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TECHNOLOGY GROUP

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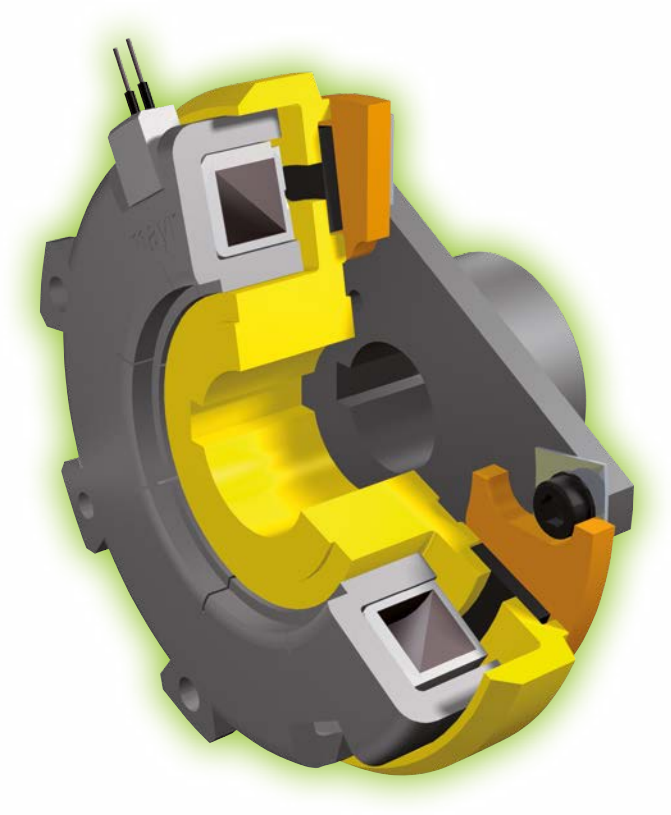
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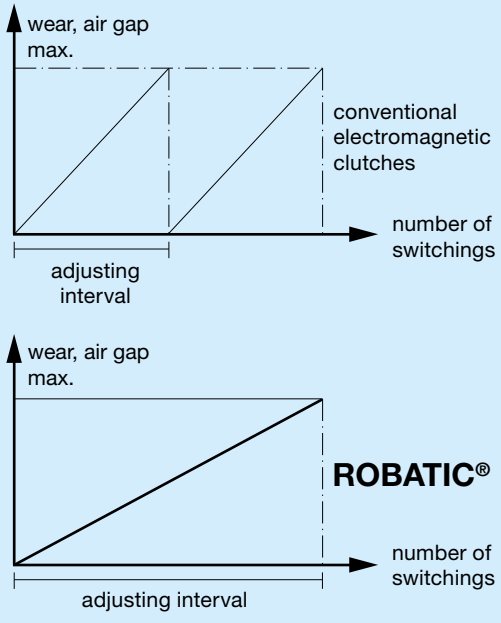
Find the *Mayr 4/540.100* at our website: *Click HERE*

ROBATIC®-electromagnetic clutch

Constant switching performance throughout the entire service lifetime



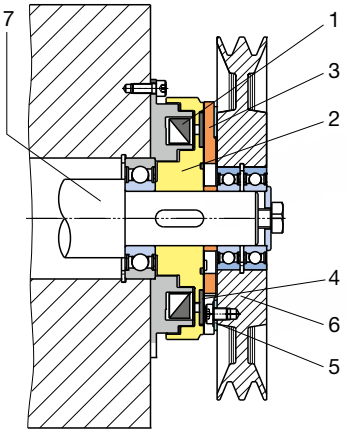
- **High torque security**
  due to an optimised magnetic circuit and the new design of the ROBATIC®. Therefore higher capacities due to less magnetic leakage flux.
- **Half the wear**
  due to large friction surfaces and smooth switching behaviour, the ROBATIC® has a higher wear resistance (approx. 100 %)
- **Large internal diameters of the magnetic coil bodies**
  therefore large permitted shaft diameters
- **Low-noise**
- **Short switching times/high switching frequencies**
- **Correct function up to wear limit**



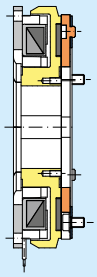
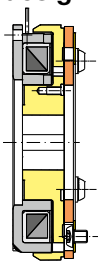
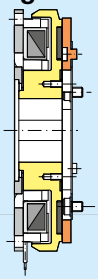
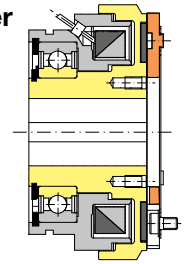
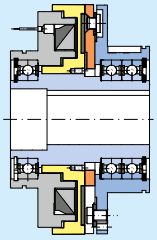
Functional principle

ROBATIC®-clutches are 'energise to engage', electromagnetic pole face units.
When DC voltage is applied to the magnetic coil (1), a magnetic field is built up. The armature disk (3) is attracted to the rotor (2) with friction lining (4). The torque is transmitted via frictional locking.

The torque is transmitted from the drive element (6) via the armature disk (3) and the rotor (2) to the output shaft (7). After having de-energised the coil, the membrane spring (5) draws back the armature disk (3) to the drive element (e.g. belt pulley), and the torque transmission is then disconnected.

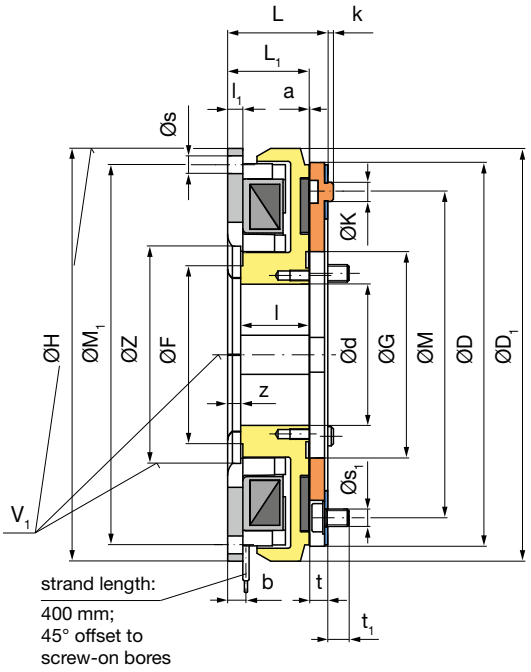


Summary of constructional designs ROBATIC®

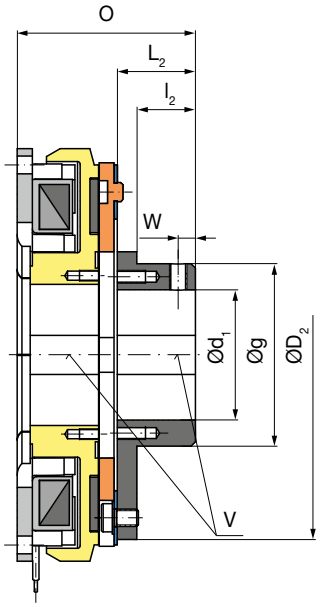
ROBATIC® standard 	Sizes 3 to 9 Type 500._ _ _._				
	Sizes 3 to 7 Type 500.20_.0	without accessories with flange hub	Type Type	500.200.0 500.201.0	
	Sizes 8 to 9 Type 500.1_ _	without accessories with flange hub	Type Type	500.10_ 500.11_	
					Pages 8 – 11
ROBATIC® double-flow design 	Sizes 3 to 7 Type 500.30_	without accessories with flange hub	Type Type	500.300.0 500.301.0	
					Pages 12 – 13
ROBATIC® small mounting diameter 	Sizes 3 to 7 Type 500.21_.0	without accessories with flange hub	Type Type	500.210.0 500.211.0	
	Sizes 8 to 9 Type 580.1_0 with small bolt circle	without accessories with flange hub	Type Type	580.100 580.110	
					Pages 14 – 17
ROBATIC® with bearing-supported coil carrier 	Sizes 3 to 9 Type 540.1_ _	without accessories with flange hub	Type Type	540.10_ 540.11_	
					Pages 18 – 19
ROBATIC® with bearing-supported flange 	Sizes 3 to 9 Type 540.14_		Type	540.14_	
					Pages 20 – 21

ROBATIC®-electromagnetic clutch

Standard **Sizes 3 – 7** **Type 500.20_.0**



Type 500.200.0
Standard



Type 500.201.0
Standard with flange hub

Order number

__ / 5 0 0 . 2 0 __ . 0 / __ / __ / __ / __						
▲		▲	▲	▲	▲	▲
Size **3** **to** **7**	without accessories flange hub	**0** **1**	Coil voltage [VDC] **24** **104**	Rotor bore Ø d H7	Flange hub bore Ø d_1 H7	Keyway acc. DIN 6885/1 or DIN 6885/3

