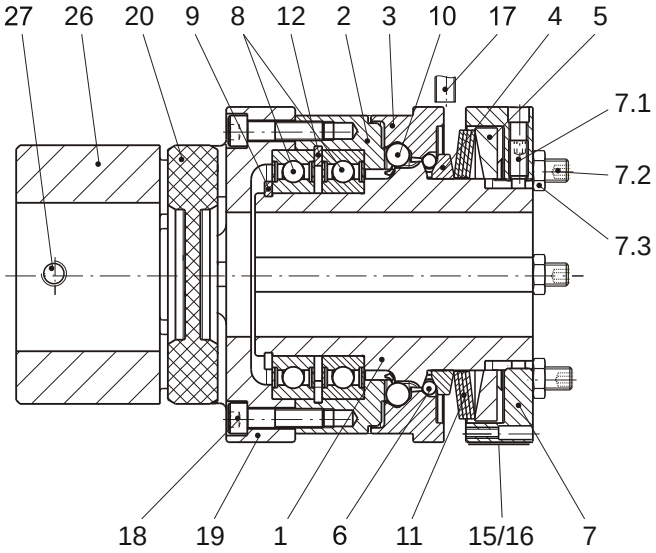

Fig. 5

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
20	Elastomeric element
21	Clamping hub
22	Cap screw

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

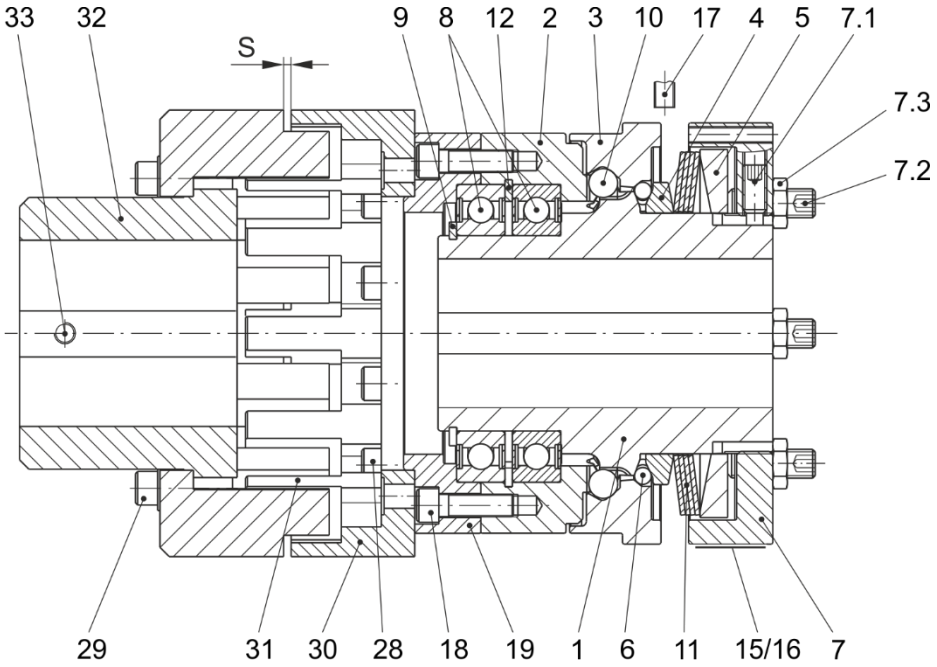

Fig. 6

Type 494. _ 14.2
Lastic-side: Keyway
EAS®-side: Cone bushing

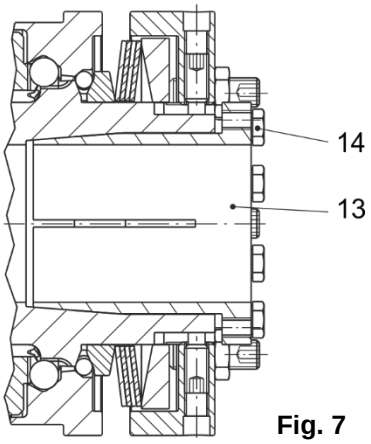

Fig. 7

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
(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

