Installation and Operational Instructions for EAS®-dutytorque Type 404_._ _400 Sizes 2 – 9

(B.4.3.1.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

Attachment:
- Adjustment Diagram
- Assembly Drawing
- Tschan Operational Instructions BAWN 060-EX

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Safety and Guideline Signs

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.
- ❒ If 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. 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.

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

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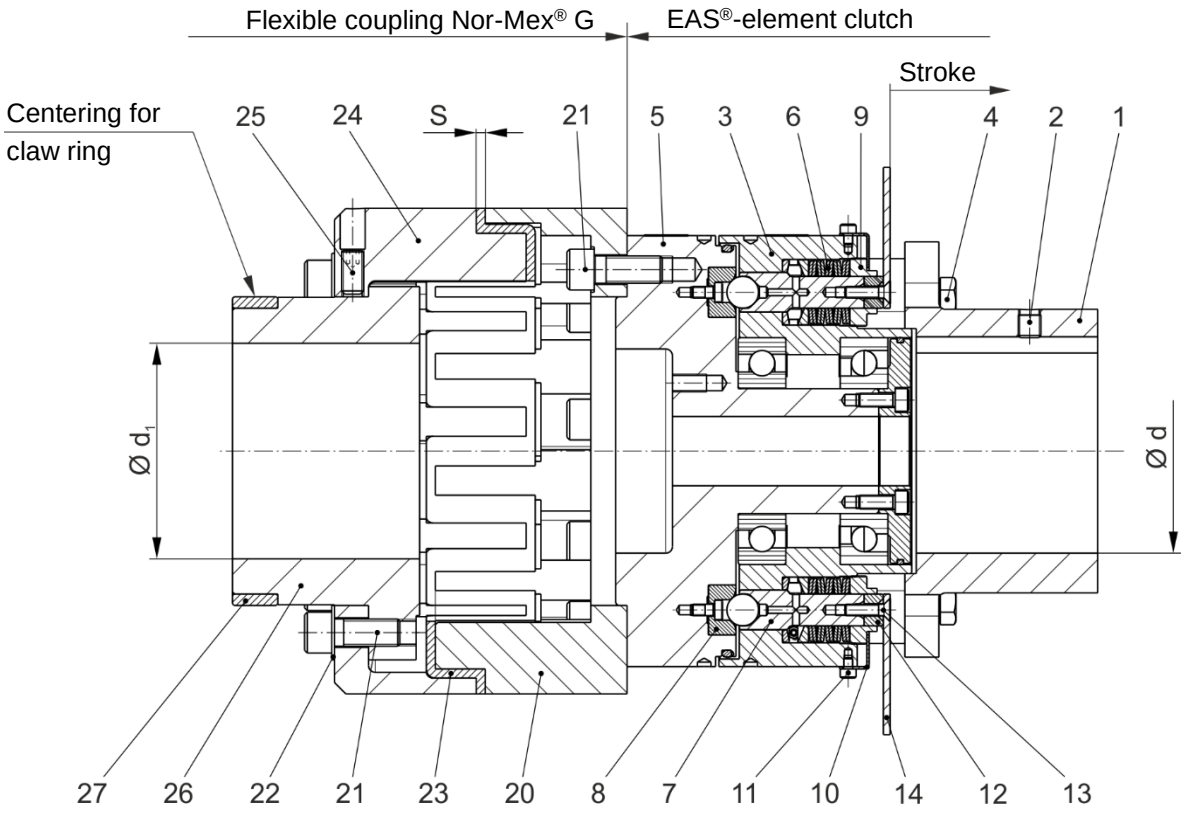

Fig. 1: Type 4043._1400 (Design with switching disk (14))