Example: 6 / 500.201.0 / 24 / 35 / 40 / DIN 6885/1

Standard **Sizes 3 – 7** **Type 500.20_.0**

Technical data				Size				
				3	4	5	6	7
Nominal torque [1]	Type 500.20_.0	M_2	[Nm]	10	20	45	80	160
Electrical power		P_{20}	[W]	18	26	37	53	79
Maximum speed		n_{max}	[rpm]	8600	7000	6100	5800	4500
Weight	without accessories	m	[kg]	0.68	1	2.15	3.48	6.6
	with flange hub	m	[kg]	0.75	1.31	2.35	4.03	7.5
Mass moment of inertia	Rotor [2]	I_{eig}	[10^{-4} kgm²]	2	5.14	13.25	29.85	86.75
	Armature disk	I_{eig}	[10^{-4} kgm²]	0.76	1.92	6.86	17.56	52.86
	Flange hub [2] + Armature disk	I_{eig}	[10^{-4} kgm²]	1.02	2.75	8.63	24.66	70.63

1) Please observe run-in conditions or minimum speed (see page 4).
2) With max. bore

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size				
			3	4	5	6	7
Ød H7	Preferred bores	[mm]	10; 15	17; 20	20; 25; 30	25; 30; 35	30; 40; 50
	min.	[mm]	9	11	13	13	20
	max.	[mm]	25	35	42	55	65
Ød$_1$ H7	Preferred bores	[mm]	17; 20	20; 25	25; 30	30; 40	40; 50
	min.	[mm]	9	13	15	20	23
	max.	[mm]	20	30	35 [3]	45	60

3) Up to Ø 32 keyway acc. DIN 6885/1, over Ø 32 keyway acc. DIN 6885/3

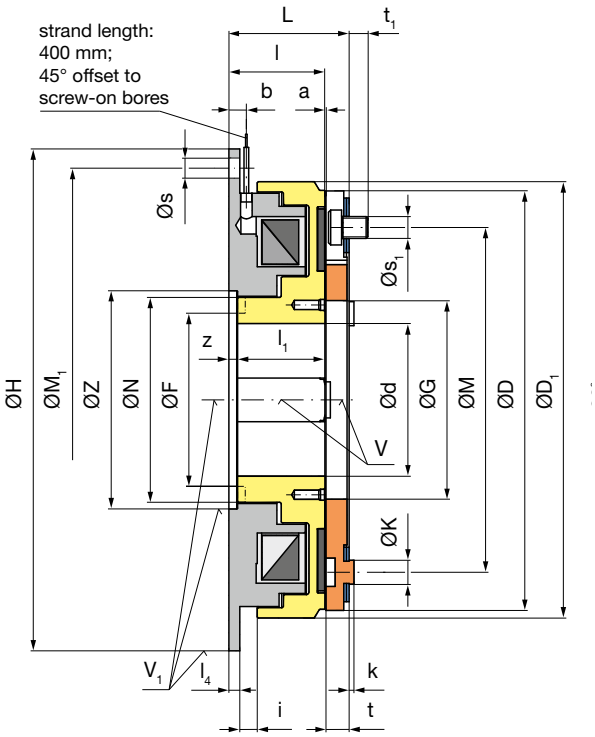
Dimensions [mm]	Size				
	3	4	5	6	7
a	0.2	0.2	0.2	0.3	0.3
b	4.5	4	5.5	5.5	7.5
D	73.5	92	115	140	177
D$_1$	80	100	125	150	190
D$_2$	70	88	110	140	170
F	33	41.5	47	63	82
G	36	49	57.5	74	95
g	29.5	44	47	66	84
H$_{h9}$	80	100	125	150	190
K	3 x 4.6	3 x 6.4	3 x 7.0	3 x 10.4	3 x 10.2
k	1.7	2.3	2.7	2.8	2.7
L	28.1	31.2	36.0	40.8	46.1
L$_1$	24	26.5	30	33.5	37.5
L$_2$	20	22	28	32	36
l	20.5	22	25	27.5	31.5

Dimensions [mm]		Size				
		3	4	5	6	7
l$_1$		3.5	4.3	5.2	6	7
l$_2$		16	17	22	25	27
M		60	76	95	120	150
M$_1$		72	90	112	137	175
O		48.1	53.2	64.1	72.9	82.2
s		4 x 4.8	4 x 5.7	4 x 6.8	4 x 6.8	4 x 9.2
s$_1$		3 x M4	3 x M5	3 x M6	3 x M8	3 x M8
t		3.9	4.5	5.8	7.0	8.3
t$_1$		5.2	7.2	8.7	8.0	9.7
Permitted shaft misalignm. and centre offset	**V**	0.05	0.05	0.05	0.05	0.1
	V$_1$	0.1	0.15	0.15	0.15	0.2
W		5	5	6	8	8
Z^{H8}		42	52	62	80	100
z		3.5	4.5	5	6	6

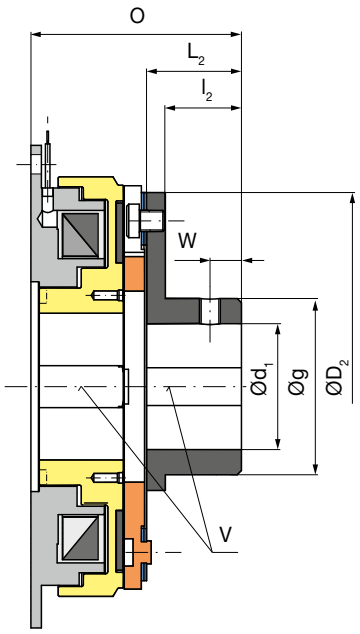
We reserve the right to make dimensional and constructional alterations.

ROBATIC®-electromagnetic clutch

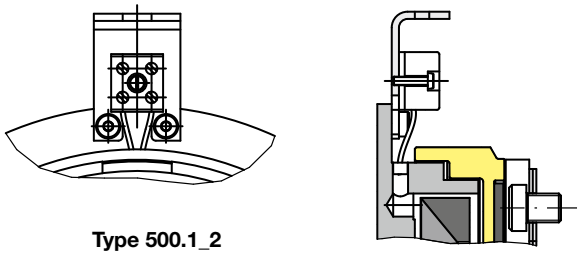
Standard **Sizes 8 – 9** **Type 500.1_ _**



Type 500.100
Standard
with connection strand



Type 500.110
Standard with flange hub
with connection strand



Type 500.1_2
Standard
with connection terminal

Order number

without accessories	**0**	
flange hub	**1**	

▼

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

▲

Size			Coil voltage [VDC]	Bore Rotor [3] Ø d^{H7}	Bore flange hub Ø d_1^{H7}	Keyway acc. DIN 6885/1 or DIN 6885/3
8	connection strand	**0**	**24**			
9	connection terminal	**2**	**104**			

Example: 8 / 500.100 / 24 / 40 / DIN 6885/1

Technical data				Size	
				8	9
Nominal torque [1]	Type 500.1_ _	M_2	[Nm]	320	640
Electrical power		P_{20}	[W]	61	82
Maximum speed		n_{max}	[rpm]	3000	2200
Weight	without accessories	m	[kg]	10.1	20.5
	with flange hub	m	[kg]	13	25
Mass moment of inertia	Rotor [2]	I_{eig}	[10^{-4} kgm²]	165	450
	Armature disk	I_{eig}	[10^{-4} kgm²]	81	315
	Flange hub [2] + Armature disk	I_{eig}	[10^{-4} kgm²]	107	381

1) Please observe run-in conditions or minimum speed (see page 4).
2) With max. bore

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size	
			8	9
Ød H7	Preferred bores	[mm]	40; 50; 60	50; 60; 70
	min.	[mm]	24	34
	max.	[mm]	70	80
Ød$_1$ H7	Preferred bores	[mm]	40; 50	50; 60
	min.	[mm]	24	27
	max.	[mm]	60	80

Dimensions [mm]	Size	
	8	9
a	0.5	0.5
b	8	9
D	193	251
D$_1$	200	251
D$_2$	185	242
F [3]	-	-
G	91	111
g	84	104
H$_{h9}$	230	290
i	8	9.5
K	3 x 11	4 x 20
k	2	4.2
L	55.1	63.9
L$_2$	45.3	53.9
l	44	51
l$_1$	40	47