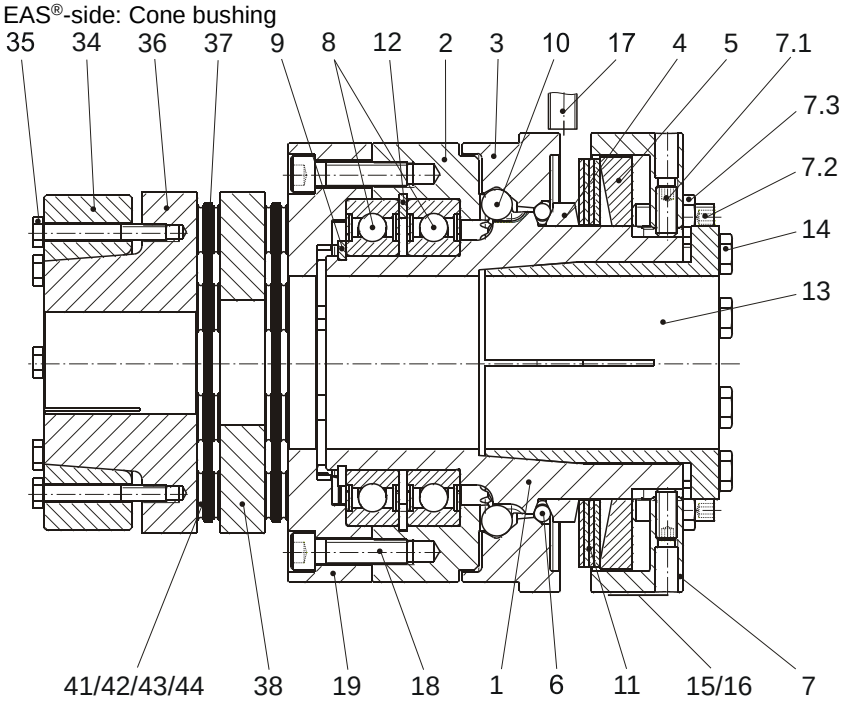

Fig. 8

Type 496. _ 24.2
Lastic-side: Keyway
EAS®-side: Keyway

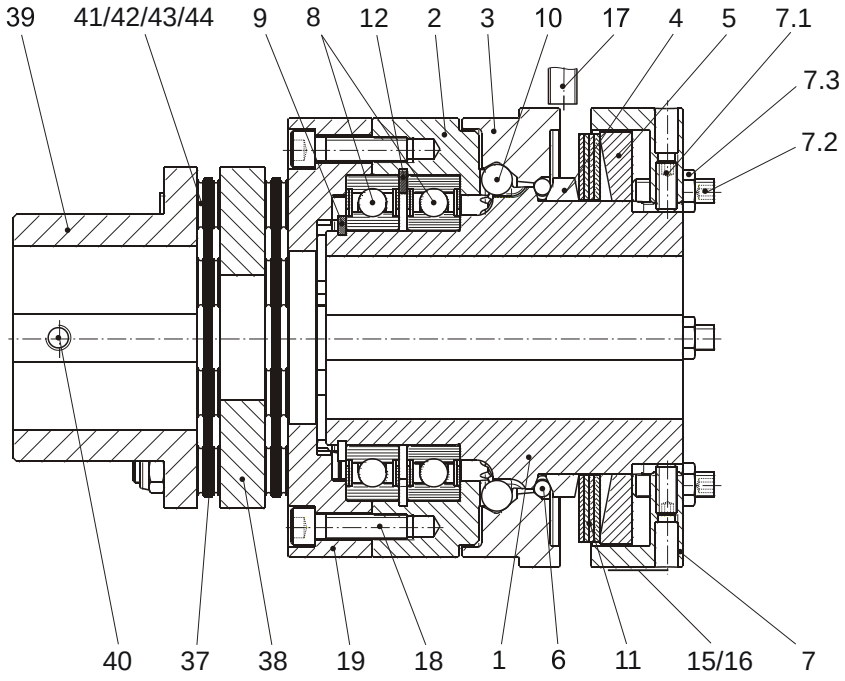

Fig. 9

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Technical Data

Table 1

Size	Limit torque for overload M_G				Max. speed [rpm]	Thrust washer (Fig. 1; Item 3) stroke on overload [mm]	Bore from – to	
	Type 490.5_4.2 [Nm]	Type 490.6_4.2 [Nm]	Type 490.7_4.2 [Nm]	Type 490.8_4.2 [Nm]			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