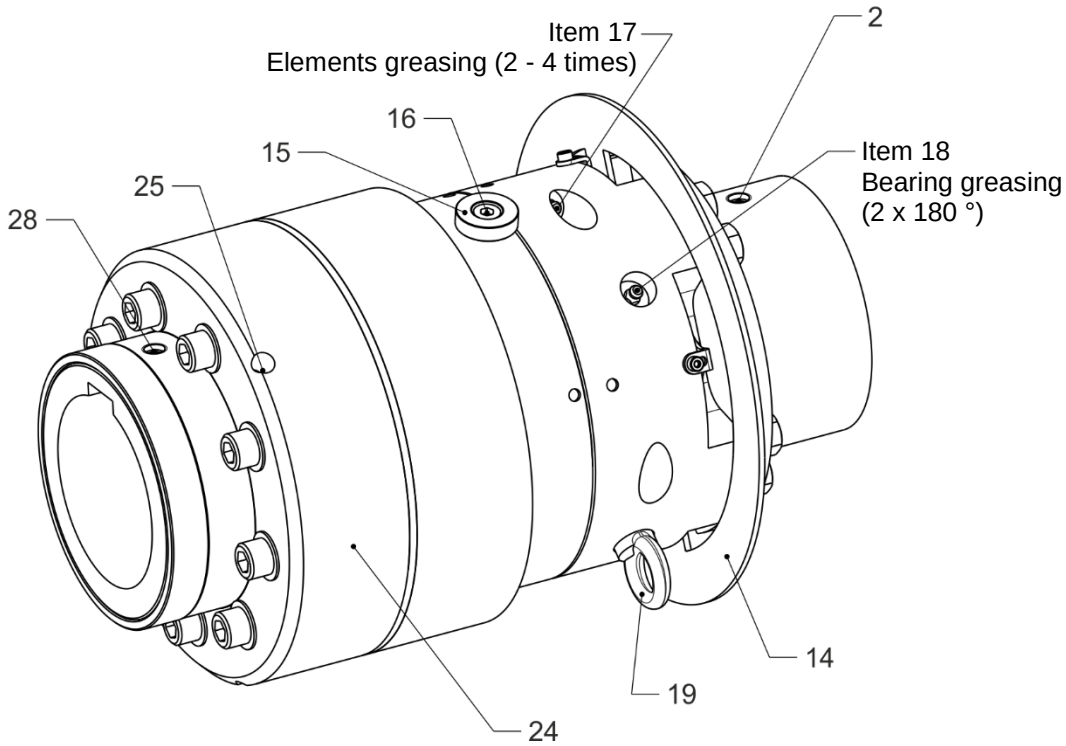

Fig. 2: Type 4043._1400 (Design with switching disk (14))

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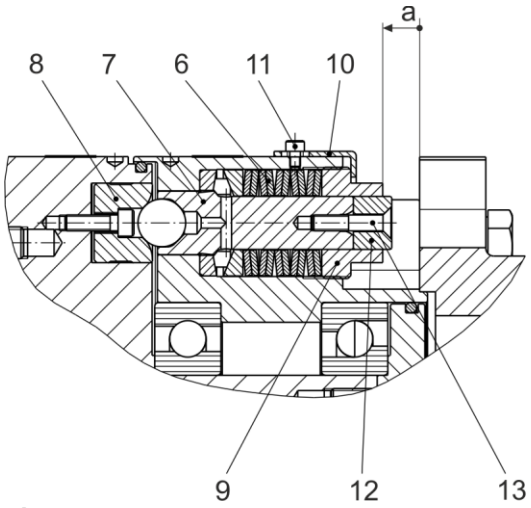

Fig. 3:
Detail overload element (Item 6), Type 404_._0400
(Design without switching disk (14))

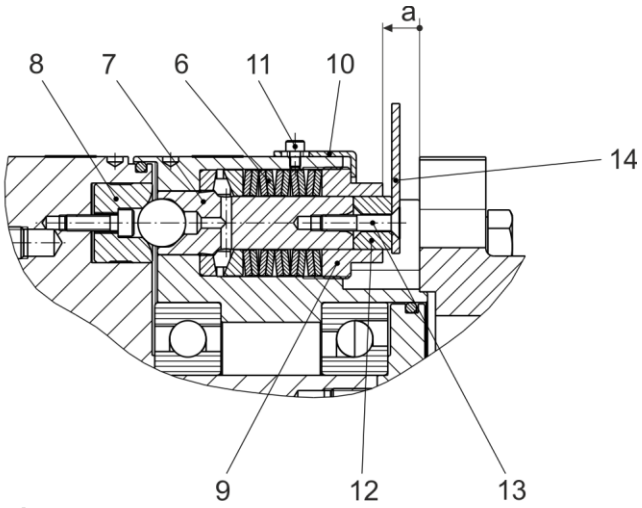

Fig. 4:
Detail overload element (Item 6), Type 404_._1400
(Design with switching disk (14))

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

Item	Name
1	Hub
2	Set screw
3	Element flange
4	Hexagon head screw
5	Pressure flange
6	Overload element
7	Bolt
8	Thrust piece
9	Adjusting nut
10	Lock washer
11	Cap screw
12	Distance bushing
13	Countersunk screw
14	Switching disk [1] (Type 404_._1400)

