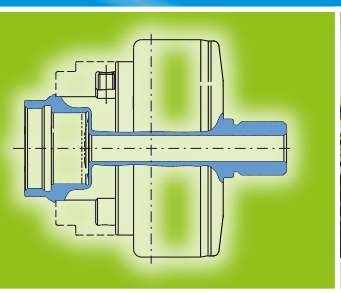
mayr®

your reliable partner

ROBA®-contitorque

The perfect closing clutch



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ROBA®-contitorque closing clutches with magnetic hysteresis technology

The perfect closing clutch for the food industry, the pharmaceutical industry, the packaging industry and the chemical industry

If you wish to close bundles reliably and wear-free, then our ROBA®-contitorque type series is your ideal partner.
In contrast to the permanent magnet clutches or friction type clutches available on the market, ROBA®-contitorque hysteresis clutches provide significant advantages.

● Precise

Contrary to the pulsating permanent magnet clutches generally available on the market, the ROBA®-contitorque features a linear and consistent torque characteristic. The torque repetitive accuracy of the hysteresis clutch is +/-2%.

● Long service lifetime

Thanks to the contactless and impact-free torque transmission, the hysteresis clutch is wear-free and maintenance is not required. The high-quality bearing is also characterised by a long service lifetime.

● User-friendly

The torque is adjusted through loosening of the clamp and subsequent turning of the set collar or the magnetic part. The set torque can be read off directly using the graduation scale.

● Hygienic

Due to the special construction, the rustproof clutch design provides optimum protection against contamination. Cleaning solvents, liquids etc. can drain off immediately, so penetration of liquids into the clutch input side can be ruled out. The bearing made of stainless steel and the covered magnets provide additional protection against corrosion.

● Flexible

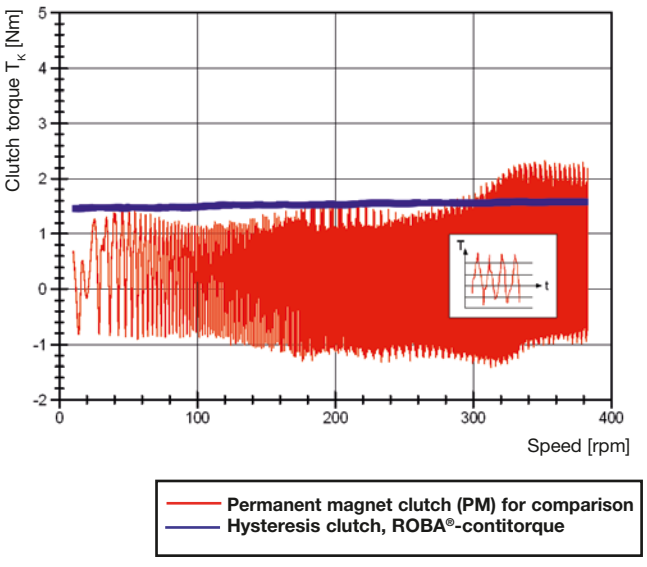
Optional modifications, such as compressed air feedthrough, customer-specific mounting dimensions etc. can be implemented.

Function in malfunction-free operation

The ROBA®-contitorque transmits the set torque synchronously from the input to the output element.
The input element can be attached to the clutch flange.
Here, the operating torque is lower than the clutch limit torque T_g.
The torque is transmitted contactlessly via magnetic forces, which are generated by permanent magnets and which magnetise hysteresis material.

Function in case of overload

If the operating torque exceeds the set limit torque T_g, the clutch slips, i.e. the input and output sides rotate towards each other with a relative speed ns, the so-called slip speed.
The hysteresis material is constantly magnetised and demagnetised and the clutch heats up.
The torque is transmitted asynchronously.
Even in case of overload, the clutch torque T_K remains consistently at the level of the set limit torque T_g.
After remedying of the overload, the relative speed n_s reduces to zero and the torque is transmitted synchronously again between the input and output sides.