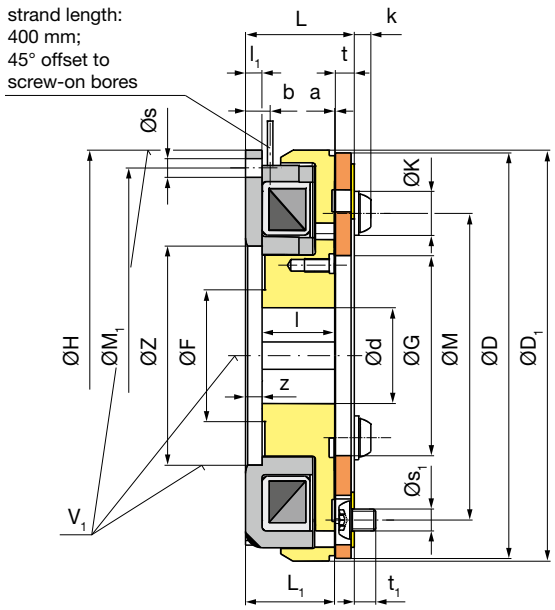
Dimensions [mm]		Size	
		8	9
l$_2$		36.3	42.9
l$_4$		5	6
M		158	210
M$_1$		215	270
N		93.9	116.8
O		100.4	117.8
s		4 x 9	4 x 11
s$_1$		3 x M10	4 x M12
t		10.6	12.4
t$_1$		8.5	11.8
Permitted shaft misalignm. and centre offset	**V**	0.1	0.1
	V$_1$	0.2	0.25
W		15	20
Z^{H8}		100	125
z		4	4

3) Turning for RS-ball bearing according to customer specifications – no turning is allowed for in the standard range.

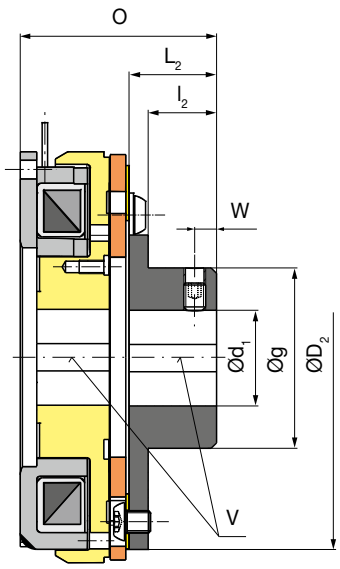
We reserve the right to make dimensional and constructional alterations.

ROBATIC®-electromagnetic clutch

Double-flow design **Sizes 3 – 7** **Type 500.30_.0**



Type 500.300
Double-flow design



Type 500.301
Double-flow design with flange hub



Performance Characteristics

- **Preferred for static or virtually static applications**
- **High torque security with low friction work**
- **No organic friction lining installed (environmentally friendly)**

Order number

__ / 5 0 0 . 3 0 __ . 0 / __ / __ / __ / __								
▲			▲		▲	▲	▲	▲
Size 3 to 7		without accessories flange hub	**0 1**	Coil voltage [VDC]	**24 104**	Rotor bore Ø d H7	Flange hub bore Ø d_1 H7	Keyway acc. DIN 6885/1

Example: 6 / 500.301 / 24 / 35 / 40

Double-flow design **Sizes 3 – 7** **Type 500.30_.0**

Technical data				Size				
				3	4	5	6	7
Nominal torque [1) 2)] (+50% /-12%) Type 500.30_.0		M_2	[Nm]	20	40	90	160	320
Electrical power		P_{20}	[W]	17	25	37	50	79
Maximum speed [3)]		n_{max}	[rpm]	8600	7000	6100	5800	4500
Weight	without accessories	m	[kg]	0.65	1.16	2.02	3.3	6.22
	with flange hub	m	[kg]	0.76	1.5	2.53	4.46	8.09
Mass moment of inertia	Rotor [4)]	I_{eig}	[10^{-4} kgm²]	2.02	5.56	14.08	32.26	106.36
	Armature disk	I_{eig}	[10^{-4} kgm²]	1.08	2.69	7.34	19.92	61.57
	Flange hub [4)] + Armature disk	I_{eig}	[10^{-4} kgm²]	1.46	3.98	10.26	30.43	89.01

1) Please observe run-in conditions or minimum speed (see page 4).
2) During permanent synchronisation without friction work, the torque may drop to 50 % - 60 % of the nominal torque.
3) Max. switching speed is dependent on friction work and switching frequency - ***if necessary, please contact the manufacturer.***
4) With max. bore

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size				
			3	4	5	6	7
Ød [H7]	Preferred bores	[mm]	15, 20	20, 25, 28	30, 35, 40	45, 50	55, 60
	min. [5)]	[mm]	14	19	30	42	55
	max.	[mm]	25	35	42	55	65
Ød$_1$ [H7]	Preferred bores	[mm]	15, 17, 20	20, 25, 28	25, 30	35, 40, 45	50, 55, 60
	min. [5)]	[mm]	14	19	24	32	50
	max.	[mm]	20	30	32	45	60

5) For torques smaller than the nominal torque M_2, bores below d_{min} are possible on request.

Dimensions [mm]	Size				
	3	4	5	6	7
a	0.2	0.2	0.2	0.3	0.3
b	4.5	4	5.5	5.5	7.5
D	79	99	123.5	148	188
D$_1$	80	100	125	150	190
D$_2$	70	88	110	140	170
F [6)]	-	-	-	-	-
G	32	49	55	73	95
g	29.5	44	47	66	84
H$_{h9}$	80	100	125	150	190
K	3x8	3x10	3x12	3x16	3x14
k	3.2	3.8	4.3	6	4.4
L	28.1	31.25	35.7	40.7	46.1
L$_1$	23.5	26.5	30	33.5	37.5
L$_2$	20	22	28	32	36
l	20	22	25	27.5	31.5

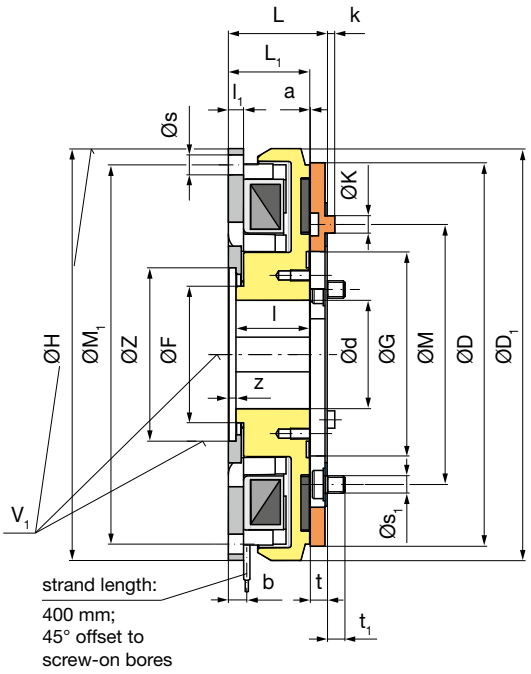
Dimensions [mm]		Size				
		3	4	5	6	7
l$_1$		3.5	4.3	5.2	6	7
l$_2$		16	17	22	25	27
M		60	76	95	120	150
M$_1$		72	90	112	137	175
O		48.1	53.25	63.7	72.7	82.2
s		4x4.8	4x5.7	4x6.8	4x6.8	4x9.2
s$_1$		3xM4	3xM5	3xM6	3xM8	3xM8
t		4.3	4.45	5.5	6.9	8.3
t$_1$		5	7.2	8.7	14	13.7
Permitted shaft misalignm. and centre offset	**V**	0.05	0.05	0.05	0.05	0.1
	V$_1$	0.1	0.15	0.15	0.15	0.2
W		5	5	6	8	8
Z^{H8}		42	52	62	80	100
z		3.5	4.5	5	6	6

6) Turning for RS-ball bearing according to customer specifications – no turning is allowed for in the standard range.

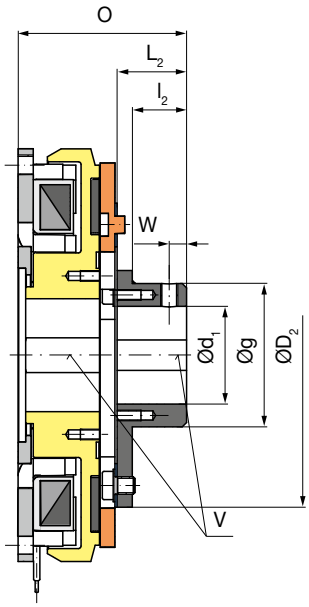
We reserve the right to make dimensional and constructional alterations.

