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

(B.4.14.2.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 13 and 15. 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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Design with keyway

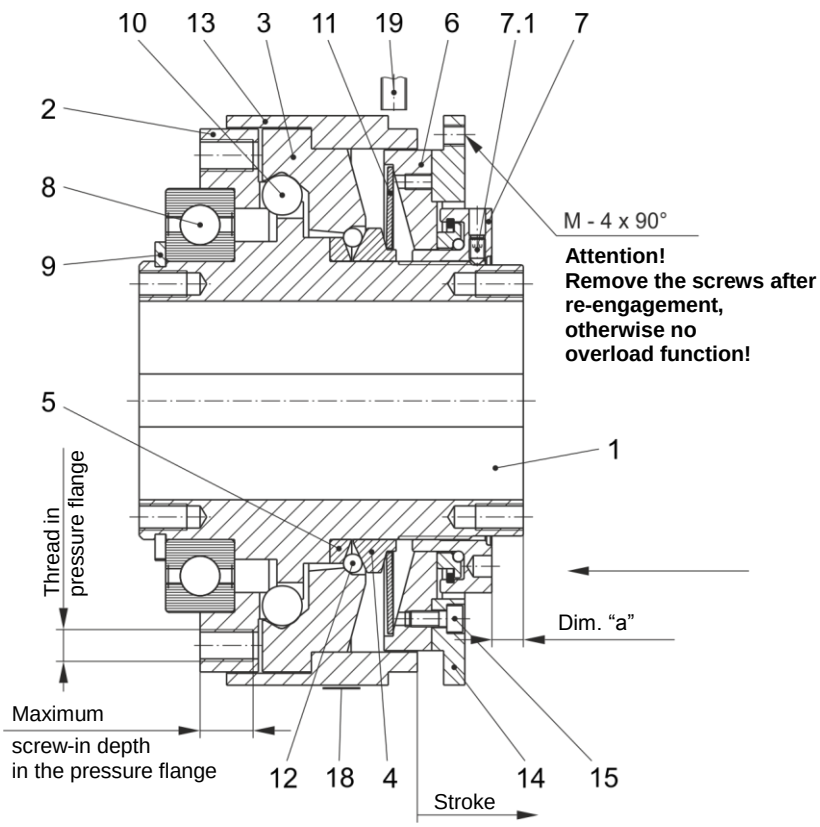

Fig. 1

Design with cone bushing

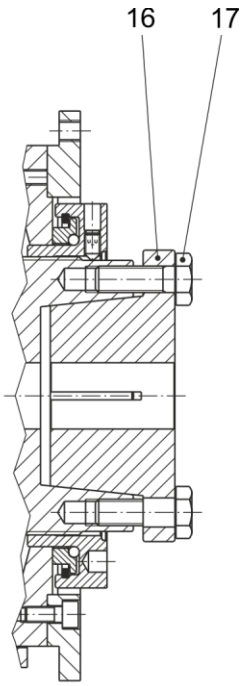

Fig. 2

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

Item	Name
1	Hub
2	Pressure flange
3	Thrust washer
4	Thrust ring
5	Supporting ring
6	Intermediate disk
7	Adjusting nut
7.1	Set screw [1)]
8	Deep groove ball bearing
9	Locking ring

Item	Name
10	Steel ball
11	Cup spring
12	Steel ball
13	Sealing cover
14	Engagement disk
15	Cap screw
16	Cone bushing
17	Hexagon head screw
18	Type tag
19	Limit switch [2)]