Item	Name
15	Control flag [2]
16	Cap screw
17	Cone lubricating nipple (elements greasing)
18	Cone lubricating nipple (bearing greasing)
19	Eyebolt
20	Cam ring
21	Cap screw
22	Locking washer
23	Flexible intermediate ring
24	Claw ring
25	Set screw
26	Flange hub
27	Centring ring
28	Set screw

[1] Item 14 for overload recognition using a limit switch

[2] Item 15 for overload recognition using a speed monitoring device

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Table 1: Technical Data of the EAS®-element Clutch

Sizes	Limit torques for overload M_G		
	Type 404_.5_400 [Nm]	Type 404_.6_400 [Nm]	Type 404_.7_400 [Nm]
2	170 – 350	350 – 700	700 – 1400
3	170 – 350	350 – 700	700 – 1400
4	700 – 1400	1400 – 2800	-
5	700 – 1400	1400 – 2800	2000 – 4000
6	700 – 1400	1400 – 2800	2800 – 5600
7	3000 – 6000	6000 – 9000	-
8	3000 – 6000	6000 – 12000	-
9	3000 – 6000	6000 – 12000	8500 – 17000

Table 2: Technical Data of the EAS®-element Clutch

Sizes	EAS®-elements		Maximum speed [rpm]	Bolt stroke on overload [mm]	Maximum bore Ød [mm]	Permitted ambient temperature
	Sizes	Pcs.				
2	01	2 / 4 [3)]	3500	4	90	-15 °C to +80 °C
3	01	2 / 4 [3)]	3000	4	90	-15 °C to +80 °C
4	0	2	3000	6	120	-15 °C to +80 °C
5	0	2	2750	6	120	-15 °C to +80 °C
6	0	2 / 4 [3)]	2500	6	120	-15 °C to +80 °C
7	1	3	2250	8	140	-15 °C to +80 °C
8	1	3	2000	8	140	-15 °C to +80 °C
9	1	3	1750	8	140	-15 °C to +80 °C

[3)] 4 EAS®-elements on Type 404_.7_400

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Table 3: Technical Data of the Flexible Shaft Coupling

Sizes	Nominal torque T_N [Nm]	Peak torque T_{KS} [Nm]	Permitted misalignments (Figs. 6 and 7) axial ΔK_a [mm]	radial ΔK_r [mm]	angular ΔK_w [mm]	Axial installation backlash (Fig. 1) Distance dimension S [mm]	Maximum bore $Ød_1$ [mm]
2	1650	2400	± 1.5	0.3	0.3	3.5	85
3	2400	4200	± 2.0	0.3	0.3	4	95
4	2400	4200	± 2.0	0.3	0.3	4	95
5	3700	6200	± 2.0	0.3	0.3	4	100
6	5800	8300	± 2.5	0.3	0.3	5.5	115
7	7550	10500	± 2.5	0.3	0.3	8	130
8	9900	14500	± 2.5	0.3	0.3	8	135
9	14000	20000	± 2.5	0.3	0.3	8	160

Table 4: Screws

Sizes	Cap screws (21) in the claw ring (24) and in the cam ring (20) Pcs.	Wrench opening	Tightening torque [Nm]	Hexagon head screws (4) in the hub (1) Pcs.	Wrench opening	Tightening torque [Nm]	Set screws in the claw ring (24) Pcs. Item 25	in the hub (1) Pcs. Item 2	in the flange hub (26) Pcs. Item 28
2	9 x M10	8	40	8 x M12	19	122	3 x M10	1 x M8 (at Ød ≤ 30) 1 x M10 (at Ød > 30)	1 x M10
3	9 x M12	10	100	8 x M12	19	122	3 x M10	1 x M8 (at Ød ≤ 30) 1 x M10 (at Ød > 30)	1 x M12
4	9 x M12	10	100	8 x M16	24	300	3 x M10	1 x M12	1 x M12
5	10 x M12	10	100	8 x M16	24	300	2 x M10	1 x M12	1 x M16
6	10 x M14	12	160	8 x M16	24	300	3 x M10	1 x M12	1 x M16
7	10 x M14	12	160	9 x M20	30	590	3 x M12	1 x M16	1 x M16
8	10 x M16	14	240	9 x M20	30	590	3 x M12	1 x M16	1 x M16
9	11 x M16	14	240	9 x M20	30	590	3 x M10	1 x M16	1 x M16

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Installation and Operational Instructions for EAS®-dutytorque Type 404_._ _400 Sizes 2 – 9

(B.4.3.1.ATEX.EN)