ROBATIC®-electromagnetic clutch

Small mounting diameter **Sizes 3 – 7** **Type 500.21_.0**



Type 500.210.0
Small mounting diameter



Type 500.211.0
Small mounting diameter
with flange hub

Order number

__ / 5 0 0 . 2 1 __ . 0 / __ / __ / __ / __ / __

Size 3 to 7		without accessories flange hub	0 1	Coil voltage [VDC]	24 104	Rotor bore Ø d H7	Flange hub bore Ø d_1 H7	Keyway acc. DIN 6885/1 or DIN 6885/3

Example: 6 / 500.211.0 / 24 / 40 / 30 / DIN 6885/1

Small mounting diameter **Sizes 3 – 7** **Type 500.21_.0**

Technical data				Size				
				3	4	5	6	7
Nominal torque [1]	Type 500.21_.0	M_2	[Nm]	10	20	45	80	160
Electrical power		P_{20}	[W]	18	26	37	53	79
Maximum speed		n_{max}	[rpm]	8600	7000	6100	5800	4500
Weight	without accessories	m	[kg]	0.65	1.1	2.1	3.4	6.4
	with flange hub	m	[kg]	0.7	1.16	2.25	3.6	6.95
Mass moment of inertia	Rotor [2]	I_{eig}	[10^{-4} kgm²]	2.2	5.3	13.47	32.31	90.13
	Armature disk	I_{eig}	[10^{-4} kgm²]	0.7	1.79	6.28	15.77	48.1
	Flange hub [2] + Armature disk	I_{eig}	[10^{-4} kgm²]	0.8	1.97	7.19	17.45	55.2

1) Please observe run-in conditions or minimum speed (see page 4).
2) With max. bore

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size				
			3	4	5	6	7
Ød H7	Preferred bores	[mm]	10; 15	17; 20	20; 25; 30	25; 30; 35	30; 40; 50
	min.	[mm]	9	11	13	13	20
	max.	[mm]	20	28	35	42	55
Ød$_1$ H7	Preferred bores	[mm]	10; 15	17; 20	20; 25	25; 30	30; 40
	min.	[mm]	8	9	13	15	20
	max.	[mm]	17	20	30	35 [3]	45

3) Up to Ø 32 keyway acc. DIN 6885/1, over Ø 32 keyway acc. DIN 6885/3

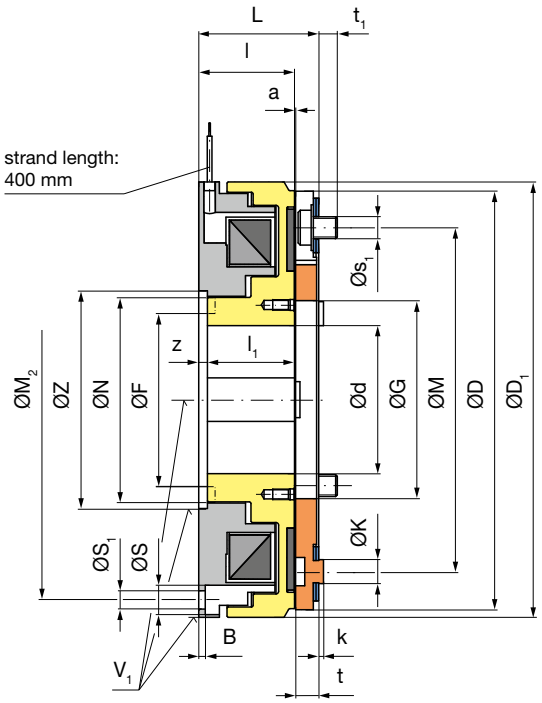
Dimensions [mm]	Size				
	3	4	5	6	7
a	0.2	0.2	0.2	0.3	0.3
b	4.5	4	5.5	5.5	7.5
D	73.5	92	115	140	177
D$_1$	80	100	125	150	190
D$_2$	54	70	88	110	140
F	26	36.5	41.5	47	63
G	36	49	57.5	74	95
g	27	29.5	44	47	66
H$_{h9}$	80	100	125	150	190
K	3 x 4.3	3 x 4.6	3 x 6.4	3 x 7	3 x 10.4
k	1.6	1.7	2.3	2.7	2.8
L	28.1	31.1	36.0	40.4	45.8
L$_1$	24	26.5	30	33.5	37.5
L$_2$	15	20	22	28	32
l	22	24	27	30	34

Dimensions [mm]		Size				
		3	4	5	6	7
l$_1$		3.5	4.3	5.2	6	7
l$_2$		11.5	16	17	22	25
M		46	60	76	95	120
M$_1$		72	90	112	137	175
O		43.1	51.1	58.1	68.8	77.9
s		4 x 4.5	4 x 5.7	4 x 6.8	4 x 6.8	4 x 9.2
s$_1$		3 x M3	3 x M4	3 x M5	3 x M6	3 x M8
t		3.9	4.4	5.8	6.6	8.0
t$_1$		4.1	5.2	6.7	8.7	8.0
Permitted shaft misalignm. and centre offset	**V**	0.05	0.05	0.05	0.05	0.1
	V$_1$	0.1	0.15	0.15	0.15	0.2
W		5	5	6	8	8
Z^{H8}		35	42	52	62	80
z		2	2.5	3	3.5	3.5

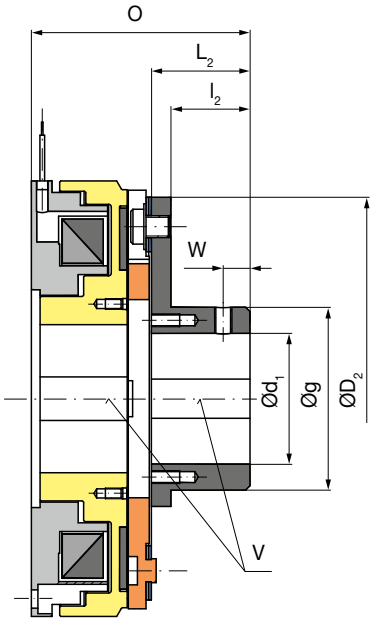
We reserve the right to make dimensional and constructional alterations.

ROBATIC®-electromagnetic clutch

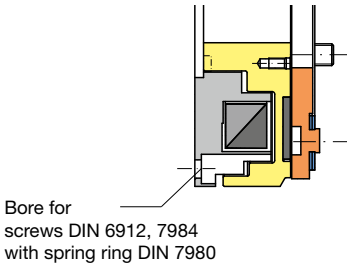
Small mounting diameter **Sizes 8 – 9** **Type 580.1_0**



Type 580.100
Coil carrier with small bolt circle



Type 580.110
Coil carrier with small bolt circle and flange hub



Order number

__ / 5 8 0 . 1 __ 0 / __ / __ / __ / __								
△			△		△	△	△	
Size **8** **9**		without accessories flange hub	**0** **1**	Coil voltage [VDC]	**24** **104**	Hub bore Ø d ^{H7}	Flange hub bore Ø d_1^{H7}	Keyway acc. DIN 6885/1 or DIN 6885/3

Example: 8 / 580.110 / 24 / 40 / 40

Small mounting diameter **Sizes 8 – 9** **Type 580.1_0**

Technical data				Size	
				8	9
Nominal torque [1]	Type 580.1_0	M_2	[Nm]	320	640
Electrical power		P_{20}	[W]	74	77
Maximum speed		n_{max}	[rpm]	3000	2200
Weight	without accessories	m	[kg]	10.1	20.5
	with flange hub	m	[kg]	13	23.5
Mass moment of inertia	Rotor [2]	I_{eig}	[10^{-4} kgm²]	165	450
	Armature disk	I_{eig}	[10^{-4} kgm²]	81	315
	Flange hub [2] + Armature disk	I_{eig}	[10^{-4} kgm²]	107	381

1) Please observe run-in conditions or minimum speed (see page 4).
2) With max. bore

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size	
			8	9
Ød H7	Preferred bores	[mm]	40; 50; 60	50; 60; 70
	min.	[mm]	24	34
	max.	[mm]	70	80
Ød$_1$ H7	Preferred bores	[mm]	40; 50	50; 60
	min.	[mm]	24	27
	max.	[mm]	60	80

