your reliable partner

Disengaging torque limiters with automatic re-engagement

EAS®-reverse
Type 4100/4103
Sizes 3 – 6

Issue status 2017-04

Translation of the Original Operational Instructions
B.4100.EN

Operational Instructions for EAS®-reverse Type 4100/4103 Sizes 3 – 6 (B.4100.EN)

Contents

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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 Operational Instructions are part of the delivery.
Please keep the Installation and Operational Instructions handy and near to the clutch at all times.

1 Safety

1.1 Safety and Guideline Signs

Symbol	Signal word	Meaning
	**DANGER**	Designates a directly pending danger. If not avoided, death or severe injuries will be the consequence.
	**WARNING**	Designates a possibly hazardous situation. If not avoided, death or severe injuries will be the consequence.
	**CAUTION**	Designates a hazardous situation. If not avoided, slight or minor injuries can be the consequence.
	ATTENTION	Possible property damage can be the consequence.
	**Please Observe**	Designates tips for application and other particularly useful information. Not a signal word for dangerous or damaging situations.

Safety Regulations

These Installation and Operational Instructions are part of the clutch delivery.
Please keep the Installation and Operational Instructions handy and near to the clutch at all times.

It is forbidden to start use of the product until you have ensured that all applicable EU directives, 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®-reverse 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 risk of explosion. This statement is based on the ATEX directive.

CAUTION

- ❒ If the EAS®-reverse clutches have been changed or converted.
- ❒ If the relevant standards for safety and / or installation conditions are ignored.

User-implemented Protective Measures

- ❒ Cover all moving parts to protect against seizure, dust or foreign body impact.
- ❒ The 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 professionals and specialists should work on the devices, following the relevant standards and directives. 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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2 Product Description

2.1 State of Delivery

EAS®-reverse clutches are completely manufacturer-assembled, including the finish bore and the keyway.

Torque Adjustment:
The clutch is set manufacturer-side to the torque stipulated in the order.

2.2 Application – Operation – Function

EAS®-reverse clutches are positive locking, disconnecting overload clutches.
In case of an exceedance of the set limit torque (in case of overload), the clutch disengages and disconnects the input and output side almost residual torque-free.

The disengagement must be recorded and a signal issued to switch off the system via a customer-side installed limit switch,.

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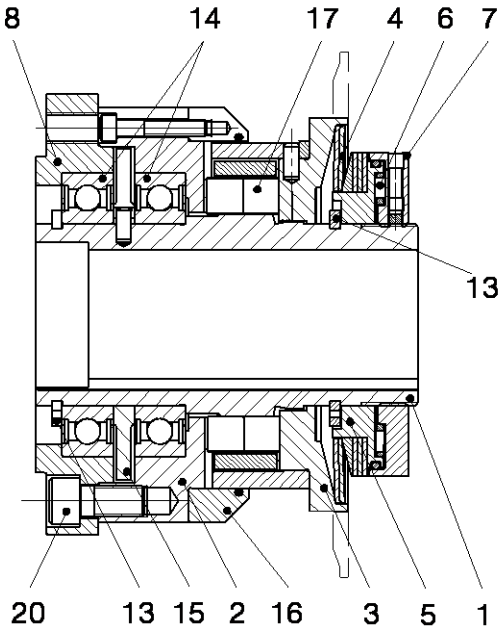
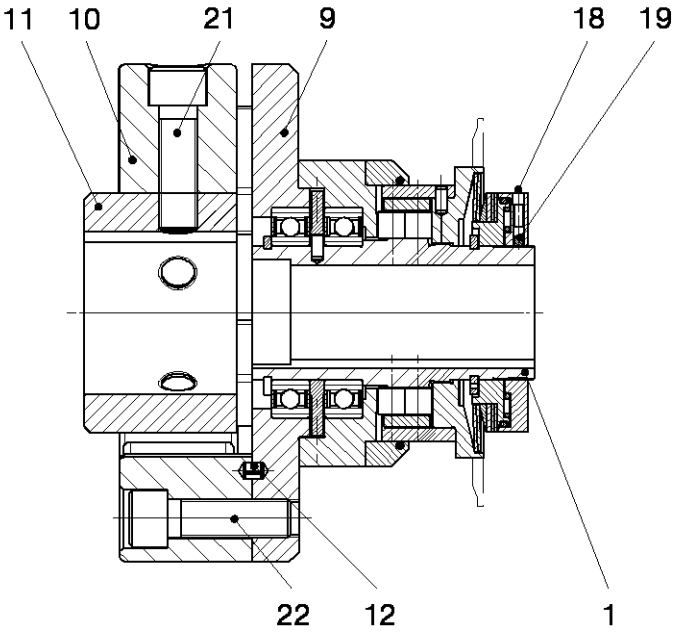
2.3 Views