[1)] Secure the set screws Item 7.1 with Loctite 243

[2)] 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._

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

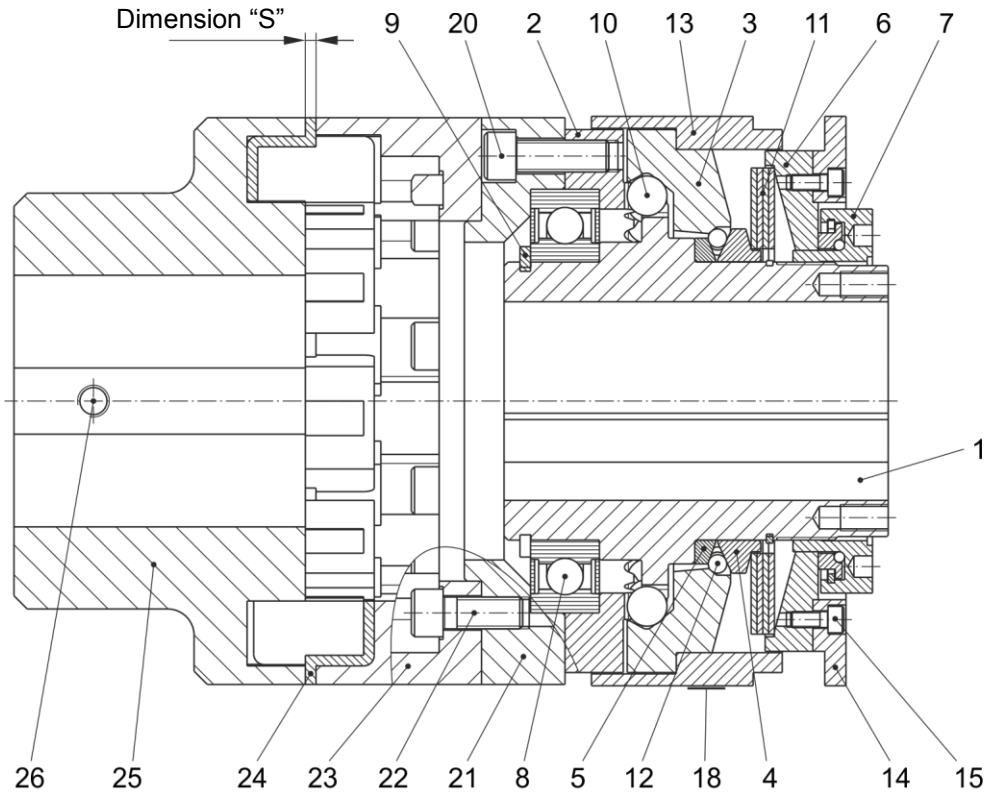

Fig. 3

Type 494. _ 14._
Lastic-side: Keyway
EAS®-side: Cone bushing

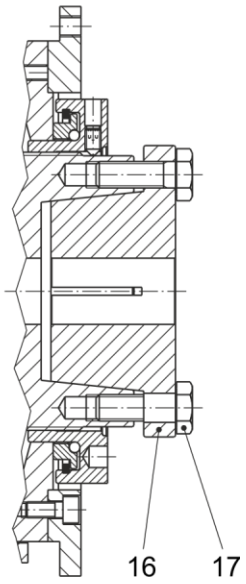

Fig. 4

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

Item	Name
1 – 19	see Type 490._ _ 4._ (page 3)
20	Cap screw
21	Flange
22	Cap screw
23	Cam ring
24	Flexible intermediate ring (elastomeric element)
25	Hub
26	Set screw

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Technical Data

Table 1

Sizes	Limit torques for overload M_G			Max. speed [rpm]	Thrust washer stroke (Fig. 1; Item 3/13) on overload [mm]	Bore from – to	
	Type 49_.5_4._ [Nm]	Type 49_.6_4._ [Nm]	Type 49_.7_4._ [Nm]			Type 49_._14._ [mm]	Type 49_._24._ [mm]
4	175 – 350	350 – 700	700 – 1400	3000	5.5	42 – 65	40 – 70
5	350 – 700	700 – 1400	1400 – 2800	2000	7.0	50 – 75	45 – 90

Table 2:

Sizes	Type 49_.5_4._		Type 49_.6_4._		Type 49_.7_4._	
	Maximum torque M_G [Nm]	Inspection dimension “a” (Fig. 1) at approx.70 % M_G [mm]	Maximum torque M_G [Nm]	Inspection dimension “a” (Fig. 1) at approx.70 % M_G [mm]	Maximum torque M_G [Nm]	Inspection dimension “a” (Fig. 1) at approx.70 % M_G [mm]
4	350	12.4	700	10.4	1400	6.2
5	700	13.6	1400	11.2	2800	6.1

Table 3

Sizes	Thread in pressure flange (2) (Fig. 1)	Max. screw-in depth in the pressure flange (2) (Fig. 1) [mm]	Thread “M” in the engagement disk (14) (Fig. 1)	Permitted ambient temperature	Max. permitted		
					axial forces [N]	radial forces [N]	transverse force torques [3] [Nm]
4	6 x M12	20	4 x M8	-15 °C to +80 °C	4800	4800	50
5	6 x M16	22	4 x M10	-15 °C to +80 °C	7700	7700	70