Dimensions [mm]	Size	
	8	9
a	0.5	0.5
B	3	3
D	193	251
D$_1$	200	251
D$_2$	185	242
F [3]	-	-
G	91	111
g	84	104
H$_{h9}$	230	290
i	8	9.5
K	3 x 11	4 x 20
k	2	4.2
L	55.1	63.9
L$_2$	45.3	53.9
l	44	51
l$_1$	40	47

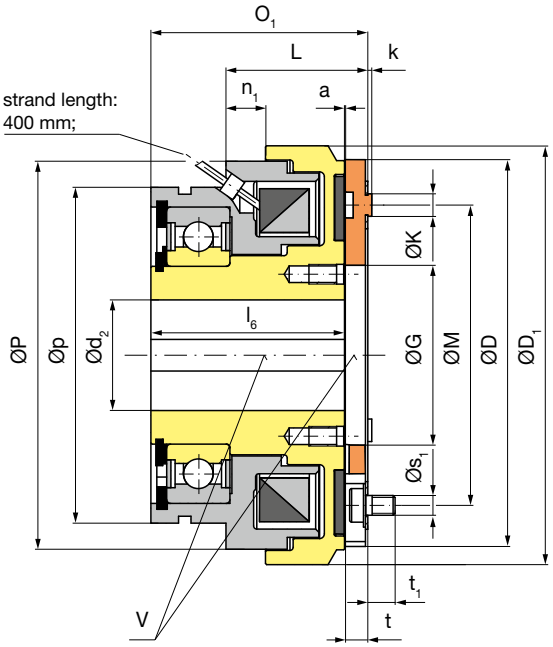
Dimensions [mm]		Size	
		8	9
t		10.6	12.4
l$_2$		36.3	42.9
M		158	210
M$_2$		184	235
N		93.9	116.8
O		100.4	117.8
S		13.5	13.5
S$_1$		3 x 8.4	3 x 8.4
s$_1$		3 x M10	4 x M12
t$_1$		8.5	11.8
Permitted shaft misalignm. and centre offset	**V**	0.1	0.1
	V$_1$	0.2	0.25
W		15	20
Z^{H8}		100	125
z		4	4

3) Turning for RS-ball bearing according to customer specifications – no turning is allowed for in the standard range.

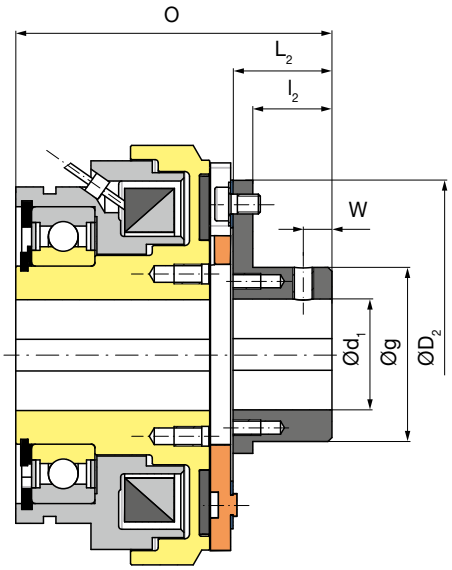
We reserve the right to make dimensional and constructional alterations.

ROBATIC®-electromagnetic clutch

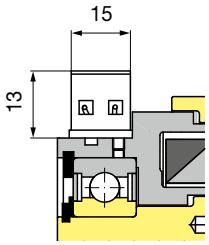
With bearing-supported coil carrier **Sizes 3 – 9** **Type 540.1_ _**

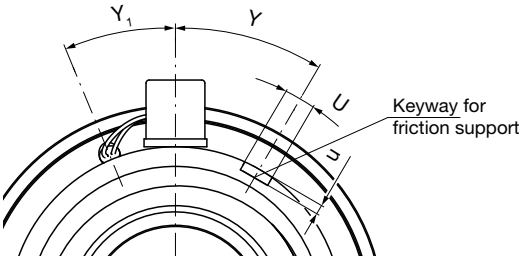


Type 540.100
With bearing-supported coil carrier



Type 540.110
With bearing-supported coil carrier and flange hub





Type 540.1_2 with connection terminal

Order number

without accessories	**0**
flange hub	**1**

▼

__ / 5 4 0 . 1 __ __ / __ / __ / __ / __ / __

▲		▲	▲	▲	▲	▲
Size **3** **to** **9**	connection strand connection terminal	**0** **2**	Coil voltage [VDC] **24** **104**	Rotor bore Ø d_2	Keyway acc. DIN 6885/1 or DIN 6885/3	Flange hub bore Ø d_1

Example: 5 / 540.100 / 24 / 20

With bearing-supported coil carrier **Sizes 3 – 9** **Type 540.1_ _**

Technical data				Size						
				3	4	5	6	7	8	9
Nominal torque [1]	Type 540.1_ _	M_2	[Nm]	10	20	45	80	160	320	640
Electrical power		P_{20}	[W]	18	19	28	38	46	61	82
Maximum speed		n_{max}	[rpm]	8000	6000	5000	4200	3600	3000	2200
Weight	without accessories	m	[kg]	0.73	1.22	1.85	3.16	5.54	11.6	22.2
	with flange hub	m	[kg]	0.78	1.29	2.01	3.38	6.11	12.86	23.93
Mass moment of inertia	Rotor [2]	I_{eig}	[10^{-4} kgm²]	1.37	3.35	9.36	20.8	54.4	178	462
	Armature disk	I_{eig}	[10^{-4} kgm²]	0.35	1.05	2.97	7.04	14	81	315
	Flange hub [2] + Armature disk	I_{eig}	[10^{-4} kgm²]	0.5	1.5	4.5	10.9	37.1	107	381

1) Please observe run-in conditions or minimum speed (see page 4).
2) With max. bore

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size						
			3	4	5	6	7	8	9
Ød$_2$ H7	Preferred bores	[mm]	10; 15	17; 20	20; 25; 30	20; 25; 30	25; 30; 40	40; 45; 50	40; 50; 60
	min.	[mm]	7	8	12	12	19	22	30
	max.	[mm]	20 [3]	25 [3]	30	40	50	60	65
Ød$_1$ H7	Preferred bores	[mm]	10; 15	17; 20	20; 25	25; 30	30; 40	40; 50	50; 60
	min.	[mm]	8	9	13	15	20	24	27
	max.	[mm]	17	20	30	35 [4]	45	60	80

3) With max. bore keyway to DIN 6885/3
4) Up to Ø 32 keyway acc. DIN 6885/1, over Ø 32 keyway acc. DIN 6885/3

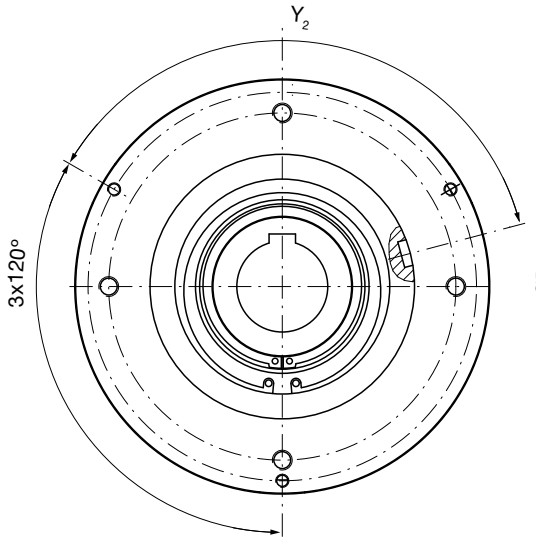
Dimensions [mm]	Size						
	3	4	5	6	7	8	9
a	0.2	0.2	0.2	0.3	0.3	0.5	0.5
D	64.5	81.5	99	118	151	193	251
D$_1$	70	87	106	125	157	200	251
D$_2$	55	70	88	110	140	185	242
G	29.5	30.5	45.5	48	69	91	111
g	27	29.5	44	47	66	84	104
K	3x4.3	3x4.6	3x5.8	3x7	3x9.4	3x11.5	4x20
k	1.6	1.7	2.3	2.7	2.8	2.0	4.2
L	28	31	35.9	40.5	46.5	55.4	63.9
L$_2$	15	20	25	29.5	38	45.3	53.9
l$_2$	11.5	16	20	23.5	31	36.3	42.9
l$_6$	40	43.5	49	55	61.5	74	81
M	46	60	76	95	120	158	210
n$_1$	9	9	10	10.5	12	13	15.5