Design

EAS®-dutytorque clutches are mechanically disengaging overload clutches (EAS®- element clutches) with a mounted, plug-in elastomer compensating coupling (flexible coupling Nor-Mex® FG).
The overload clutch separates the input and the output on overload.
When disengaged, the clutch slows down freely without any residual torque.
The elastomer compensating coupling is the connection to the output-side shaft end of the system and compensates for misalignments of the shaft ends (see Table 3, page 6) .
The elastomer compensating coupling consists of the following components: Flange hub (26), claw ring (24), flexible intermediate ring (23), cam ring (20) and the cap screws (21).
At the end of the flange hub (26) there is a centring ring (27), which is intended for holding the claw ring (24) in de-installed state.

De-installation of the claw ring (24) is necessary when:

- ❑ the flexible intermediate ring (23) of the coupling must be replaced (see page 9), or
- ❑ the running characteristics of the motor in dry running must be checked; the input and the output can be separated without moving the motor (see page 9).

CAUTION

This operating state is not permitted under ATEX conditions, and is in general only permitted using suitable protective measures.

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 must be adjusted to the required torque by using the Adjustment Diagram (attachment) (see section Torque Adjustment).
- ❑ The clutch is balanced with a balance quality of G2.5 at 1500 rpm.

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 from the hub (1) (input) via the pressure flange (5) or the flange hub (26) (flexible coupling) onto the output.
If the set limit torque is exceeded (overload), the clutch disengages.
On disengagement, the bolts (7) in the overload elements (6) perform an axial movement (stroke) and remain disengaged.
Optionally, a switching disk (14) can be mounted onto Type 404_._1400, which is able to actuate a contactless **limit switch with ATEX certification** (not included in scope of delivery) in case of overload. The limit switch registers the disengagement movement and switches off the drive.
The input and the output are separated residual torque-free.
After-acting masses can run free.

The run-out time after disengagement must be max. 3 minutes.

CAUTION

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

The drive can be switched off electrically via:

- ❑ a speed monitoring device; for this, there are 2 control flags (Item 15, Fig. 2) in the pressure flange (5) or in the element flange (3); or
- ❑ a **limit switch with ATEX approval** (only for design with switching disk (14))

In order to make the clutch function again after overload occurrence, it must be re-engaged using axial pressure on the bolt end (7) of each overload element (6) (see Re-engagement, page 10).

General Installation Guidelines

The bore tolerances in the hub (1) and in the flange hub (26) are produced to H7. The surface roughness depth in the bores is produced to Ra 1.6 µm.
Please secure screws with Loctite 243 (medium hard).

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Clutch Installation

The clutch is manufacturer-assembled ready for installation and set to the limit torque stipulated in the order.
The switching disk (Item 14, only for Type 404_._1400) is included loose in delivery.
It is possible to mount the EAS®-dutytorque overload clutch radially without having to move the motor (input-side) (see section 'Radial Installation').
However, if it is possible to push the input and/or output unit together, the clutch can be mounted "axially" (see section 'Axial Installation').
For speed monitoring, there are two control flags (Item 15, Fig. 2). They can either be screwed into the pressure flange (5) (output-side) or into the element flange (3) using cap screws (16).

Axial Installation

CAUTION

The clutch must not be mounted so that the shaft facing side contacts the bearing cover, as the bearing cover moves at relative speed towards the shaft in case of overload.
A safe distance of 2 mm (Fig. 5) must be maintained.

1) Mount the EAS® part of the clutch incl. the cam ring (20) onto the input shaft using a suitable device, and secure it axially using the set screw (2).
2) Mount the flexible part (flange hub 26 incl. claw ring 24) onto the output shaft using a suitable device, and secure it axially using the set screw (28).
3) The set screws (25) in the claw ring (24) must be secured against being catapulted out or they must be removed from the clutch.
4) Push the input and output shafts together axially and establish the positive locking of the elastomer compensating coupling.
   While doing this, please observe the distance dimension “S” and the permitted misalignment values (see Fig. 1, page 3 and Table 3, page 6).
5) When in position, screw the input and output units together.