Size	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

Size	Flexible backlash-free shaft coupling Type 494._ _ 4.$^{3}_{4}$					
	Bore hub from – to			Screw tightening torques		
	Clamping hub Item 21 [mm]	Shrink disk hub Item 23 [mm]	Key hub Item 26 [mm]	Item 18 [Nm]	Item 22 [Nm]	Item 25 [Nm]
4	45 – 80	45 – 75	38 – 80	75	200	100

Table 4

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

Table 5

Size	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

Size	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

Size	Flexible shaft coupling Type 494._ _ 4.2						
	Nominal and maximum torques				Max. permitted shaft misalignments		
	Type 494. 5 6 7 _ 4.2 Flexible intermediate ring Pb 72 Sh A		Type 494.8 _ 4.2 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

Size	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]	Items 41/44 [Nm]
4	55 – 90	35 – 70	75	25	35
5	50 – 85	45 – 90	122	35	120

Table 9

Size	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 output are separated residual torque-free.
A mounted limit switch registers the disengagement movement and switches off the drive.
After-acting masses can slow down freely.

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.

The level of engagement force required is dependent on the set limit torque for overload, and can be roughly calculated using the following formula:

F_E = 2.5 x M_G [N]

F_E = Engagement force of the clutch [N].

M_G = Set limit torque for overload [Nm].

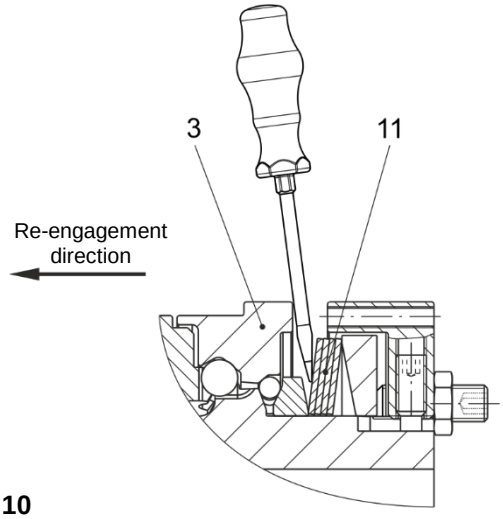

Fig. 10

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 centered 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 center 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