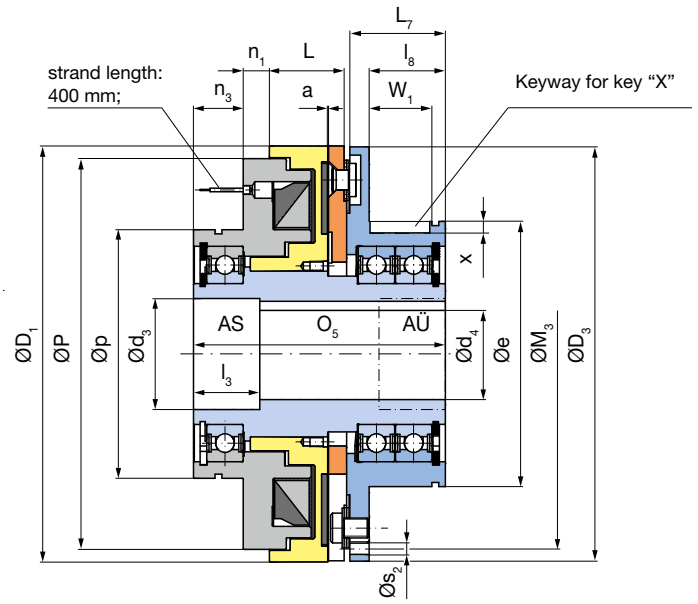
Dimensions [mm]		Size						
		3	4	5	6	7	8	9
O		59	68	79.9	91.5	108.5	130.4	147.8
O$_1$		44	48	54.9	62.0	70.5	85.1	93.9
P		70	79.7	98.2	115.4	150.4	189.4	235.8
p		64	72	85	105	120	145	150
s$_1$		3xM3	3xM4	3xM5	3xM6	3xM8	3xM10	3xM12
t		3.8	4.3	5.7	6.7	8.7	10.6	12.4
t$_1$		4.1	5.0	6.9	6.7	8.2	8.5	11.8
U		6	8	8	10	12	14	14
u		2	2.5	2.5	2.5	3	4.5	6
Permitted shaft misalignment	**V**	0.05	0.05	0.05	0.05	0.1	0.1	0.1
W		5	5	6	10	10	15	20
Y	[°]	45	45	30	30	30	30	30
Y$_1$	[°]	30	30	22.5	22.5	15	15	15

We reserve the right to make dimensional and constructional alterations.

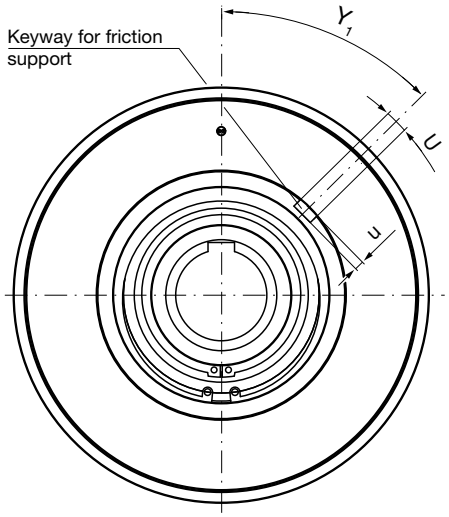
ROBATIC®-electromagnetic clutch

With bearing-supported flange [1] Sizes 3 – 9 **Type 540.14_**





Type 540.140
With bearing-supported flange



Order number

__ / 5 4 0 . 1 4 __ / __ / __ / __ / __

Size						
3 to 9	connection strand connection terminal	**0** **2**	Coil voltage [VDC] **24** **104**	Hub bore Ø d_4	Keyway acc. DIN 6885/1 or DIN 6885/3	AS AÜ Counterbore: coil carrier side transmission flange side

Example: 5 / 540.140 / 24 / 24 / 6885/1 / AS

With bearing-supported flange [1] Sizes 3 – 9

Type 540.14_

Technical data				Size						
				3	4	5	6	7 *)	8 *)	9 *)
Nominal torque [2]	Type 540.14_	M_2	[Nm]	10	20	45	80	160	320	640
Electrical power		P_{20}	[W]	18	19	28	38	46	61	82
Maximum speed		n_{max}	[rpm]	8000	6000	5000	4200	3600	3000	2200
Weight	with max. bore	m	[kg]	1.2	1.85	2.95	4.7	8.25	16.6	29.2
Mass moment of inertia	Rotor (max. bore)	I_{eig}	[10^{-4} kgm²]	1.59	3.82	10.24	23.22	52.05	197.66	497
	Armature disk + driver flange	I_{eig}	[10^{-4} kgm²]	1.97	4.06	9.95	22.93	50.53	147.83	533.7

1) 2-shaft connection on request
2) Please observe run-in conditions or minimum speed (see page 4).
*) From Size 7 on, the installation of a key in the driver flange is necessary in order to ensure torque transmission.

Standard voltages 24 VDC; 104 VDC.
Permitted voltage tolerances acc. IEC 38 +/-10 %.

Bores			Size						
			3	4	5	6	7	8	9
Ød$_4$	maximum	[mm]	15	19 [3]	24	33	46	58	65
Ød$_3$		[mm]	16	20	26	26 [4] 37 [5]	37 [6] 47 [7]/ _ [8]	37 [6] 47 [7] 59 [8]	47 [9] 67 [8] _ [10]

3) Above Ø 18 keyway to DIN 6885/3 with $d_{4\,max}$ – depth of hub keyway $1.2^{+0.1}$
4) above Ø d_4 to 19
5) above Ø d_4 over 19
6) above Ø d_4 to 28
7) above Ø d_4 over 28
8) above Ø d_4 over 38
9) above Ø d_4 to 38
10) above Ø d_4 über 55

Dimensions [mm]	Size						
	3	4	5	6	7	8	9
a	0.2	0.2	0.2	0.3	0.3	0.5	0.5
D_1	70	87	106	125	157	200	251
D_3	71	82	102	122	156	199	250
G	29.5	30.5	45.5	48	69	91	111
e_{h6}	56	64	75	90	110	135	160
L	28	31	35.9	40.5	46.5	55.4	63.9
L_7	25.8	29.7	38.7	43.5	48.9	53.9	57.1
l_3	35	45 [11] 35 [12]	50 [4] 40 [5]	60 [4] 40 [5] 20 [7]	55 [6] 35 [7] _ [8]	75 [6] 55 [7] 25 [8]	70 [9] 40 [8] _ [10]
l_8	21.5	24	30	34	39	44	46
M_3	66	75	94	112	145	184	235
n_1	9	9	10	10.5	12	13	15.5
n_3	16	17	19	21.5	24	30	30

Dimensions [mm]		Size						
		3	4	5	6	7	8	9
O_5		70	78	94	106	120	140	152
P		70	79.7	98.2	115.4	150.4	189.4	235.8
p		64	72	85	105	120	145	150
s_2		3 x M4	3 x M5	3 x M5	3 x M6	3 x M6	3 x M8	3 x M8
U		6	8	8	10	12	14	14
u		2	2.5	2.5	2.5	3	4.5	6
W_1		17.5	19	24.5	28	31	36	38
Key X [13]		6x6 x16	6x6 x18	8x7 x22	10x8 x25	10x8 x28	14x9 x32	16x10 x36
x		3.5	3.5	4	5	5	5.5	6
Y_1	[°]	75	75	52.5	52.5	45	45	45
Y_2	[°]	90	90	90	90	90	90	135

11) above Ø d_4 bis 14
12) above Ø d_4 über 14
13) From Size 7 on, the installation of a key in the driver flange is necessary in order to ensure torque transmission.

We reserve the right to make dimensional and constructional alterations.