[3] 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 4

Sizes	Screw tightening torques [Nm]			
			for mounting the output element onto the pressure flange (2) for Type	
	Item 7.1	Item 17	49_.5_4._ and 49_.6_4._ screw quality 8.8	49_.7_4._ screw quality 12.9
4	4.1	40	80	135
5	8.5	60	195	330

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Technical Data

Table 5

Sizes	Flexible shaft coupling Type 494._ _ 4._			
	Bore hub from – to	Dimension "S"	Screw tightening torques	
	Item 25 [mm]	[mm]	Item 20 [Nm]	Item 22 [Nm]
4	55 – 95	4	120	74
5	60 – 110	4	175	120

Table 6

Sizes	Flexible shaft coupling Type 494._ _ 4._				
	Nominal and maximum torques		Max. permitted shaft misalignments		
	T_{KN} [Nm]	$T_{K\ max.}$ [Nm]	Axial ΔKa [mm]	Radial ΔKr [mm]	Angular ΔKw [mm]
4	1500	3100	± 2	0.15	0.15
5	2400	4800	± 2	0.15	0.15

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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 4 locking set screws (7.1) are not provided with screw securement on a pre-set clutch.

Before initial operation of the clutch, please secure the locking set screws (7.1), e.g. using Loctite 243.

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.

In order to make the clutch functional again after an overload occurrence, the clutch must be engaged using the engagement disk (14) and 4 screws.
After re-engagement has taken place, the screws must be removed immediately from the engagement disk (14) (blockage, danger of ignition).

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 to the sealing cover (13) using 4 screws (Fig. 1; provided by the customer: M8 for Size 4; M10 for Size 5), evenly screwed into the engagement disk (14).
It may be necessary to turn slightly between the pressure flange (2) and the thrust washer (3) incl. the sealing cover (13).

CAUTION

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

General Installation Guidelines

As standard the bores in the hub (Items 1 and 25) are provided with a H7 tolerance.
The surface roughness depth in the bore is produced to Ra = 1.6 µm.

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Installation of the Output Elements (Fig. 5)

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), see Fig. 1, page 3 and Table 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 3, an additional bearing for the output element is not necessary.
No appreciable axial forces (see Table 3) should be transferred from the output element onto the clutch pressure flange (2).
The EAS®-Compact® with a long protruding hub (Type 490._ _ 4.1) is recommended for extremely wide output elements, or for elements with small diameters. 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. 5).

Please observe the connection dimensions “a” and “e” for the output elements (Fig. 5 and Table 7).