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

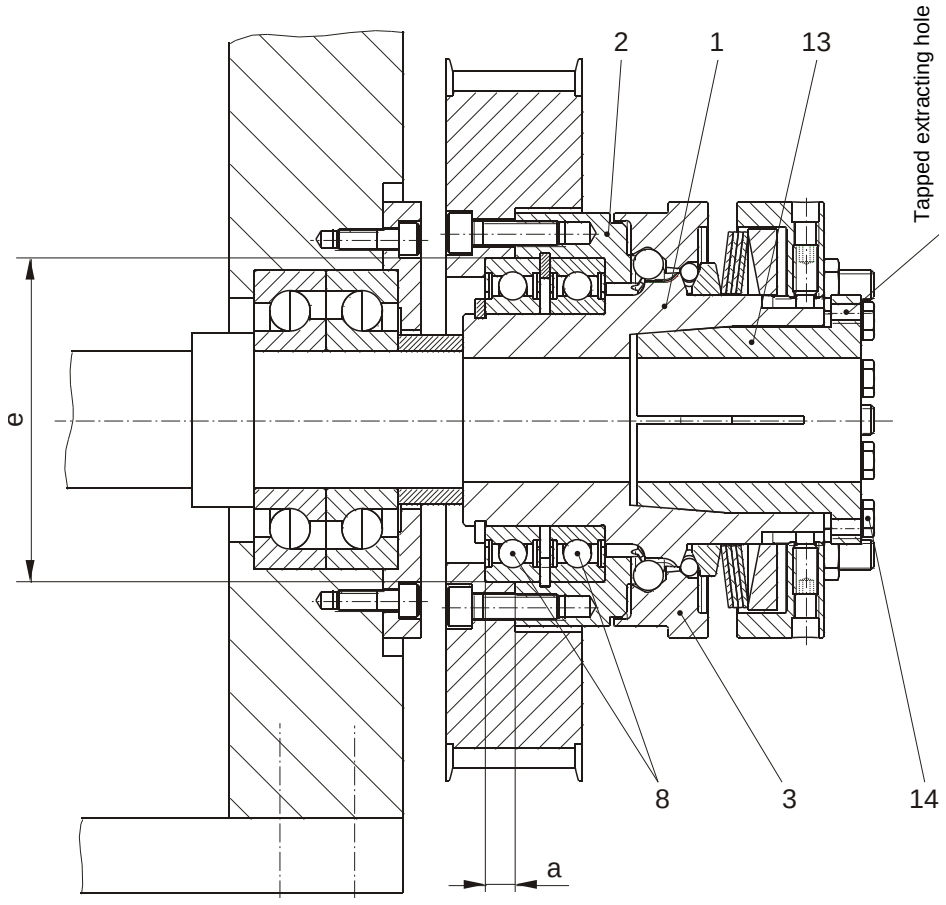

Fig. 11

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Cup Spring Layering (Fig. 12)

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

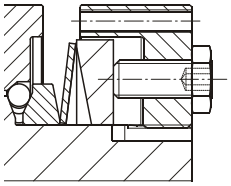
For the lower torque range, **one** cup spring (Type 49_.**5**_ 4._),

for the medium torque range, **two** cup springs (Type 49_.**6**_ 4._),

for the high torque range, **four** cup springs (Type 49_.**7**_ 4._)

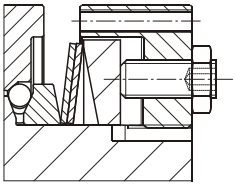
and for the maximum torque range **five** cup springs (Type 49_.**8**_ 4._) are installed.

1x layered



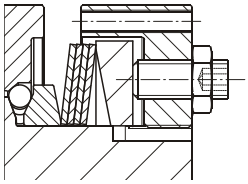
Type 49_.5_4._

2x layered



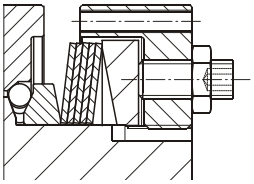
Type 49_.6_4._

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. C45 +QT, 42CrMoS4 +QT.
- ❒ 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 center 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 "S" = 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.

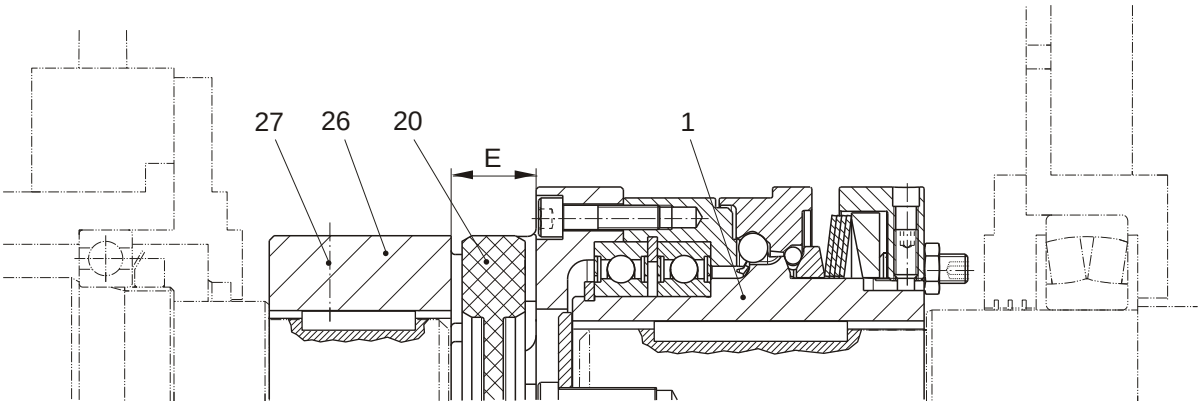

Fig. 13

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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. 14. 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 clutch 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.

