Translation of the Original Operational Instructions

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.

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Safety Regulations

These Installation and Operational Instructions (I + O) are part of the clutch delivery. Please keep them handy and near to the ROBA[®] contitorgue 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 ROBA[®] contitorque accord with the known technical specifications and are operationally safe at the time of delivery. Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the ATEX directive.



If the ROBA[®] contitorque are modified.

the relevant standards for safety and / or installation conditions are ignored.

User-implemented Protective Measures

- Cover all moving parts to protect against seizure, dust impacts or foreign body impact.
- The ROBA[®] contitorque heats up during slipping operation.
 - Do not touch the ROBA[®] contitorque housing! => Danger of burns!
- The ROBA® contitorque works using strong magnetic fields which can disturb or destroy electronic or mechanical devices. This is particularly the case for heart pacemakers. Data saved on credit cards, hard drives or disks can be deleted by the magnetic fields.

In order to prevent such occurrences, please keep to the safety distance of more than 0.2 metres away from the ROBA® contitorque.

- □ The ROBA[®] contitorque must not be subjected to impact stresses, as the magnets break into slivers and can injure people.
- The ROBA[®] contitorque must not come into contact with metal chips.
- □ If work with metal parts is carried out close to the ROBA[®] contitorque, please be extremely careful, as the strong magnetic surface on the outer diameter of the magnetic part (2) attracts metal parts. This can lead to injuries to personnel and damage to the ROBA[®] contitorque through crushing.
- □ The ROBA[®] contitorque must not be disassembled into its individual parts. Due to the strong magnetic fields, clutch parts or other elements may be pulled towards the magnet, causing crush injuries.
- The ROBA® contitorque cylindrical fitting surface on the hub (Item 1 / Fig. 3) must not be damaged or made dirty, as this will reduce the running smoothness or cause the torque adjustment to fail.

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!



Installation and Operational Instructions for ROBA[®] contitorque Type 151.³₄00 Sizes 3 and 4

Danger of injury to people, in particular due to

Danger for people with heart pacemakers

Safety and Guideline Signs



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



Fig. 1

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

Item	Name		
1	Hub		
2	Magnetic part with permanent magnets		
3	Flange		
4	Hysteresis material		
5	Roller bearing		
6	Clamping screw		
7	Locking ring 1		
8	Locking ring 2		
9	Locking ring 3 (only on Size 3)		
10	Locking ring 4		
11	Shim rings		
12	Stainless steel plug		

Table 1

DANGER

DANGER

hot surfaces

Size / Type	Dimension X
3 / 151.400	26.25 mm
3 / 151.300	35.65 mm
4 / 151.300	43 mm





Installation and Operational Instructions for ROBA[®] contitorque Type 151. $^{3}_{4}$ 00 Sizes 3 and 4

Technical Data

Table 2

		Limit torque for overload ¹⁾ T _G [Nm]	Permitted power loss ²⁾ P _{V perm.} [W] at operating temperature ³⁾		
Size	Туре		0 °C – 25 °C	26 °C – 35 °C	36 °C – 45 °C
3	151.400	1 – 2	24	20	16.5
	151.300	0.5 – 3	26	22	18
4	151.300	0.5 - 6	34	29	23.5

Table 3

		Maximum permitted mechanical speed 4)	Maximum permitted bearing load ⁵⁾		
Size	Туре	n _{max} [rpm]	radial Fr [N]	axial Fa [N]	
	151.400	2000	223	149	
3	151.300	2000	325	217	
4	151.300	2000	390	260	

Table 4

		Mass moment of inertia		Weight
		Drive end (flange) J	Output side (hub) J	
Size	Туре	[10 ⁻³ kgm²]	[10 ⁻³ kgm²]	[kg]
3	151.400	0.653	0.447	1.43
	151.300	0.779	0.541	1.7
4	151.300	2.375	1.724	3.34

 Request the tolerance values for the maximum deviation of the set limit torque T_G from the scale value at the manufacturer's. At high relative speeds, the limit torque T_G increases due to eddy current effects. Please contact the manufacturer for exact T_G values.

2) Refers to the maximum surface temperature of approx. 100 °C for rotating flanges (n = 200 rpm).

3) Operating temperature within a range of 0 °C up to 45 °C

4) The maximum permitted speed in slipping operation must be calculated via the Thermal Dimensioning (see page 4).

5) Referring to a nominal bearing service lifetime $L_{10h} = 20000 \text{ h}$, a radial force F_r lever arm at a maximum distance of 70 mm from the bearing center (Fig. 1) and a bearing speed n = 350 rpm.

Installation and Operational Instructions for ROBA[®] contitorque Type 151. $^{3}_{4}$ 00 Sizes 3 and 4

Design and Function

The ROBA $^{\otimes}$ contitorque can be used as a load-holding overload clutch or brake in machine drives.

The ROBA[®] contitorque drive end consists of a flange (3) with hysteresis material (4). The drive elements are screwed together with the flange (3) threaded pin.