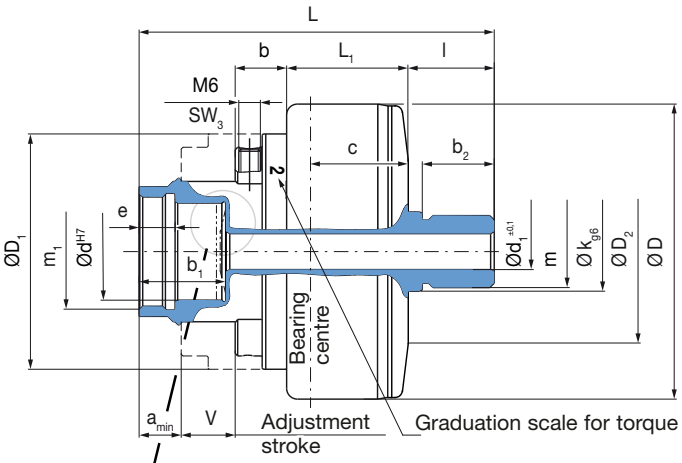
Torque-speed characteristic curve of permanent magnet clutches and hysteresis clutches in case of overload.

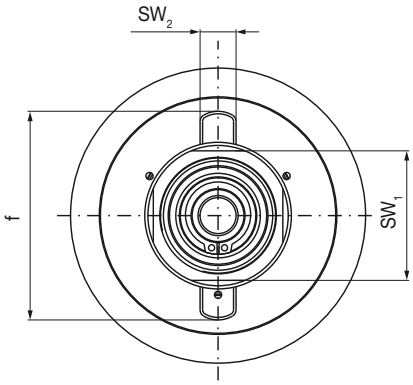
ROBA®-contitorque (rustproof)

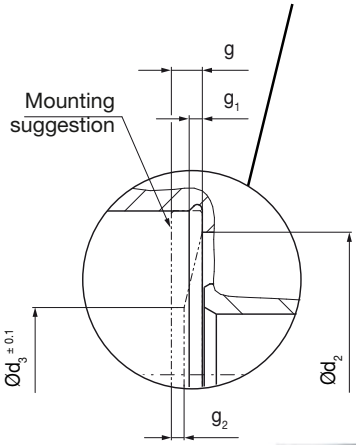
Rustproof closing clutch

Type: 151._00

Sizes 3, 4







Dim. [mm]	Size		
	3		4
	151.400	151.300	151.300
a_{min}	11,7	13	11,7
b	14,3	14,6	12,8
b_1	24	24	24
b_2	20	20	20
c	26,25	35,65	43
d H7	27	27	27
d_1 ±0.1	9	9	9
d_2 ±0.1	23,5	23,5	23,5
d_3 ±0.1	11	11	11
e	10	10	10
f	64	64	76
g	2,5	2,5	2,5
g_1	1,07	1,07	1,07

Dim. [mm]	Size		
	3		4
	151.400	151.300	151.300
g_2	1	1	1
D	82	82	104
D_1	65,4	65,4	83,4
k_{g6}	22	22	22
l	24	24	24
L	98,7	117,5	131,7
L_1	33,7	40,4	48,2
m	M20 x 1,5		
m_1	M32 x 1,5		
SW_1	36	36	41
SW_2	10	10	10
SW_3	3	3	3
V	0 – 15	0 – 25,5	0 – 35