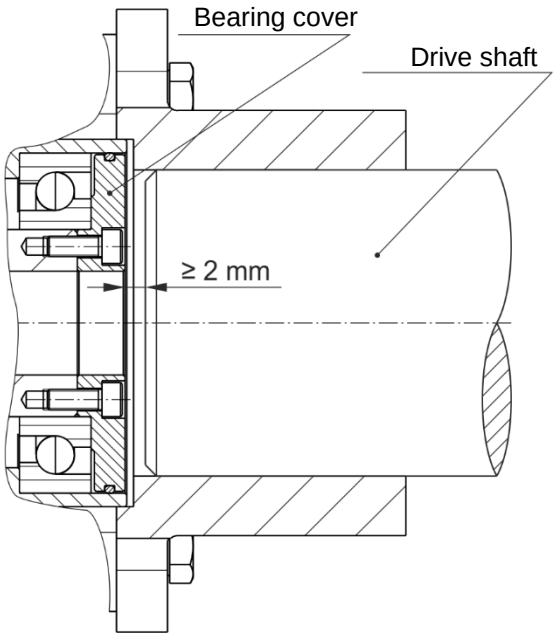

Fig. 5

CAUTION

Press cover (Fig. 6) is not permitted in ATEX version!

Danger of ignition!

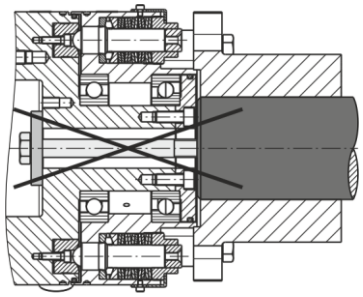

Fig. 6

Radial Installation

1) Loosen the hexagon head screws (4) in the element flange (3).
2) Mount the EAS®-hub (1) onto the input shaft using a suitable device and secure it axially using a set screw (2).
3) Mount the flange hub (26) incl. the claw ring (24) onto the output shaft using a suitable device, and secure it axially using the set screw (28).
4) Loosen the cap screws (21) in the claw ring (24).
5) Pull the claw ring (24) on the centring ring (27) back.
6) Tighten the set screws (25).
   Please observe the tightening torques:
   - for set screw M10: 28 Nm (Sizes 2 to 6 and 9)
   - for set screw M12: 48 Nm (Sizes 7 and 8)
7) Add the remaining clutch part (element flange (3) + pressure flange (5) + cam ring (20)) radially between the input and the output shafts.
8) Tighten the hexagon head screws (4) in the element flange (3).
   Please observe the tightening torque acc. Table 4!
9) Loosen the set screws (25) in the claw ring (24). After loosening the set screws (25), they must be secured against being catapulted out or they must be removed from the clutch.
10) Pull the claw ring (24) over the flange hub (26) in the direction of the cam ring (20).
11) Tighten the cap screws (21) in the claw ring (24).
    Please observe the tightening torque acc. Table 4!
12) Establish the positive locking of the elastomer compensating coupling.
    While doing this, please observe the distance dimension “S” and the permitted misalignment values
    (see Fig. 1, page 3 and Table 3, page 6).

Please observe the screw tightening torques acc. Table 4!

CAUTION

Before initial operation of the clutch, please remove the eyebolt (19) (installation aid).

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Clutch De-installation

Replace the flexible intermediate ring (23) according to the procedure described in section 'Replacing the Flexible Intermediate Ring'.
In order to check the running characteristics of the motor in dry running without moving the motor, please observe section 'Checking the Motor Running Characteristics'.

Replacing the Flexible Intermediate Ring

1) Loosen the cap screws (21) in the claw ring (24).
2) Remove the cap screws and locking washers (21/22) from the clutch.
3) Pull the claw ring (24) back up to the flange hub (26) end on the centring ring (27).
4) Tighten the set screws (25).
   Please observe the tightening torques:
   - for set screw M10: 28 Nm (Sizes 2 to 6 and 9)
   - for set screw M12: 48 Nm (Sizes 7 and 8)
5) The flexible intermediate ring (23) on the coupling can be removed by separating it using a cutting tool (see Tschan Operational Instructions BAWN 060-EX).
6) The new flexible intermediate ring (23) can also only be inserted in separated state.
7) The clutch is ready for operation again after steps 9) to 12) on page 8 have been carried out.

If the clutch part between the input and the output shafts is lifted out radially, the intermediate ring can be replaced axially. (For radial de-installation, steps 1) to 9) in section 'Checking the Motor Running Characteristics' must be carried out and for radial re-installation steps 7) to 12) on page 8 must be carried out).

Checking the Motor Running Characteristics

CAUTION

Not permitted in ATEX version!