The clutch output side consists of a magnetic part with permanent magnets (2) and a hub (1).

The magnetic part (2) is screwed onto the hub (1) and secured using the clamping screw (6) and the stainless steel plug (12). The output elements are screwed into the hub (1) fine thread. The input and output sides are connected rotatably using the roller bearings (5). The roller bearings (5) are held axially with the locking ring 1 (7), the locking rings 2/3 (8/9) and the shim rings (11).

The locking ring 4 (10) serves as an axial limit stop for the magnetic part (2).

In normal operation, the torque is transmitted contactlessly and synchronously via magnetic forces from the drive end to the output side.

On overload, the clutch slips, meaning that the input and output sides move with relative speed, the so-called slip speed, in relation to one another. On overload, the clutch torque is equal to the set torque.



Diagram 1: Torque Characteristic

The hysteresis material (4) is constantly re-magnetized and back again by the permanent magnets of the magnetic part (2). This causes power loss, which must be released into the surrounding area in the form of heat. Please contact the manufacturers for precise details.

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If the permitted power loss is exceeded, the $\text{ROBA}^{\circledast}$ contitorque overloads

- => Destruction of the permanent magnets
- => The clutch must be thermally dimensioned (see section Thermal Dimensioning, page 4).

State of Delivery

The ROBA $^{\otimes}$ contitorque Type 151. $\overset{3}{_{4}}00$ is delivered completely manufacturer-assembled.

The clutch is set manufacturer-side to the maximum torque. The flange (3) is equipped with a threaded pin M20 x 1.5. The hub (1) has a fine thread (internal thread) M32 x 1.5. All clutch components (including the roller bearings (5)) except the magnet material (2/4) are manufactured from rustproof stainless steel.

The permanent magnets of the magnetic part (2) and the hysteresis material (4) are corrosion resistant.

Thermal Dimensioning

$$P_{V} = \frac{T \cdot n_{S}}{9.55} \cdot V \le P_{V \text{ perm.}}$$
with $V = \frac{t_{S}}{t_{Cycle}}$ and $t_{S}^{(6)} \le 23 \text{ s for Size } 3 \le 16 \text{ s for Size } 4$
The following applied for continue

The following applied for continuous slipping operation: V = 1

 P_V = Clutch / brake power loss [W]

P_{V perm.} = Permitted clutch / brake power loss [W]

T = Clutch / brake torque [Nm]

n_s = Slipping speed [rpm]

V = Reduction factor [-]

t_s = Slipping period [s]

 t_{Cycle} = Cycle period [s]

Valid for maximum torque adjustment and a slip speed of $n_s = 2000$ rpm. Please contact the manufacturer for other torques and slip speed values for ts.

The following Diagram shows the ROBA[®] contitorque clutch and brake operating characteristic curve.



Diagram 2: Operating Characteristic Curve

The green area below the limit curve $P_{V \text{ perm.}}$ shows the permitted range. If the operating point lies in the red area (above the limit curve), the clutch will be destroyed by overload.

Calculation Example

Screwing on screw caps (Application as clutch in an assembly cycle)

Given:

Т	= 2 Nm	(screw-on torque of the screw cap)	
ns	= 300 rpm	(screw-on speed)	T
ts	= 3 s	(slipping period)	I, IIS
t _{Cycle}	= 10 s	(cycle period)	
Operating temperature 30°C			

Required:

 $P_V = ???$ (clutch power loss)

$$V = \frac{t_S}{t_{Cycle}} = \frac{3 s}{10 s} = 0.3$$

$$P_V = \frac{T \cdot n_S}{9.55} \cdot V = \frac{2 \text{ Nm} \cdot 300 \text{ rpm} \cdot 0.3}{9.55} = 18.85 \text{ W}$$

Selected:

 $\begin{aligned} & \text{ROBA}^{\circledast} \text{ contitorque Size 3 Type 151.400} \\ & \text{with } T_G = 1 - 2 \text{ Nm and} \\ & \text{P}_{V \text{ perm.}} = 20 \text{ W} > \text{P}_V = 18.85 \text{ W} \text{ (see above)} \end{aligned}$

Fig. 2



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Torque Adjustment

If no specific torque is requested on order, the ROBA® contitorque is set manufacturer-side to the maximum torque.



The set torgue can be read using the graduation scale located on the magnetic part (2) (see Fig. 3).

The torque must only be adjusted step-wise (for the max. step width, see Table 5). After each stepwise adjustment, the clutch must slip, so that no intermittent torque occurs. Should intermittent torque occur, the clutch must be set to the maximum torque and the hub (1) must be turned by 2 turns relative to the flange (3).



Damage to or dirt on the cylindrical fitting surface (Fig. 3) will lead to reductions in running smoothness or torque adjustment failure.

The clamping screw (6) must not be dismantled, as otherwise the stainless steel plug (12) could fall out of the threaded hole of the magnetic part (2) and may be lost.

Observe the max. tightening torque of 3 Nm for the clamping screw (6). Use a torque wrench.