Technical Data Type 151._00				Size		
				3		4
Type				151.400	151.300	151.300
Limit torque on overload 1)		T_g	[Nm]	1 – 2	0,5 – 3	0,5 – 6
			[in-lbs]	9 – 18	5 – 27	5 – 53
Permitted power loss 2) at application temperature 3) [°C]	0 – 25 °C	$P_{V, perm.}$	[W]	24	26	34
	26 – 35 °C			20	22	29
	36 – 45 °C			16,5	18	23,5
Permitted speed		n_{max}	[rpm]	The maximum permitted speed in slipping operation must be calculated via the Thermal Design (see Main Catalogue K.150.V_ _, page 8).		
Mass moments of inertia	Inner part (hub)	J_i	[10^{-3} kgm²]	0,447	0,541	1,724
	Outer part (housing)	J_a	[10^{-3} kgm²]	0,653	0,779	2,375
Weight			[kg]	1,43	1,70	3,34
Permitted bearing load 4)	radial	F_{rad}	[N]	223	325	390
	axial	F_{ax}	[N]	149	217	260

1) Request the tolerance values for the maximum deviation of the set limit torque T_g from the scale value at the manufacturer's. Torque repetitive accuracy ± 2 %. 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 housings. (n = 200 rpm)
3) Application temperature in the range 0 – 45 °C.
4) Referring to a nominal bearing service lifetime L_{10h} = 20000 h, a radial force F_{rad} lever arm at a maximum distance of 70 mm from the bearing centre and a bearing speed n = 350 rpm.

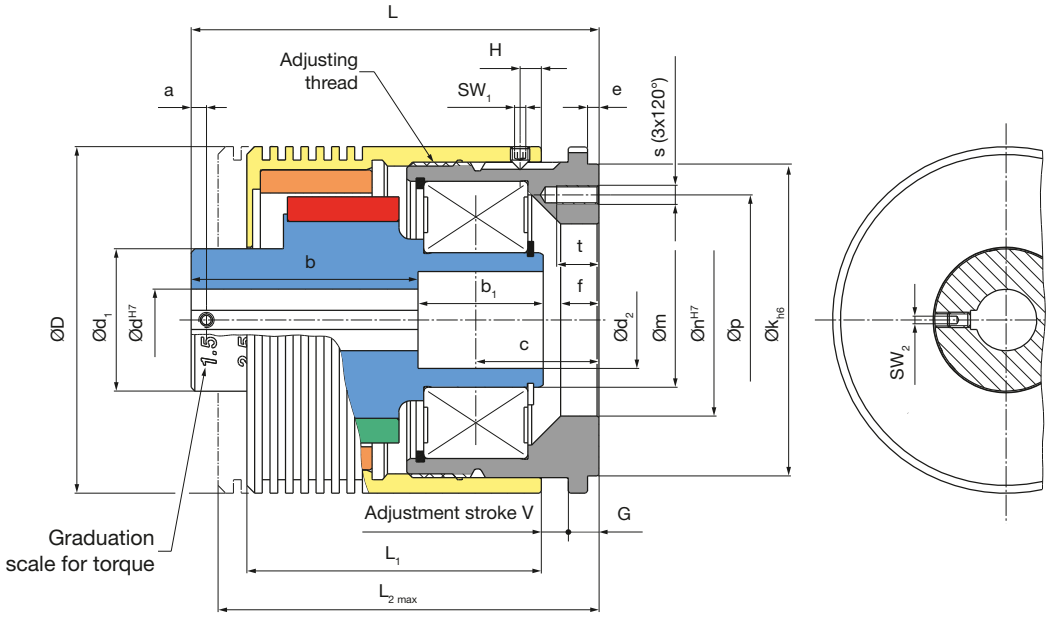
We reserve the right to make dimensional and constructional alterations.

All dimensions in mm.
Further sizes for smaller and larger torques on request.