Type 4100



Type 4103

Fig. 1

2.4 Parts List

(Only use *mayr*® original parts)

Item	Name
1	Hub overload-side
2	Pressure flange
3	Control element
4	Cup spring
5	Thrust ring
6	Needle bearing
7	Adjusting nut
8	Output flange
9	Intermediate flange
10	Elastomer ring
11	Hub flexible side

Item	Name
12	Spring pin
13	Locking ring
14	Ball bearing
15	Magnetic disk
16	Cover ring
17	Cylinder roller
18	Set screw
19	Elastomer plug
20	Cap screw output flange
21	Cylinder screw, flexible, radial
22	Cylinder screw, flexible, axial

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3 Technical data

3.1 Guidelines

3.1.1 Application Conditions

The stated values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application.

- ❑ Mounting dimensions and connection dimensions must be adjusted according to the size at the place of installation.
- ❑ Use in extreme environmental conditions or outdoors, directly exposed to the weather, is not permitted.
- ❑ The surfaces of the outer components have been phosphated manufacturer-side to form a basic corrosion protection.

3.1.2 Ambient temperature

-20 °C to +80 °C

The Technical Data refers to the stated temperature range.

3.1.3 Installation position

The EAS®-reverse can be operated in any installation position.

3.1.4 Prerequisites for Product Application

Compare the limit values stated in these Operational Instructions with the actual application, e.g.

- ❑ Masses
- ❑ Temperatures etc.

3.2 Cup Spring Layering

Correct cup spring layering is a prerequisite for problem-free clutch function and torque adjustment.
The respective adjustment range results for the limit torque for overload depending on the layering of the cup springs.

3.3 Storage

- ❑ Store in a horizontal position, in dry rooms and dust and vibration-free.
- ❑ Relative air humidity <50 %.
- ❑ Temperature without major fluctuations within a range from 0 °C up to +40 °C.
- ❑ Do not store in direct sunlight or UV light.
- ❑ Do not store aggressive, corrosive substances (solvents / acids / lyes / salts etc.) near to the brakes.

For longer storage lasting more than 2 years, special measures are required.
► Please contact *mayr*® power transmission.

3.4 Technical data

Technical data				**Size**			
				3	**4**	**5**	**6**
Limit torques for overload [1)]	**Type 410_.40400**	**M_G**	**[Nm]**	75 - 150	125 - 250	250 - 500	500 - 1000
	Type 410_.50400	**M_G**	**[Nm]**	150 - 300	250 - 500	500 - 1000	1000 - 2000
	Type 410_.60400	**M_G**	**[Nm]**	300 - 600	500 - 1000	1000 - 2000	2000 - 4000
	Type 410_.70400	**M_G**	**[Nm]**	375 - 750	625 - 1250	1250 - 2500	3000 - 6000
Max. speed		**n_{max}**	**[rpm]**	3600	2000	2000	2000
Control element stroke on overload			**[mm]**	3	4	5	6
Axial displacement Type 4103			**[mm]**	5.0	5.0	5.0	5.0
Radial misalignment Type 4103			**[mm]**	2.0	2.0	2.0	2.0
Angular misalignment Type 4103			**[°]**	2.0	2.0	2.0	2.0
Tightening torque set screw (18)			**[Nm]**	2.5	2.5	5.0	20
Tightening torque cap screw (20)			**[Nm]**	74	127	310	310
Tightening torque cap screw (21)			**[Nm]**	220	500	500	610
Tightening torque cap screw (22)			**[Nm]**	220	500	500	1050

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4 Installation

4.1 Installation preparations (customer-side)

- ❑ Bore or shaft surface quality:
  Ra = 0.8 µm acc. DIN 4762.
- ❑ Standard bore or shaft tolerances: h6.
- ❑ Standard tolerance of the keyway: JS9.