Procedure for Torque Adjustment (see Figs. 3 and 4):

- Turn the clamping screws (6) back until the magnetic part (2) can be turned. This equals approximately half a thread turn.
- 2) The torque must only be adjusted stepwise. The maximum step width is defined in Table 5.
- Secure the hub (1) against turning (using an open-end wrench SW 36 for Size 3 or SW 41 for Size 4). Turn the 3) magnetic part (2) with open-end wrench SW 10 or by hand slowly until either the maximum step width according to Table 5 or the desired torque value is reached. The open-end wrenches are not included in the standard scope of delivery. If the step width for torque adjustment is smaller than

the maximum step width (see Table 5), then step 6) can be left out.

- Tighten the clamping screw (6) by hand. 4)
- Turn the hub (1) relative to the flange (3) by approximately 5) 2 turns (= 720° rotation angle) ("slipping"), so that the magnetization of the hysteresis material (4) reverses. In order to do this, secure the flange (3) by hand and turn either the hub (1) or the magnetic part (2) using an openend wrench (see step 3). If the ROBA® contitorque has already been installed into a

system, then the hub (1) can also be turned mechanically. Repeat the previous steps 1) to 5) until the required clutch

- 6) torque is reached.
- Tighten the clamping screw (6) (hexagon socket wrench 7) opening 3) using a torque wrench (not included in the standard scope of delivery) to a tightening torque of 3 Nm.

Table 5

Size	Туре	Torque adjustment range	Maximum step width
3	151.400	1 to 2 Nm	0.3 Nm
	151.300	0.5 to 2 Nm	0.3 Nm
		2 to 3 Nm	0.5 Nm
4	151.300	0.5 to 2 Nm	0.4 Nm
		2 to 6 Nm	1 Nm

Example for ROBA[®] contitorque Size 4 Type 151.300: Torque adjustment from 3 Nm to 1.4 Nm (Short description)

- 1) Adjust the magnetic part (2) from the scale value 3 Nm to the scale value 2 Nm (max. step width 1 Nm) and let the clutch slip for approximately 2 turns.
- 2) Adjust the magnetic part (2) from the scale value 2 Nm to the scale value 1.6 Nm (max. step width 0.4 Nm) and let the clutch slip for approximately 2 turns.
- Adjust the magnetic part (2) from the scale value 1.6 Nm to 3) the scale value 1.4 Nm (step width 0.2 Nm) and let the clutch slip for approximately two turns.





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24/02/2025 TK/OF/GC

Installation and Operational Instructions for ROBA[®] contitorque Type 151. $^{3}_{4}$ 00 Sizes 3 and 4

Important Installation Guidelines

- □ Bores, threads and all mounting parts must be <u>free of</u> grease and <u>oil</u>.
- □ The inner and outer threads of the mounting parts must be <u>burr and chip-free.</u>



When installing the ROBA[®] contitorque, please make sure that any heat produced can dissipate into the surrounding area.

The ROBA® contitorque has a highly magnetic surface on the outer diameter of the magnetic part (2) (see Fig. 4 on page 5). In order to prevent injury to personnel and damage to the clutch, any metal objects or other magnets must not be brought near this surface.



The ROBA[®] contitorque may not be disassembled into its individual parts.

The ROBA[®] contitorque cylindrical fitting surface on the hub (Item 1 / Fig. 3) must not be damaged or made dirty.

Installation

a) Attaching drive elements (flange-side)

Screw the drive elements together with the threaded pin of the flange (3) (remove the transport protection cap).

To counter, we recommend using an oil filter strap wrench (not included in delivery) to be applied to the flange (3) outer diameter.

b) Attaching output elements (hub-side)

First, remove the sealing plug from the hub (1) and put it to the side.

The output elements are screwed into the hub (1) fine thread (internal thread).

To counter, we recommend using an open-end wrench SW 36 for Size 3 or SW 41 for Size 4, which engages into the wrench flat of the hub (1), as shown in Fig. 4 on page 4.

The open-end wrench is not included in the standard scope of delivery.

Cleaning

Spray the ROBA® contitorque with a commercially available foam cleaner suitable for stainless steel. Allow the foam cleaner to take effect and subsequently rinse with hot water and dry with compressed air.



During cleaning no cleaning agent or water may penetrate the ring gap between the magnetic part (2) and the flange (3) of the hysteresis clutch.

When cleaning the clutch, please make sure that no liquid penetrates the ring gap between the magnetic part (2) and the flange (3) and the gap between the hub (1) and the roller bearing (5).

The clutch is installed vertically as a standard procedure (flange (3) faces upwards). When cleaning, e.g. using a high pressure cleaner, we recommend always holding the cleaning jet inclined downwards onto the ROBA® contitorque.

Maintenance

The torque transmission is contactless, meaning that no maintenance is necessary for the ROBA® contitorque. The roller bearings (5) are covered and greased with a grease filling to last for the duration of their lifetime. 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.

In this case, please contact the manufacturers.

Disposal

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