ROBA®-contitorque

Standard closing clutches

Type 150._00
Sizes 1 – 5



- Aluminium housing
- Optimised weight
- Closing torques up to 12 Nm possible
- For applications without special corrosion protection requirements

Rustproof design available on request

Order Number

__	/	1	5	0	.	__	0	0	/	__	/	__

Sizes 1 to 5	low torque range 7) high torque range 7)	**1** **2**	Hub Bore Ø d (depending on size)	Keyway acc. **DIN 6885-1** or **DIN 6885-3**

Example: 1 / 150.100 / 12 / 6885-1; 4 / 150.200 / 38 / 6885-3

1) Request the tolerance values for the maximum deviation of the set limit torque T_g from the scale value at the manufacturer's. Torque repetitive accuracy ± 2 %. 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. 90 °C for non-rotating set collar.
3) Application temperature in the range 0 – 45 °C.
4) The maximum permitted speed in slipping operation must be calculated via the Thermal Design (see page 6).
5) Referring to a nominal bearing service lifetime L_{10h} = 30000 h, a radial force F_{rad} lever arm at a maximum distance of 100 mm from the bearing centre and a bearing speed n_{max}.
6) Other mounting dimensions or bores on request.
7) See Table "Technical Data", limit torque on overload

Further sizes for smaller and larger torques on request.

ROBA®-contitorque

Technical Data					Size				
					1	2	3	4	5
Limit torque [1] on overload	Type 150.100 (low torque range)		$T_{g\,min}$	[Nm]	0,1	0,1	0,1	0,2	0,5
			$T_{g\,max}$	[Nm]	0,4	0,8	1,5	3	6
	Type 150.200 (high torque range)		$T_{g\,min}$	[Nm]	0,4	0,8	1,5	3	6
			$T_{g\,max}$	[Nm]	0,8	1,6	3	6	12
Permitted power loss [2]	at application temperature [3]	0 – 25 °C	$P_{V,\,perm.}$	[W]	70	79	90	122	152
		26 – 35 °C			59	67	76	103	129
		36 – 45 °C			48	55	62	84	106
Maximum permitted mechanical speed [4]			n_{max}	[rpm]	4000	3500	3000	3000	3000
Permitted bearing load [5]		radial	F_{rad}	[N]	105	220	340	560	1115
		axial	F_{ax}	[N]	70	145	230	375	744

Mass moments of inertia and weight for Ø d_{middle} and keyway DIN 6885-1				Size				
				1	2	3	4	5
Inner part (hub)	Type 150.100	J_i	[10^{-3} kgm²]	0,034	0,165	0,384	1,181	4,329
	Type 150.200			0,043	0,193	0,474	1,448	5,166
Outer part (flange + set collar)	Type 150.100	J_a	[10^{-3} kgm²]	0,237	0,644	1,31	3,725	11,944
	Type 150.200			0,27	0,735	1,5	4,361	13,706
Weight	Type 150.100		[kg]	0,59	1,28	1,72	3,04	6,06
	Type 150.200		[kg]	0,69	1,44	1,97	3,53	6,88

Bores					Size				
					1	2	3	4	5
Hub bore Ø d^{H7} with keyway according to DIN [6]	6885-1	from	Ø d_{min}	[mm]	10	12	15	18	20
		to		[mm]	12	17	22	35	45
	6885-3	over		[mm]	12	17	22	35	45
		to	Ø d_{max}	[mm]	14	20	25	38	50
Middle hub bore			Ø d_{middle}	[mm]	12	16	20	28	35

Dimensions [mm]	Size				
	1	2	3	4	5
a	3,5	3,5	4	4,5	5,5
b	45	53	61	73	86
b_1	26	30,5	33	37,5	49
c	26	30,4	33,5	38,9	51,15
d_1	26	31	37	52	75
d_2	14,2	20,2	25,2	38,2	50,2
D	62	77	90	113	145
e	3	3	3	3	5
f	8	8	10	10	12
G	7,7	7,7	7,7	8,7	15,7
H	5	5	5,5	6	6
k_{h6}	54	69	81	103	133

Dimensions [mm]	Size				
	1	2	3	4	5
L	83	98	110	129	160
L_1	58,5	70,5	80	93,5	111
$L_{2\,max}$	76,5	91,5	103	120,5	149,5
m	20	30	35	50	65
n^{H7}	32	42	50	70	90
p	43	55	65	86	111
s [6]	M4	M4	M5	M6	M8
SW_1	2	2	2,5	2,5	2,5
SW_2	2	2	2	2,5	3
t	8	8	11	13	18
V	0,3 – 10,3	0,3 – 13,3	0,3 – 15,3	0,3 – 18,3	0,3 – 22,8

We reserve the right to make dimensional and constructional alterations.