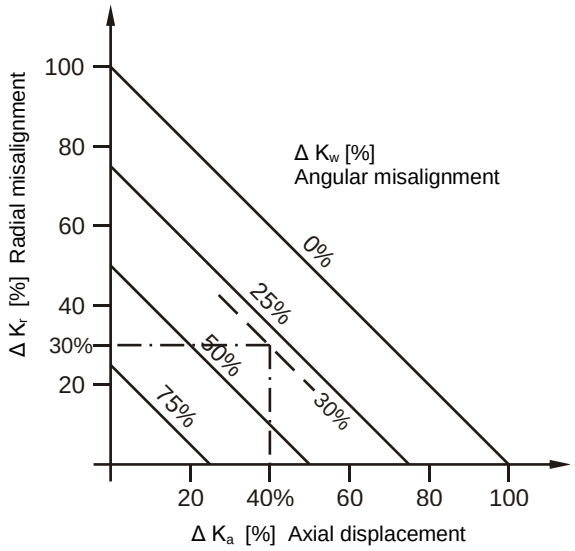
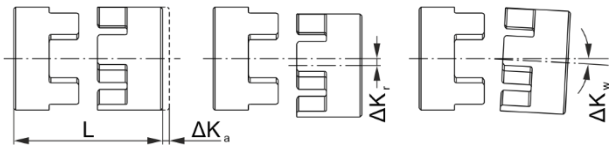


Fig. 14

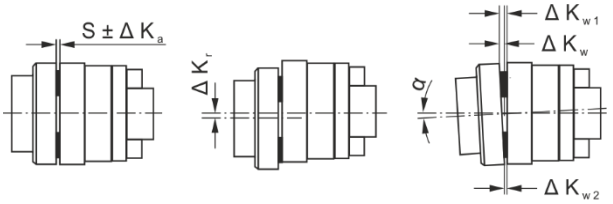
Type 494._ _4._ (Size 4)



Axial displacement | Radial misalignment | Angular misalignment

Fig. 15

Type 494._ _4.2 (Size 5)

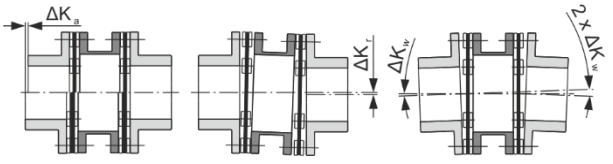


Difference dimension $\Delta K_w = \Delta K_{w1} - \Delta K_{w2}$
Please measure dimensions ΔK_{w1} and ΔK_{w2} vertically and horizontally offset by 180°.

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.
If no particular torque adjustment is requested customer-side, the clutch will always 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 Fig. 18).
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).

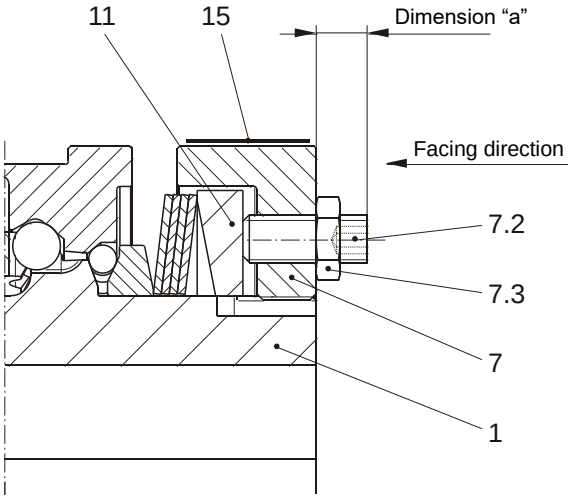

Fig. 18

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).