Table 7

Sizes	Connection dimensions	
	a	e
4	13 $^{+0.1}$	160 h5
5	14 $^{+0.1}$	180 h5

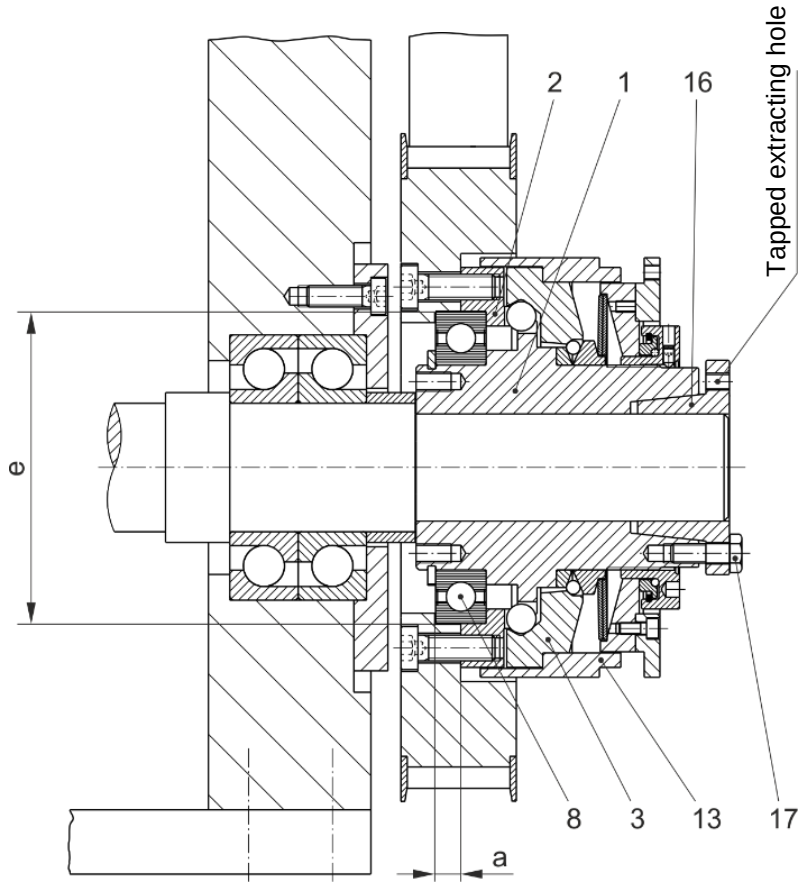

Fig. 5

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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/mm^2, 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 onto the shaft using a suitable device and bring it into the correct position.
- ❒ Tighten the tensioning screws (hexagon head screws Item 17) 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 (16) when tightening the cone bushing (16).

De-installation

There are tapped extracting holes next to the tensioning screws (hexagon head screws Item 17) in the cone bushings (16).

1) Loosen all tensioning screws (17).
2) Screw out the tensioning screws (17) 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.

Shaft Installation via Key Connection

On the EAS®-Compact® with a keyway, the clutch must be axially fixed onto the shaft after mounting.
This securing procedure can be carried out e.g. 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. 1 and 3.

Joining Both Clutch Components EAS®-Compact® Type 494._ _4._ (Figs. 3 and 4)

The flexible intermediate ring (24) is pre-tensioned between the metal claws by joining component 23 with component 25. To do this, an axial installation force is required.
The amount of force required can be reduced by lightly greasing the intermediate ring (24).

Use PU-compatible lubricants (e. g. Mobilith SHC460)!
No unpermittedly high axial pressure should be placed on the intermediate ring (24) in completely assembled condition.
Keep to distance dimension "S", see Fig. 3 and Table 5!

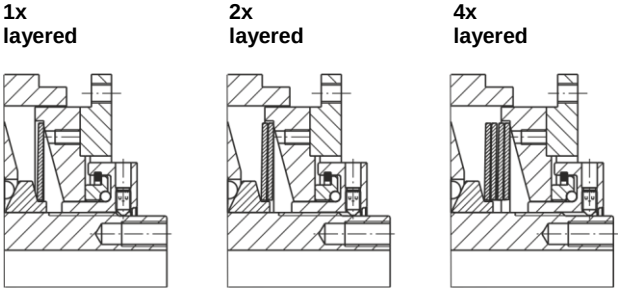
Cup Spring Layering (Fig. 4)

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._),

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



Type 49_.5_4._ Type 49_.6_4._ Type 49_.7_4._

Fig. 6

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Permitted Shaft Misalignments Type 494._ _4._

The EAS®-Compact® clutches Type 494._ _ 4._ compensate for radial, axial and angular shaft misalignments (Fig. 8).
However, the permitted shaft misalignments indicated in Table 6 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. 7. 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 Table 6 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:

Axial displacement occurrence K_a = 0.8 mm equals 40 % of the permitted maximum value $K_{a\,max}$ = 2 mm.
Angular misalignment occurrence K_w = 0.045 mm equals 30 % of the permitted maximum value $K_{w\,max}$ = 0.15 mm.
=> permitted radial misalignment K_r = 30 % of the maximum value $K_{r\,max}$ = 0.15 mm => K_r = 0.045 mm

Clutch Alignment Type 494._ _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.