Technical Specifications

Thermal design of the clutch

The ROBA®-contitorque slips in case of overload, i.e. the input and output sides rotate towards each other with a relative speed, the so-called slip speed.
The hysteresis material is constantly magnetised and demagnetised by the magnetic field of the permanent magnets. On that occasion a power loss occurs, which must be dissipated into the environment in form of heat.
Otherwise the clutch would overheat unpermittedly and the magnetic material would get damaged.
The power loss in a continuous slipping operation depends on the set clutch torque and the slip speed.
If the clutch is used e.g. with an assembly cycle and only slips a certain part of the complete cycle duration, then the calculated power loss can be reduced in contrast to the continuous slipping operation by means of the reduction factor V.

$$P_V = \frac{T \times n_S}{9{,}55} \times V \leq P_{V,\,perm.}$$

$$V = \frac{t_s}{t_{cycle}} \quad \text{and } t_s \text{ [1)]}$$

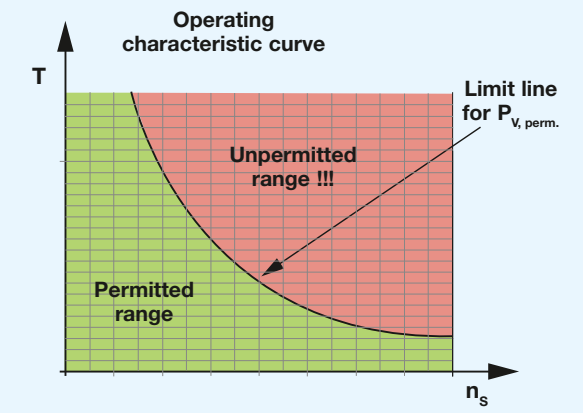
t_s:
- ≤ 30 s for Size 1
- ≤ 25 s for Size 2
- ≤ 20 s for Size 3
- ≤ 15 s for Size 4
- ≤ 10 s for Size 5

The following applies to continuous slipping operation: **V = 1**

P_V	=	power loss of the clutch/brake [W]
$P_{V,\,perm.}$	=	permitted power loss of the clutch/brake [W]
T	=	torque of the clutch/brake [W]
n_S	=	slip speed [rpm]
V	=	reduction factor [-]
t_S	=	slipping period [s]
t_{cycle}	=	cycle period [s]

[1)] Valid for maximum torque adjustment with Type 150.200 and slip speed n_s = 3 000 rpm.
For other torques and slip speed values for t_s please contact the manufacturer.

The following diagram shows the operating characteristic curve of the continuous slip clutch and brake ROBA®-contitorque.



The green range below the limit line of $P_{V,\,perm.}$ shows the permitted range, in which the continuous slip clutch and brake does not overheat.
If the operating point lies in the red range, above the limit line, the clutch overheats unpermittedly and could be destroyed.

Design examples

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

Given:

T	= 2,5 Nm	Closing cap screw-on torque
n_S	= 300 rpm	Screwing speed
t_S	= 2 s	Slipping period
t_{cycle}	= 10 s	Cycle period

40 °C Application temperature

Required:

P_V	= ???	Clutch power loss

$$V = \frac{t_s}{t_{cycle}} = \frac{2\,s}{10\,s} = 0{,}2$$

$$P_v = \frac{T \times n_s}{9{,}55} \times V = \frac{2{,}5\,Nm \times 300\,rpm \times 0{,}2}{9{,}55} = 15{,}7\,W$$