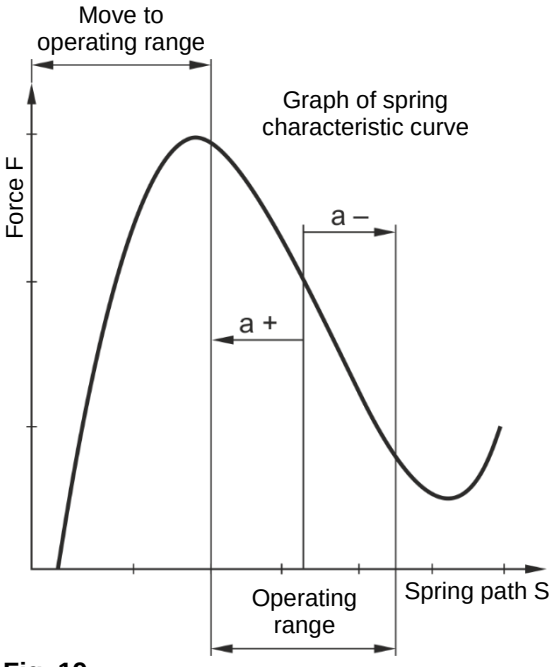

Fig. 19

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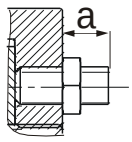
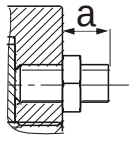
Adjustment Tables (Item 15)



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.
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.

Limit Switch Installation

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

Contactless limit switch (mounting example)

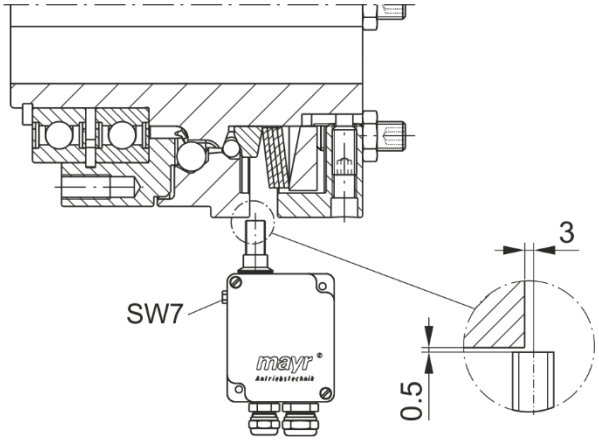


Fig. 21

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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 4 and 5) must be maintained.
- ➔ Inspection of the set torque
- ➔ Clutch release inspection
- ➔ Inspection of the bearing or bearing pre-tension
- ➔ Re-greasing of the transmission geometries, balls, recesses and sealing elements.

Clutch re-greasing must only be carried out 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 maintenance intervals.
We recommend that maintenance work is carried out at the site of manufacture.

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 aluminum components:
Non-ferrous metals (Code No. 160118)

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

Malfunctions / Breakdowns Type 490._ _4.2

Result of Malfunction	Possible Causes	Solutions
Premature clutch release	Incorrect torque adjustment Adjusting nut has changed position Worn clutch	1) Set the system out of operation 2) Check the torque adjustment 3) Secure the adjusting nut 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 Adjusting nut has changed position Disengagement mechanism blocked by a foreign body Worn clutch	1) Set the system out of operation 2) Check whether foreign bodies influence the disengagement mechanism function 3) Check the torque adjustment 4) Secure the adjusting nut 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 Worn disengagement mechanism	1) Set the system out of operation 2) Inspect the clutch at the place of manufacture
Running noises in normal operation	Insufficient clutch securement Loosened screws Loosened adjusting nut	1) Set the system out of operation 2) Check the clutch securement 3) Check the screw tightening torques 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	Solutions
Changes in running noise and / or vibration occurrence	Incorrect alignment	1) Set the system out of operation 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 distance dimension “E”) 3) Check the clutch for wear
	Wear on the elastomeric element, temporary torque transmission due to metal contact	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary
	Tensioning and clamping screws or locking set screw for axial hub securement are loose	1) Set the system out of operation 2) Check the clutch alignment 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 4) Check the clutch for wear
Cam breakage	Wear on the elastomeric element, torque transmission due to metal contact	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment
	Cam breakage due to high impact energy / overload / excessively high shaft misalignments	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment 4) Find the cause of overload
	Operating parameters are not appropriate for the clutch performance	1) Set the system out of operation 2) Check the operating parameters and select a suitable clutch (observe installation space) 3) Install a new clutch 4) Check the alignment
	Operational mistakes due to clutch characteristic data being exceeded	1) Set the system out of operation 2) Check clutch dimensioning 3) Replace the entire clutch 4) Check the alignment 5) Train and advise operating personnel
Premature wear on the elastomeric element	Incorrect alignment	1) Set the system out of operation 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 distance dimension “E”) 3) Check the clutch for wear