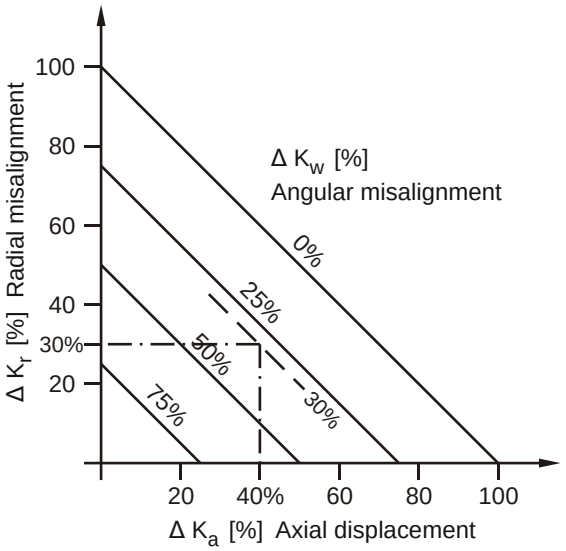
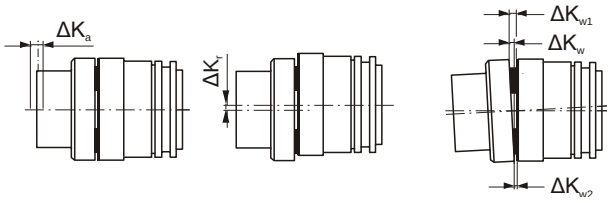


Fig. 7

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. 8

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Torque Adjustment

The torque is set manufacturer-side according to the customer's request.
Torque adjustment is carried out by turning the adjusting nut (7). The installed cup springs (11) are operated in the negative range of the characteristic curve (see Fig. 11); this means that a stronger pre-tensioning of the cup spring results in a decrease of the spring force.

Turning the adjusting nut (7) clockwise causes a reduction in torque.
Turning it anti-clockwise causes an increase in torque.
You should be facing the adjusting nut (7) as shown in Figs. 9 and 10.

Changing the Torque

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

$$\frac{\text{Required torque adjustment}}{\text{max. adjustment value}} \times 100 = \text{Adjustment in \%}$$

b) Loosen the 4 locking set screws (7.1) in the adjusting nut (7).

c) Turn the adjusting nut (7) using the engraved adjustment scale (Fig. 10) clockwise or anti-clockwise using a hook or a face wrench until the required torque is reached.

d) The required torque results from the marking overlap on the hub (1) and the percent value on the adjusting nut (Item 7 / Fig. 10).
Alternatively, adjustment can be carried out via dimension “a” (Fig. 9) acc. Adjustment Diagram (if necessary, please order the Adjustment Diagram from the manufacturers).

e) Paint the 4 locking set screws (7.1) with Loctite 243, screw them in and tighten them
(observe the tightening torque acc. Table 4).

Adjusting the adjusting nut (7) or distorting the cup springs (11) outside of the cup spring characteristic curve (see Fig. 11) stops the clutch functioning.
The inspection dimension “a” (see Table 2) can show deviations due to construction tolerances or to clutch wear.