Selected:
=> ROBA®-contitorque, Size 3, Type 151.300
with T_g = 0,5 – 3 Nm and
$P_{V,\,perm.}$ = 18 W > P_V = 15,7 W

Technical Explanations

Safety Regulations
During clutch operation, the clutch surfaces can become very hot. Direct contact between the user and the clutch must be avoided, as this might lead to injuries.
A safety sticker (Caution: Hot surface) is applied to the clutch housing as a standard measure, with the exception of Types 151._00. The user can be protected from injuries via additional safety measures:

a) Mount guideline signs (Caution: Hot surface) near the clutch (customer‘s responsibility)

b) Encapsulating the entire clutch (customer‘s responsibility)

The clutch must be installed so that the heat can be dissipate into the surrounding area directly and unhindered (avoid heat build-up through attachment parts). The encapsulation must not hinder the heat dissipation.

Installation and maintenance must be carried out by trained and qualified staff.
The rotating clutch or rotating clutch components might cause danger of injury to people.
The clutch uses strong magnetic fields. Strong magnetic fields 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. In order to prevent such occurrences, please maintain a sufficient safety distance (more than 0,2 m).

The clutch must not be subjected to impact stresses, as the magnets are very hard and brittle and might break into slivers. Furthermore, there is a danger of impact sparks in case of impact stresses. Therefore, the clutch must not be operated in explosive atmospheres.
The clutch must not come into direct contact with metal chips, as these might be attracted by the magnetic fields, contaminate the clutch and affect the function.
The clutch housing must not be disassembled completely. Due to the strong magnetic fields, clutch parts may be pulled towards the magnet, causing injuries through seizure.

- **Danger of injury due to hot surfaces**

- **Danger of injury due to seizure during clutch installation and de-installation**

- **Danger for people with heart pacemakers**

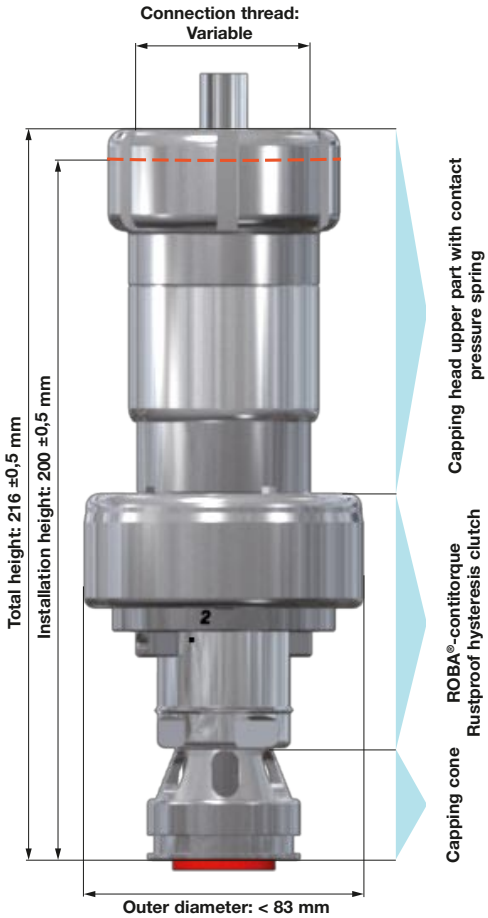
ROBA®-capping head

Rustproof hysteresis-capping head

The perfect capping head for non-returnable and returnable PET bottles as well as for non-returnable glass bottles

Advantages of the ROBA®-capping head hysteresis-capping head:

- *Resistant to dirt and aggressive media due to rustproof,* ***enclosed construction type***
- ***Cones, the function of which has been tested,*** *available for all standard caps*
- ***Adjustment of the head pressure*** *possible*
- ***Maintenance-friendly construction:*** *Fast replacement of the capping head and capping head upper part*
- ***Slim design*** *enables application in nearly all free-standing cappers or capper upper parts*
- ***Variable connection threads:*** *Suitable for all common drive spindles*



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