4.2 Important Installation Guidelines (lastic)

- ❑ Tighten all cylinder screws (21) which connect the elastomer ring (11) with the hub (11) to the tightening torque according to the table (Chapter **3.4**) using the torque wrench.
- ❑ On tightening the screw, ensure that the aluminium bushing in the elastomer ring (10) is not also turned; instead it should sit straight (Figure 2). In order to reduce the friction between the screw head and the aluminium part, you must apply a small amount of grease under the screw head before starting the installation. If necessary, prevent a rotation (tilt) of the elastomer ring (10) when tightening the screws through the application of counter-pressure using a suitable tool.
- ❑ If the clutch is pre-assembled on delivery, it should not be dismantled again, but rather installed in its pre-assembled state.

4.3 Guidelines for elastomer ring

Please only use the screws included in delivery - they are marked by a coloured mass (blue) on the threads. This mass contains micro-capsulated adhesive, which glues the screws in the thread and therefore reliably protects against loosening. After screwing in, the hardening time of this adhesive at room temperature (20 °C) needs approximately 4 - 5 hours to take adequate effect. The clutch should not be operated beforehand.
The hardening is fully completed after 24 hours. Higher temperatures accelerate the hardening, e.g. the hardening time is only 15 minutes at +70 °C (heated via a warm air blower). The micro-capsulated adhesive is temperature-resistant from 80 °C to +90 °C, and the screws can be re-used a maximum of 3 times.

Any adhesive which may have been removed during screwing in, will get caught between the hub (11) and the aluminium part. This is not a disadvantage; on the contrary, it is an advantage as this increases the frictional locking between these parts. Attention: Anaerobic adhesives (such as Loctite, Omnifit etc.) loosen the rubber adhesion on the metal and therefore lead to destruction of the clutch. If possible, do not use these adhesives. If using these adhesives cannot be avoided (e.g. for securing screws), then apply economically, so that no excess adhesive wets the rubber. We cannot be held reliable for rubber parts that have become defective due to adhesives.

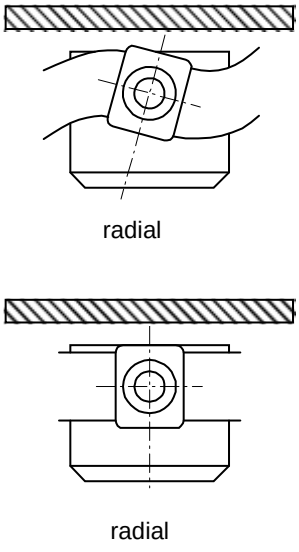

Fig. 2

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5 Installation

5.1 Installation type 4103

1. Unscrew the cap screws (21)
2. Position the hub overload side (1) on the shaft end and secure axially (e.g. using a press cover)
3. Position the hub for the elastic coupling (11) onto the shaft end.
4. Push both clutch parts together (elastic part and overload part). Pre-centering occurs via the spring pins (12).
5. Position the cylinder screws (21) and tighten evenly in several steps until the specified torque according to the table (Chapter **3.4**) is reached.

Observe the installation information **4.2**

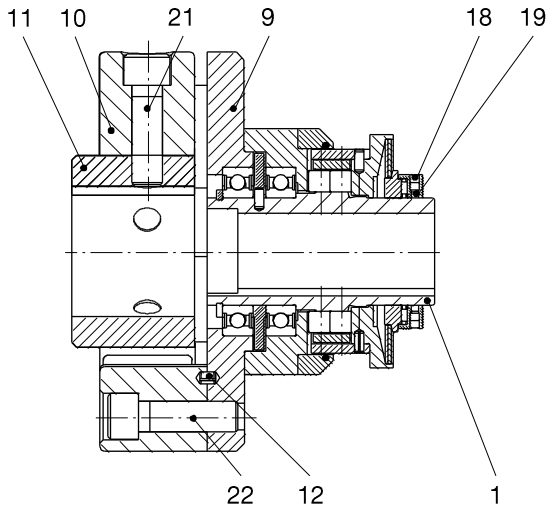

Fig. 2

5.2 Installation type 4100

1. Position the hub overload side (1) onto the shaft end and secure axially (e.g. using a press cover)

5.3 Coupling Alignment

The flexible coupling compensates for radial, axial and angular shaft misalignments (please observe the maximum permitted values).
However, exact alignment of the coupling increases the coupling service lifetime, reduces the load on the shaft bearings and improves the operational behaviour of the overload clutch.

After clutch installation, it must be aligned carefully, unless the coupled aggregates align well already having been flanged together. The higher the speed, the more careful the clutch should be aligned to make sure that it has a long service lifetime. On this design, alignment can be checked easily by means of a ruler (Fig. 3). In the process, the outer diameter of the elastomer ring (10) on the sides where the radial screws are located must be align with the intermediate flange (9) and on various planes.