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

Result of Malfunction	Possible Causes	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	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary 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 4	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary 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	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary 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	Solutions
Changes in running noise and / or vibration occurrence	Incorrect alignment	1) Set the system out of operation 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 distance dimension “S”) 3) Check the clutch for wear
	Wear on the elastomeric element, temporary torque transmission due to metal contact	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary
	Unbalance	1) Set the system out of operation 2) Check the balance condition of the system components and correct if necessary 3) Check the clutch parts for wear 4) Check the alignment and correct if necessary
	Loose connection screws	1) Set the system out of operation 2) Check the clutch alignment 3) Tighten the connection screws to the required torque or tighten the locking set screw and secure it against self-loosening using sealing lacquer 4) Check the clutch for wear
Cam breakage	Wear on the elastomeric element, torque transmission due to metal contact	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment
	Cam breakage due to high impact energy / overload	1) Set the system out of operation 2) Replace the entire clutch 3) Check the alignment 4) Find the cause of overload
	Operating parameters are not appropriate for the clutch performance	1) Set the system out of operation 2) Check the operating parameters and select a suitable clutch (observe installation space) 3) Install a new clutch 4) Check the alignment
	Operational mistakes on the system unit due to clutch characteristic data being exceeded	1) Set the system out of operation 2) Check clutch dimensioning 3) Replace the entire clutch 4) Check the alignment 5) Train and advise operating personnel

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Malfunctions / Breakdowns Type 494._ _ 4.2 / Size 5 (continued)

Result of Malfunction	Possible Causes	Solutions
Premature wear on the elastomeric element	Incorrect alignment	1) Set the system out of operation 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 distance dimension “S”) 3) Check the clutch for wear 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	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary 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	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary 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	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the elastomeric element 3) Check the clutch parts and replace if damaged 4) Insert a new elastomeric element, install clutch components 5) Check the alignment and correct if necessary 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	Solutions
Changes in running noise and / or vibration occurrence	Incorrect alignment, incorrect installation	1) Set the system out of operation 2) Find / resolve the cause of incorrect alignment 3) Check the clutch for wear
	Loose connecting screws, minor fretting corrosion under the screw head and on the disk pack	1) Set the system out of operation 2) Check the clutch parts and replace if damaged 3) Tighten the connecting screws to the specified torque 4) Check the alignment and correct if necessary
	Tensioning screws or locking set screw for axial securement of the hubs are loose	1) Set the system out of operation 2) Check the clutch alignment 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 4) Check the clutch for wear
Disk pack breakage	Disk pack breakage due to high load impacts / overload	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the disk packs 3) Check the clutch parts and replace if damaged 4) Find the cause of overload and remove it
	Operating parameters are not appropriate for the clutch performance	1) Set the system out of operation 2) Check the operating parameters and select a suitable clutch (observe installation space) 3) Install a new clutch 4) Check the alignment
	Incorrect operation of the system unit	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the disk packs 3) Check the clutch parts and replace if damaged 4) Train and advise operating personnel
Disk packs / connecting screws cracks or breakage	Drive vibrations	1) Set the system out of operation 2) Dismantle the clutch and remove the remainders of the disk packs 3) Check the clutch parts and replace if damaged 4) Check the alignment and correct if necessary. 5) Find the cause of vibration and remove it

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