ROBATIC®-electromagnetic clutch

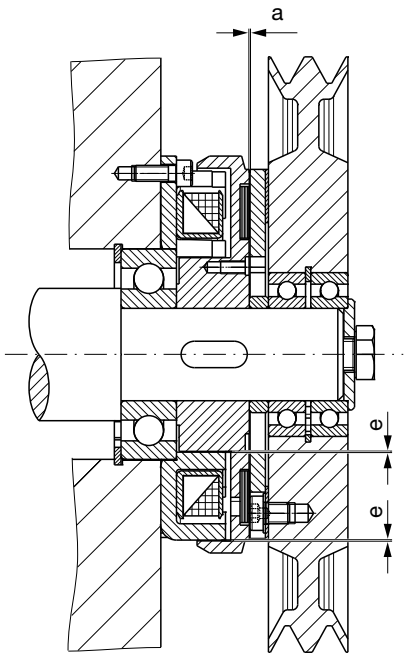


Fig. 1

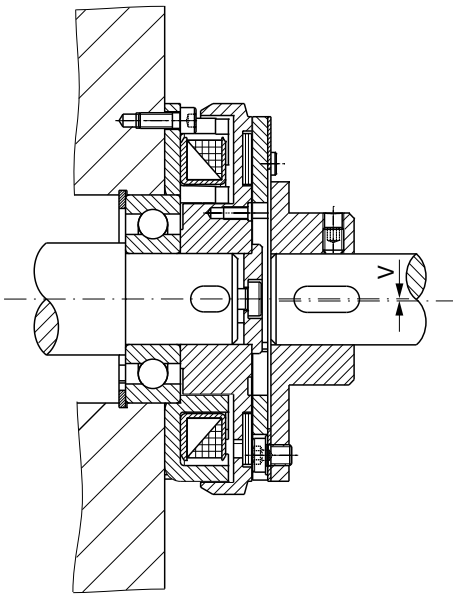


Fig. 2

	Size						
	3	4	5	6	7	8	9
a	$0.2^{+0.1}_{-0.05}$	$0.2^{+0.15}_{-0.05}$	$0.2^{+0.15}_{-0.05}$	$0.3^{+0.15}_{-0.05}$	$0.3^{+0.15}_{-0.05}$	$0.5^{+0.15}_{-0.1}$	$0.5^{+0.15}_{-0.1}$
e	0.25	0.3	0.2	0.35	0.5	0.55	0.6

Table 1 Adjustment of the air gaps

	Size						
	3	4	5	6	7	8	9
V	0.05	0.05	0.05	0.05	0.1	0.1	0.1

Table 2 Permitted shaft misalignments

The dimension “a” (Fig. 1) must be adjusted according to Table 1. Please ensure that the shaft is fastened axially, since otherwise the dimension “a” will change and cause the armature disk to band against coil carrier.
The air gap “e” is selected so that a brushing of the rotor against the coil carrier is not possible when keeping to the permitted centre offsets V and V1 (see Table “Dimensions”).

Design:

ROBATIC®-electromagnetic clutches are manufactured according to the electric protection IP 54 specification and the class of insulation F up to 155 °C for coil, casting compound, connection strands and the magnetic coil plastic-coated. The friction linings are asbestos-free, the surfaces of coil carrier, rotor and flange hub are phosphated. The armature disk is gas nitro-carburized and the transmission spring is made of stainless steel. The drive elements should be made from a material which is a poor magnetic conductor in order to prevent magnetic loss due to leakage flux and therefore loss of force.

ROBATIC®-electromagnetic clutches are used for dry running. The torque is transmitted via the connection of the armature disk on the iron poles and the friction lining of the rotor (except the double-flow ROBATIC® clutch without friction lining, Type 500.30_.0).

When coupling two shafts, the eccentricity “V” of the shafts according to Table 2 must not be exceeded. The larger the displacement “V” the more the torque decreases and the hotter the friction surface becomes. In the case of this arrangement care must be taken that both shafts have no axial backlash since, otherwise, a brushing of the rotor would also be possible. The flange hub is kept axially by means of a set screw (on set 90° to the key). The “V”-values are indicated again in the Technical Data of the individual clutches.

Please observe in particular the following:

The run-in conditions or the minimum speed must be observed (see page 4).

The friction surfaces have to be absolutely free of oil and grease as otherwise, the torque drops significantly. The air gap “a” (Fig. 1) has to be checked periodically. The clutch does not function correctly, if the max. working air gap is exceeded (see Table 4, page 25).

Installation and maintenance must be carried out by trained and qualified specialists.

Clutch size calculation

Formulas

1. Drive torque

$$M_A = \frac{9550 \times P_A}{n} \quad [Nm]$$

2. Required torque

$$M_{erf.} \geq K \times M_A \quad [Nm]$$

3. Switchable torque of the clutch (acc. to diagram 1, page 24)

$$M_S \geq M_{erf.} \quad [Nm]$$

4. Mass moment of inertia

$$I = I_{eig.} + I_{zus.} \quad [kgm^2]$$

5. Acceleration torque of the clutch

$$M_a = M_S \pm M_L \quad [Nm]$$

6. Acceleration time

$$t_a = \frac{I \times n}{9.55 \times M_a} + t_1 \quad [sec]$$

7. Max. switching frequency per hour (dependent on time)

$$S_{h\,max} = \frac{1}{t_{vM} + (t_a + t_2) \times 1.2} \times 3600 \quad [h^{-1}]$$

8. Friction work per acceleration

$$Q_a = \frac{I \times n^2}{182.4} \times \frac{M_s}{M_a} \quad [J]$$

9. Examination of the selected clutch size in diagram 2 (page 24 friction power diagram).
Intersection friction work / switching frequency must be below the friction power curve! If it is above, the next size has to be selected and re-calculated from point 3 on.

$$Q_a < Q_E \quad [J]$$

10. Number of switchings until re-adjustment

$$Z_n = \frac{Q_1}{Q_a} \times (a_n - a) \quad [-]$$

11. Number of switchings until wear limit

$$Z = \frac{Q_{ges.}}{Q_a} \quad [-]$$

Key:

P_A	[kW]	input power	
M_A	[Nm]	drive torque	
M_a	[Nm]	acceleration torque of the clutch	
$M_{erf.}$	[Nm]	required torque	
M_L	[Nm]	load torque (+ = lower load) (- = lift load)	
M_S	[Nm]	switchable torque of the clutch (diagram 1, page 24)	
n	[rpm]	input speed	
K		safety factor ≥ 2	
I	[kgm²]	mass moment of inertia	
$I_{eig.}$	[kgm²]	own mass moment of inertia (“Technical data“)	
$I_{zus.}$	[kgm²]	additional mass moment of inertia	
t_a	[sec]	acceleration time	
t_{vM}	[sec]	braking time of the machine	
t_1	[sec]	switch-on time of the clutch	Table 3, page 25
t_2	[sec]	switch-off time of the clutch	
$S_{h\,max}$	[h^{-1}]	max. switching frequency per hour (dependent on time)	
$Q_{ges.}$	[J]	total friction work (acc. Table 4, page 25)	
Q_a	[J]	friction work per acceleration	
Q_E	[J]	perm. friction work for single switching	Table 4, page 25
Q_1	[J/mm]	friction work until 1 mm wear	
Z_n		number of switchings until re-adjustment	
Z		number of switchings until wear limit	
a	[mm]	nominal air gap	Table 4, page 25
a_n	[mm]	max. working air gap	

Calculation example

Data:

Input power	P_A	= 3 kW
Input speed	n	= 1400 rpm
Load torque output	M_L	= 15 Nm
Additional mass moment of inertia	$I_{add.}$	= 0.15 kgm²
Braking time of the machine	t_{vM}	= 1.5 [sec]
180 switchings per hour		

Drive torque

$$M_A = \frac{9550 \times P_A}{n} = \frac{9550 \times 3}{1400} = \mathbf{20.5}\ [Nm]$$

Required torque

$$M_{erf.} = K \times M_A = 2 \times 20.5 = \mathbf{41}\ [Nm]$$

Determined clutch size (acc. to diagram 1) = Size 6

$$M_S \geq M_{erf.} = \mathbf{47}\ [Nm]$$

Selected clutch = Size 6, Type 500.200.0

Mass moment of inertia

$$I = I_{elg.} + I_{zus.} = 0.001756 + 0.15 = \mathbf{0.151756}\ [kgm^2]$$

Acceleration torque of the clutch

$$M_a = M_S - M_L = 47 - 15 = \mathbf{32}\ [Nm]$$

Acceleration time of the clutch

$$t_a = \frac{I \times n}{9.55 \times M_a} + t_1{}^* = \frac{0.151756 \times 1400}{9.55 \times 32} + 0.15 = \mathbf{0.845}\ [sec]$$

* Switching times t_1 und t_2 from Table 3, page 25 = without overexcitation

Max. switching frequency per hour

$$S_{h\,max} = \frac{1}{t_{vM} + (t_a + t_2{}^*) \times 1.2} \times 3600$$

$$S_{h\,max} = \frac{1}{1.5 + (0.845 + 0.060) \times 1.2} \times 3600 = \mathbf{1392}\ [h^{-1}]$$

Friction work per acceleration

$$Q_a = \frac{I \times n^2}{182.4} \times \frac{M_S}{M_a}$$

$$Q_a = \frac{0.151756 \times 1400^2}{182.4} \times \frac{47}{32} = \mathbf{2395}\ [J] \leq Q_E$$

The point of intersection determined in diagram 2 must be located in or under the characteristic curve of the selected clutch.