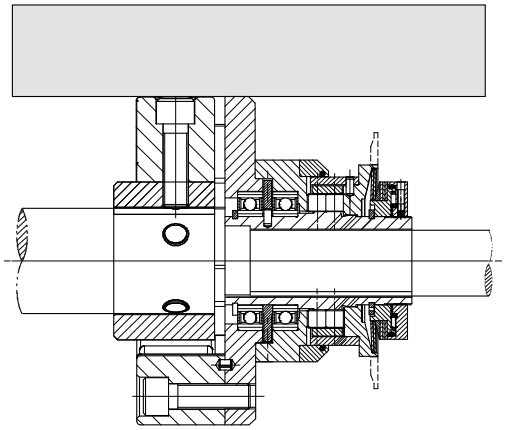

Fig. 3

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6 Options

6.1 Limit Switch Installation

The switching direction arrow on the housing lid of the mechanical limit switch faces in the direction of the adjusting nut (7) or in the control element (3) stroke direction, Fig. 4. Adjust the switch distances for the contactless and mechanical limit switch acc. Fig. 4 or Fig. 5. The distance of the control element (3) to the switching point can be adjusted using a hexagon head screw, wrench opening 7 (fig. 4 and 5).

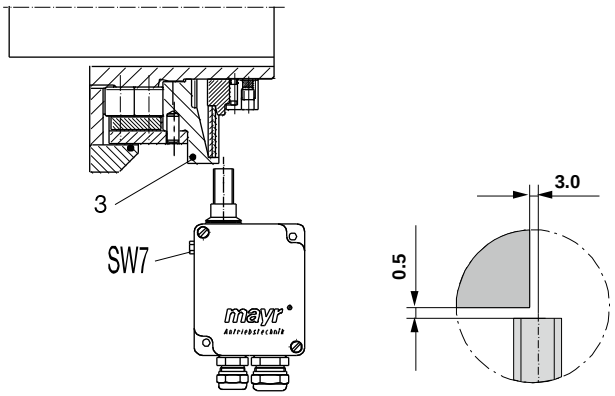

Fig. 4: Contactless limit switch

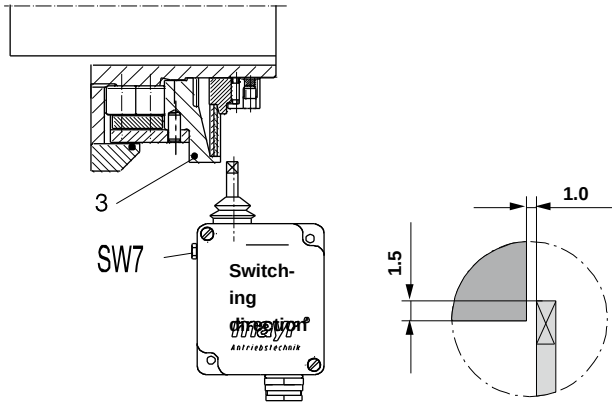

Fig. 5: Mechanical limit switch

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7 Operation / Initial operation

7.1 Permitted Shaft Misalignments

EAS®-reverse clutches are designed as a combination with a compensation coupling. The couplings compensate for angular, axial and radial shaft misalignments, see Fig. 6.
For the maximum permitted shaft misalignments, please see the Table (section **3.4**).
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:
The sum total of the actual misalignments in percent of the maximum value must not exceed 100 %.

Example: EAS®-reverse Size 4
Axial displacement occurrence: ΔK_a = 1.25 mm
Angular misalignment occurrence: ΔK_w = 0.5°
Required: Permitted radial misalignment ΔK_r

Δ Ka = 1.25 mm equals 25 % of the permitted table value.
ΔK_w = 0.5° equals 25 % of the permitted table value.
=> ΔK_r = 50 % of the permitted table value, equalling for this example a permitted radial misalignment of 1.0 mm.

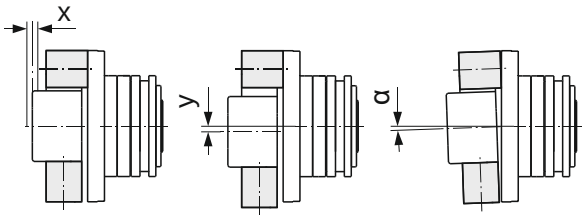

Fig. 6

7.2 Guideline on Torque Adjustment

In order to avoid inadvertent disengagement of the overload clutch, we recommend an adjustment factor of 1.3 on the max. operating torque.
The max. operating torque is the highest torque occurring on the overload clutch.