1) Loosen the cap screws (21) in the claw ring (24).
2) Remove the cap screws and locking washers (21/22) from the clutch.
3) Pull the claw ring (24) back up to the flange hub (26) end on the centring ring (27).
4) Tighten the set screws (25).
   Please observe the tightening torques:
   - for set screw M10: 28 Nm (Sizes 2 to 6 and 9)
   - for set screw M12: 48 Nm (Sizes 7 and 8)
5) Screw the eyebolt (19) into the pressure flange (5).
6) Support the clutch using the eyebolt (19).
7) Loosen the hexagon head screws (4) in the element flange (3).
8) Remove the hexagon head screws (4) from the clutch.
9) Lift the remaining clutch part (element flange (3) + pressure flange (5) + cam ring (20)) radially between the input and the output shafts.

CAUTION

When working on the clutch, the motor must be secured against switch-on.
Suitable protective devices and protective measures spread over the rotating parts must be used to guarantee the safety of the operating personnel.

10) The motor can be checked via temporary acceleration.
11) The clutch is ready for operation again after steps 7) to 12) on page 8 have been carried out.

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Torque Adjustment (Figs. 3 and 4 / Page 4)

Set the limit torque M_G for overload on the clutch by changing the cup spring pre-tension on each overload element (6) according to the Adjustment Diagram.
On the clutches the adjusting nut (9) is adjusted by turning it in the overload element (6) using an open-end wrench.

Wrench opening values of the adjusting nut (9):
Wrench opening 19 for Sizes 2 and 3
Wrench opening 30 for Sizes 4, 5 and 6
Wrench opening 41 for Sizes 7, 8 and 9

During torque adjustment, please ensure that all overload elements (6) on the clutch are evenly adjusted!

Torque Adjustment:

Type 404_._0400 (Fig. 3)

- ❒ Determine the limit torque M_G for overload.
- ❒ Please find the dimension “a” from the Adjustment Diagram included in clutch delivery.
  This dimension is equal to the required limit torque M_G.
- ❒ Remove the cap screws (11) and the lock washers (10), so that the adjusting nuts (9) can be turned.
- ❒ Set all overload elements (6) by turning the adjusting nut (9) to the dimension “a” found in the Adjustment Diagram.
- ❒ Secure the adjusting nuts (9) against turning using the lock washers (10) and the cap screws (11).
- ❒ Tighten the cap screws (11).

Type 404_._1400 (Fig. 4)

- ❒ Determine the limit torque M_G for overload.
- ❒ Please find the dimension “a” from the Adjustment Diagram included in clutch delivery.
  This dimension is equal to the required limit torque M_G.
- ❒ Unscrew the switching disk (14) and remove the countersunk screws (13) and distance bushings (12).
- ❒ Remove the cap screws (11) and the lock washers (10), so that the adjusting nuts (9) can be turned.
- ❒ Set all overload elements (6) by turning the adjusting nut (9) to the dimension “a” found in the Adjustment Diagram.
- ❒ Secure the adjusting nuts (9) against turning using the lock washers (10) and the cap screws (11).
- ❒ Tighten the cap screws (11).
- ❒ Tighten the countersunk screws (13) via the switching disk (14) and the distance bushings (12) in the bolts (7).

Re-engagement (Fig. 7)

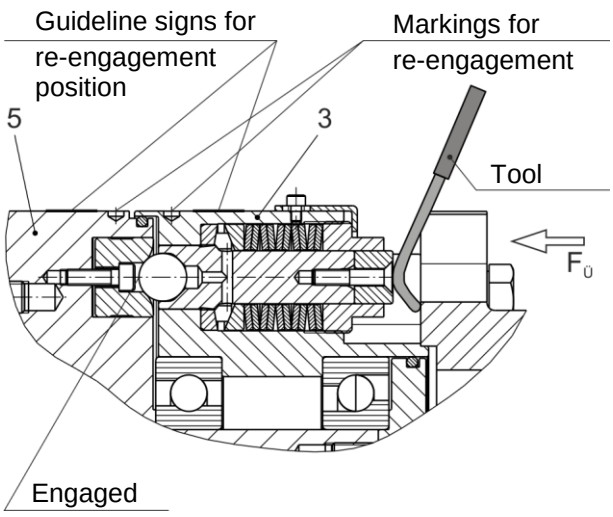

Fig. 7

In order to make the clutch ready for operation again after overload occurrence, the bolts (7) in the overload elements (6) must be re-engaged.
Both of the yellow guideline signs for regaining the synchronous position (due to balance quality) on the outer diameters of the element flange (3) and the pressure flange (5) must align with each other (Fig. 7).
Re-engagement takes place by placing axial pressure on the bolt end of each overload element (6).
Depending on the equipment available, the accessibility of the installation point etc., re-engagement can be carried out in the following ways:

- ❒ Manually, using a suitable tool.
- ❒ By using an engagement mechanism. The engagement procedure can also be automated using pneumatic or hydraulic cylinders.