Switching frequency: 180 switchings per hour = permitted

Number of switchings until re-adjustment

$$Z_n = \frac{Q_1}{Q_a} \times (a_n - a)$$

$$Z_n = \frac{57 \times 10^7}{2395} \times (1.2 - 0.3) = \mathbf{214196}\ \text{switchings}$$

Number of switchings until wear limit

$$Z = \frac{Q_{ges.}}{Q_a} = \frac{100 \times 10^7}{2395} = \mathbf{417536}\ \text{switchings}$$

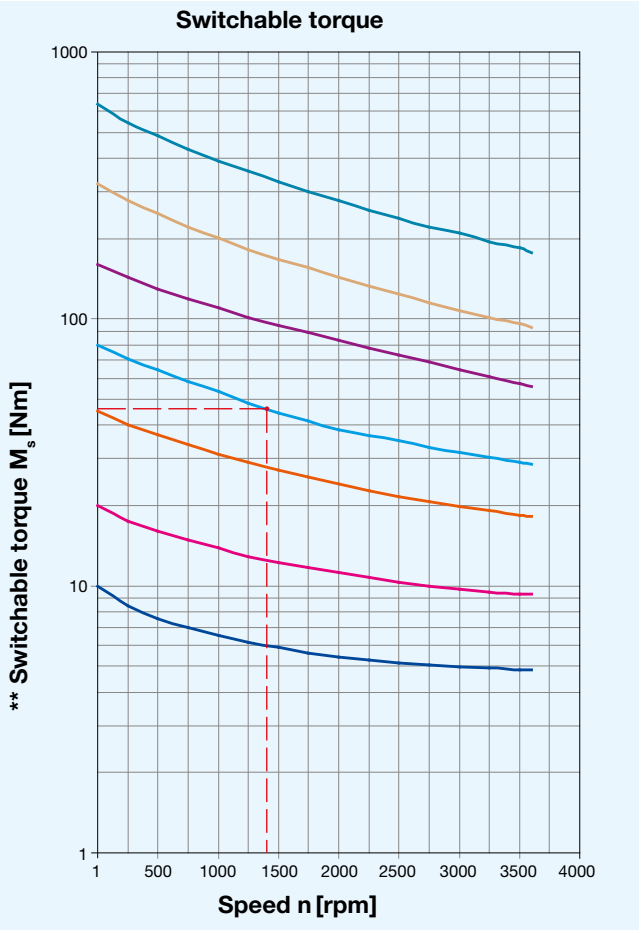


Diagram 1 (not valid for Type 500.30_)

** Friction surfaces have been run in

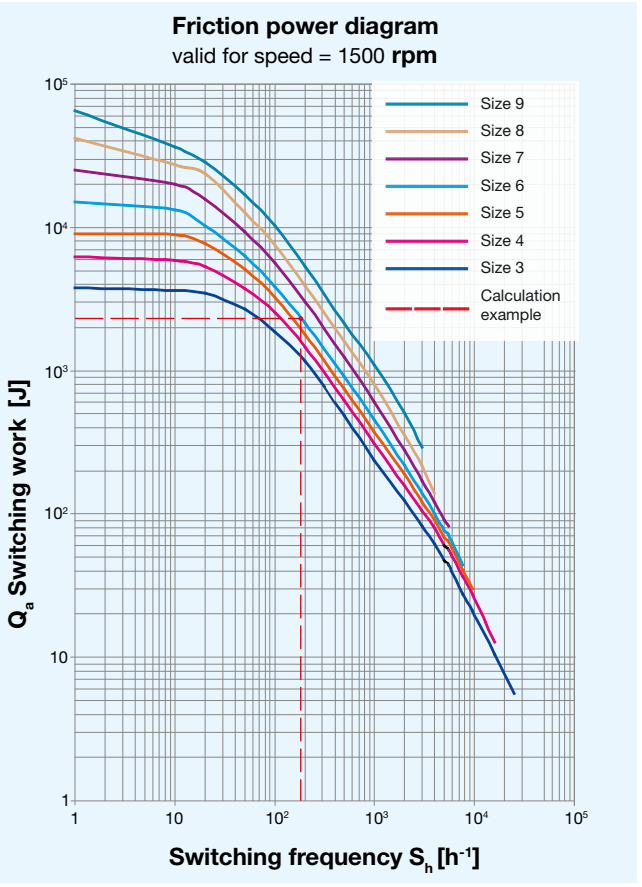


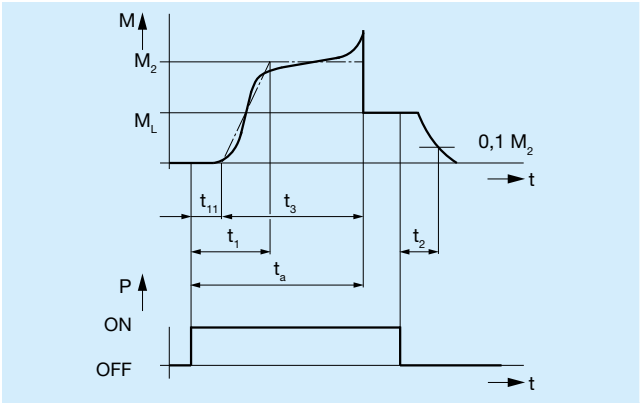
Diagram 2 (not valid for Type 500.30_)

Switching times

The switching times stated in Table 3 have been determined by comprehensive series of tests. They are valid for switching DC-side with nominal air gap and warm coil. Deviations depend on the respective installation situation, ambient temperatures, release path and the type of rectification with which the corresponding clutch is operated.

Switching times				Size						
				3	4	5	6	7	8	9
without overexcitation	Type 500._ _ _._	t_{11}	[sec]	0.010	0.015	0.020	0.030	0.045	0.050	0.060
		t_1	[sec]	0.045	0.065	0.080	0.150	0.200	0.350	0.400
		t_2	[sec]	0.012	0.020	0.045	0.060	0.090	0.095	0.130
with overexcitation	Type 500._ _ _._	t_{11}	[sec]	0.003	0.005	0.007	0.010	0.015	0.020	0.035
		t_1	[sec]	0.025	0.035	0.040	0.075	0.100	0.170	0.235
without overexcitation	Type 540._ _ _._	t_{11}	[sec]	0.010	0.012	0.012	0.020	0.025	0.050	0.060
		t_1	[sec]	0.050	0.072	0.112	0.160	0.200	0.350	0.460
		t_2	[sec]	0.014	0.020	0.030	0.050	0.075	0.095	0.130
with overexcitation	Type 540._ _ _._	t_{11}	[sec]	0.004	0.005	0.006	0.010	0.013	0.020	0.035
		t_1	[sec]	0.024	0.035	0.056	0.080	0.100	0.170	0.235
without overexcitation	Type 500.3_ _._	t_{11}	[sec]	0.017	0.026	0.035	0.052	0.079	-	-
		t_1	[sec]	0.079	0.113	0.140	0.262	0.350	-	-
		t_2	[sec]	0.010	0.016	0.036	0.048	0.072	-	-
with overexcitation	Type 500.3_ _._	t_{11}	[sec]	0.005	0.009	0.012	0.017	0.026	-	-
		t_1	[sec]	0.044	0.061	0.070	0.131	0.175	-	-

Table 3



Key:

M_2 = Nominal torque of the clutch
M_L = Load torque of the drive
P = Electrical power
t_a = Acceleration time
t_1 = Connection time
t_{11} = Response delay on connection
t_2 = Separation time
t_3 = Slip time

Diagram 3: Torque-Time Diagram

Friction work [1] and air gap				Size						
				3	4	5	6	7	8	9
Friction work up to 1 mm wear	Type 500._ _ _._	Q_1	[10^7 J/mm]	12.5	20	33	57	100	105	170
	Type 540._ _ _._	Q_1	[10^7 J/mm]	8.8	13.4	24	36	60	105	170
Total friction work	Type 500._ _ _._	Q_{ges}	[10^7 J]	12.5	25	50	100	200	185	340
	Type 540._ _ _._	Q_{ges}	[10^7 J]	8	16	35	68	135	185	340
Permitted friction work with a single switching		Q_E	[10^3 J]	3.8	6.2	9	15	25	42	65
Nominal air gap		a	[mm]	0.2	0.2	0.2	0.3	0.3	0.5	0.5
Max. working air gap		a_n	[mm]	0.6	0.8	1.0	1.2	1.5	1.8	2.0

Table 4

1) The friction work data are not valid for Type 500.30_.0 double-flow design.

Please Observe!

Due to operating parameters such as sliding speed, pressing or temperature the **wear values** can **only be considered guideline values**.

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