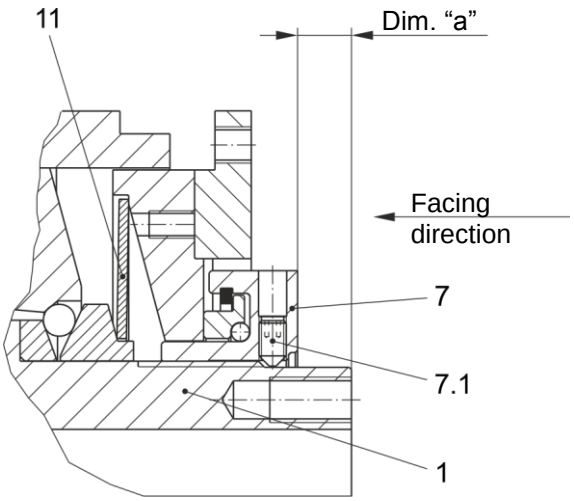

Fig. 9

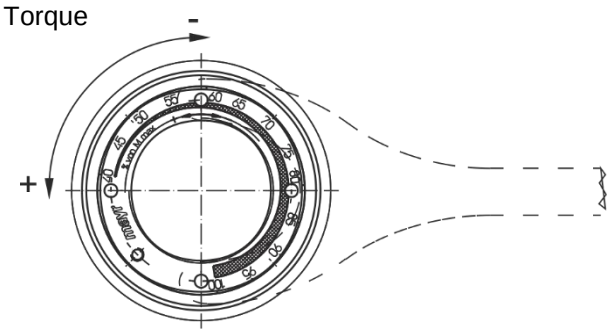

Fig. 10

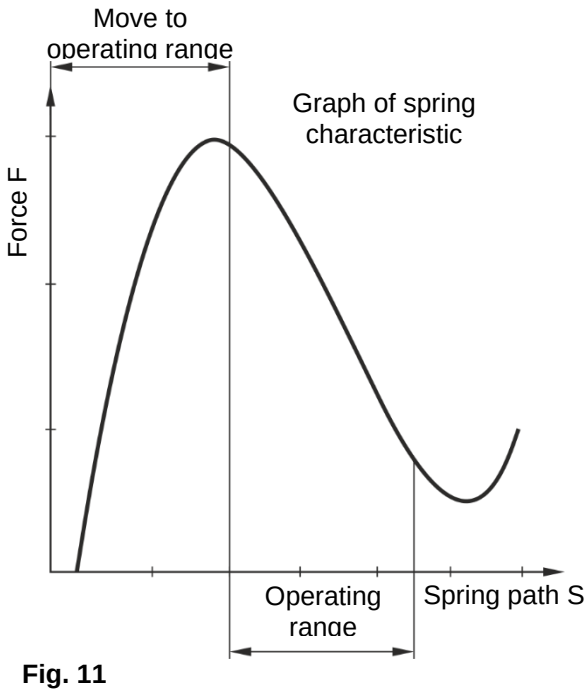

Fig. 11

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Limit Switch (Item 19; Figs. 1 and 12)

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. 12) 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) incl. the sealing cover (13) carries out a stroke (see Table 1, page 5) in the direction of the engagement disk (14) (Figs. 1 and 12), which is used to signal change on the limit switch (37).
The signal change should take place at the latest after an axial stroke of 0.5 mm of the thrust washer (3) incl. the sealing cover (13). 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. 12.

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)

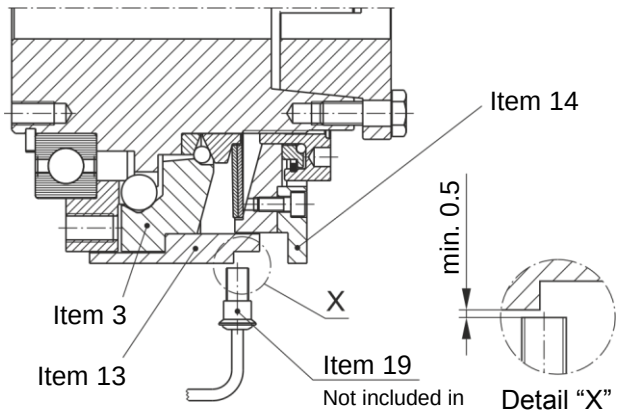

Fig. 12

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 Tables 4 and 6) 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.

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 4 and 5 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 8 (Max. Permitted Bearing Loads)

Sizes	Axial forces [N]	Radial forces [N]	Transverse force torques [Nm]
4	4800	4800	50
5	7700	7700	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 3, page 5). 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 8).
Modifications of the clutch are not permitted. This also refers to changes to the cup spring layering.

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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._

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._ / 490.624._ / 490.724._

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._ / 490.614._ / 490.714._

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._ / 490.614._ / 490.714._

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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 Nor-Mex® coupling Type 494._ _4._

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

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: 494.524._ / 494.624._ / 494.724._

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.

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: 494.514._ / 494.614._ / 494.714._

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: 494.514._ / 494.614._ / 494.714._

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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Malfunctions / Breakdowns Type 490._ _4._

Result of Malfunction	Possible Causes	Danger Guidelines for Ex Areas	Solutions
Premature clutch release	Incorrect torque adjustment Adjusting nut has changed position Worn clutch	None	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	Danger of component destruction and related danger of ignition	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	Bearing heat-up to bearing destruction Danger of ignition	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	Danger of ignition	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._

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 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”) 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 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	Danger of ignition due to hot surfaces	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	Danger of ignition due to hot surfaces and formation of sparks	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	Danger of ignition due to hot surfaces and formation of sparks	1) Set the system out of operation 2) Replace the entire clutch 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 2) Replace the entire clutch 3) Check the alignment 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 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	Danger of ignition due to hot surfaces and formation of sparks	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._ (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 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”) 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	Danger of ignition due to formation of sparks on metallic contact of the cams	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	Danger of ignition due to formation of sparks on metallic contact of the cams	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	Danger of ignition due to formation of sparks on metallic contact of the cams	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)

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:

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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, May 25, 2016
Place / Date

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

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