7.3 Clutch Engagement After Overload Occurence

Wear ear protection!
During engagement, a noise level of over 100 dB(A) is possible, depending on the clutch size.

- ❑ Maximum run-out time of the system until it comes to a standstill should be <1 min
- ❑ *mayr*® power transmission recommends the use of an end switch for requesting the switching condition

1. Rectification of the fault cause
2. Rotate the input side with maximum 10 rpm opposite to the drive direction (automatically or manually), until the clutch engages. Re-engagement after maximum 180°
3. Clutch is ready for operation again

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7.4 Changing the Torque (Fig. 7)

The EAS®-reverse is set when delivered and does not have an adjustment table adhered to it. The set limit torque M_G is to be taken from the type tag.

In case of a change in torque:

Take the respective necessary change from dimension "a" (depending on the layering of the cup springs) for a specified limit torque from the adjustment diagram (available on request).

1. Unscrew the set screws (18) from the adjusting nut (7) using a hexagon socket wrench.
2. Rotate the adjusting nut (7) using a hook wrench (Figure 7) by the dimension “a” which corresponds to the change to the desired limit torque M_G.
3. Secure the adjusting nut (7) by screwing in the radially aligned set screws (18) with the torque acc. table (Chapter **3.4**).

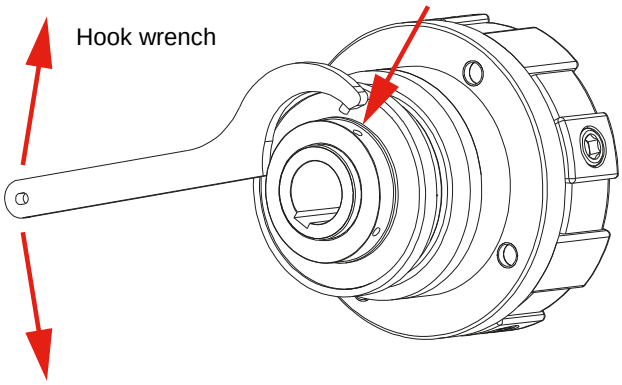

Fig. 7

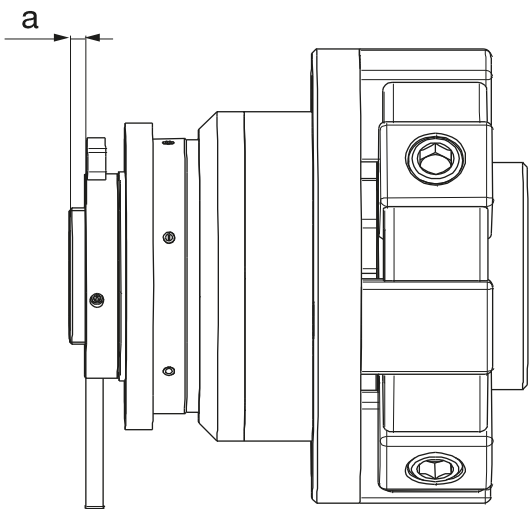

Fig. 8

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8 Maintenance and Maintenance Intervals

Maintenance work, which should be carried out after approx. 2000 operating hours, after 100 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 acc. the table (Chapter **3.4**) are to be observed.
- ➔ Inspection of the set torque
- ➔ Clutch release inspection
- ➔ Inspection of the bearing or bearing pre-tension

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.

Should the **EAS®-reverse** no longer accord with the required properties, or the specified safety standards for working on the machine or the system are no longer upheld, then the clutch must be inspected by ***mayr®***-power transmission and must if necessary be repaired and approved.

9 Disposal

For disposal, please observe the specific regulations of the respective country of application.
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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10 Malfunctions / Breakdowns

Malfunction	Possible Causes	Solutions
Premature clutch release	Incorrect torque adjustment	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
	The adjusting nut setting has changed (position)	
	Worn clutch	
Clutch does not release on overload	Incorrect torque adjustment	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
	The adjusting nut setting has changed (position)	
	Worn clutch	
Running noises in normal operation	Insufficient clutch securement	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 5) If the cause of malfunction cannot be found, the clutch must be inspected at the place of manufacture
	Loosened screws	
	Loosened adjusting nut	

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

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