On Type 404_._1400 (Fig. 4, page 4), re-engagement takes place by placing axial pressure via the switching disk (14) on the bolt end of each overload element. Inaccurate application of the lever tool onto the bolt end can lead to the switching disk (14) bending, and thus to a risk of ignition.

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 = 1.5 x M_G [kN]

F_E = Total engagement force of all clutch overload elements [kN].

M_G = Set limit torque for overload [kNm].

$F_Ü$ = Engagement force per overload element [kN].

$$F_Ü = \frac{F_E}{n}$$

n = Number of overload elements

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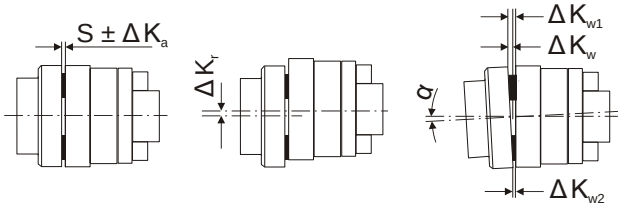
Permitted Shaft Misalignments (Figs. 8 and 9)

The EAS®-dutytorque compensates for axial, radial and angular shaft misalignments, see Fig. 8.
For the maximum permitted shaft misalignments, please see the Table 3, page 6. 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. 9.



Difference dimension $\Delta K_w = \Delta K_{w\,1} - \Delta K_{w\,2}$
=> Measure dimensions $\Delta K_{w\,1}$ and $\Delta K_{w\,2}$ vertically and horizontally offset by 180°.

Fig. 8

Example:

EAS®- dutytorque, Size 4:

- Axial displacement occurrence: $\Delta K_a = 0.4$ mm
- Angular misalignment occurrence: $\Delta K_w = 0.09$ mm
- Required: Permitted radial misalignment **ΔK_r**

$\Delta K_a = 0.4$ mm
$\Rightarrow$ 20 % of the permitted Table value $\Delta K_{a\,zul.} = 2.0$ mm

$\Delta K_w = 0.09$ mm
$\Rightarrow$ 30 % of the permitted Table value $\Delta K_{w\,zul.} = 0.3$ mm

The permitted radial misalignment in % is determined from Fig. 8:
$\Rightarrow$ **$\Delta K_r = 50$ %**
$\Rightarrow$ 50 % of the permitted Table value $\Delta K_{r\,zul.} = 0.3$ mm means that the permitted radial misalignment in this particular case is **0.15 mm**.

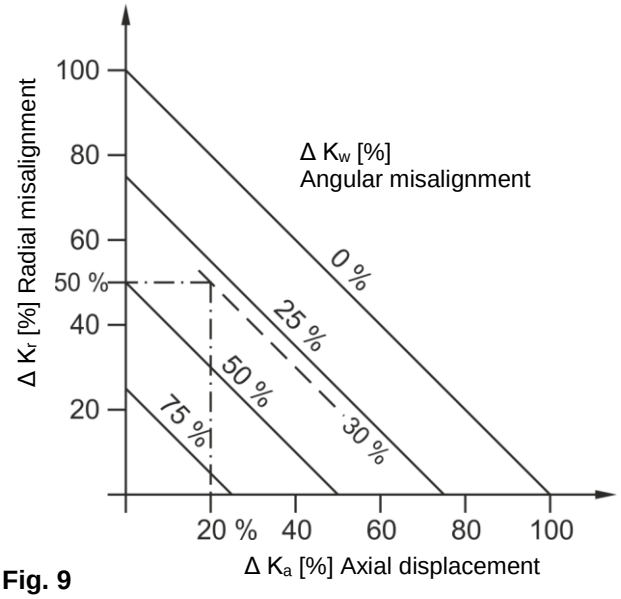


Fig. 9

Clutch Alignment

The elastomer assembly of the EAS®-dutytorque clutch compensates for radial, axial and angular shaft misalignments (please observe the maximum permitted values acc. Table 3). Exact alignment of the clutch minimises the compensating forces having an effect in the drive line, improves the running smoothness of the clutch and reduces the load on the shaft bearings. The clutch service lifetime and therefore also the engagement accuracy in case of overload are also increased. We recommend aligning the clutch to the misalignment values $\Delta K_r + \Delta K_w \leq 0.15$ mm
using a suitable measuring device, e.g. a laser.

Please observe additionally the Operational Instructions of the machine manufacturer.

Maintenance

The overload elements (6) are completely enclosed, have an initial grease filling. The EAS®-dutytorque clutch is mainly maintenance-free. Special maintenance work may be necessary, however, if the device is subject to large amounts of dirt or dust or is operating in extreme ambient conditions. Please observe section “Maintenance and Inspection Intervals for Clutches in Areas Where There is a Danger of Explosion” on page 13.

When de-installing the EAS®-element clutch, please observe:
The exact angular position between the hub (1), the element flange (3), the pressure flange (5) and the cam ring (20) is marked for maintenance of the balance quality on all 4 components with one punch number each.
On re-installation, all 4 components are to be screwed together in the **marked angular position** using the tightening torque according to the Technical Data.

When de-installing the claw ring (24) from the flange hub (26), please observe:
The exact angular position between the claw ring (24) and the flange hub (26) is marked for maintenance of the balance quality on both parts with one marking notch each.
On re-installation, push the claw ring (24) in the **marked angular position** onto the flange hub (26) and screw it on using the tightening torque according to the Technical Data.

Disposal

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

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

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

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

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

Torque transmission via key connections 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 = 230 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 combination and if the measures and guidelines described in the Installation and Operational Instructions are observed, the EAS®-dutytorque clutch is suitable for use in areas where there is a danger of explosion according to the category:

CE Ex II 3G c T4 –15°C≤Ta≤+80°C D 150°

permitted Types: 4043.50400 / 4043.60400 / 4043.70400 /
4043.51400 / 4043.61400 / 4043.71400 /

Please also observe the guidelines in the valid Nor-Mex® Installation and Operational Instructions for application in 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 5 and 6 and in the drawing.

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 4 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. The clutch run-out time in case of overload must be limited according to the dimensioning to max. 3 minutes.

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 according to the Adjustment Diagram.
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!

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 bolt (7) in case of overload, even if re-engagement is actuated. Interfering contours which prevent the bolt (7) 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!

Due to the disengaging principle of the clutch, there are no ratchetting impacts or metallic sliding movements, which could cause a danger of ignition, in case of overload. The sliding movements are prevented by an overstroke of the bolt (7) on high enough dynamics. On almost static actuation, the occurring friction energy is too low. Danger of ignition can be ruled out.
Axial run-out errors caused by production additionally move the bolt (7) into the overload position.
Seizing up of the functional components due to tribological characteristics can also be ruled out.
For additional safety, the overload bolt is painted with sliding lacquer.
Please carry out regular maintenance work referring to the simulated clutch release, the inspection of the set torque, wear inspections, inspections of the bearing and re-greasing (see Maintenance and Inspection Intervals).

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

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 zinc-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.
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.

Modifications of the clutch are not permitted.

Maintenance and Inspection Intervals for Clutches in Ex Areas Where There is a Danger of Explosion

- ❑ Re-greasing the overload elements (6) via the cone lubricating nipples (17) and the bearings via the cone lubricating nipples (18) at least every 20 overload occurrences or 1x per year, with approx. 3 – 4 thrusts of grease (approx. 5 ccm) from a grease gun.
- ❑ Maintenance work, which should be carried out 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 5 and 6) must be maintained.
  - ➔ Inspection of the set torque
  - ➔ Clutch release inspection
  - ➔ Bearing or bearing pre-tension inspection
  - ➔ Re-greasing of the bearings via the cone lubricating nipples (18), 2 x 180° offset on the element flange (3), see Fig. 2.
  - ➔ Re-greasing of the contact components of the overload elements (6) and the thrust pieces (8) via the cone lubricating nipple (17), 2 – 4 times on the element flange (3), see Fig. 2 (depending on the number of overload elements (6)).

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).

On the clutches, the exact angular position between the clutch components must be observed to maintain the balance quality.
On the clutches, the components are therefore marked and are, on re-installation, to be screwed together again in the **marked angular position** to the tightening torque according to the Technical Data.

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

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Malfunctions / Breakdowns

Result of Malfunction	Possible Causes	Danger Guidelines for Ex Areas	Solutions
Premature clutch release	Incorrect torque adjustment Worn clutch	None	1) Set the system out of operation 2) Check the torque adjustment 3) 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 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) 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 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	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

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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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®-dutytorque
Type 4043._ _403X
Sizes 2, 3, 4, 5, 6, 7, 8, 9

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

Applied Standards, Regulations and Inspections (ANVP)

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, October 06, 2016
Place / Date

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

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