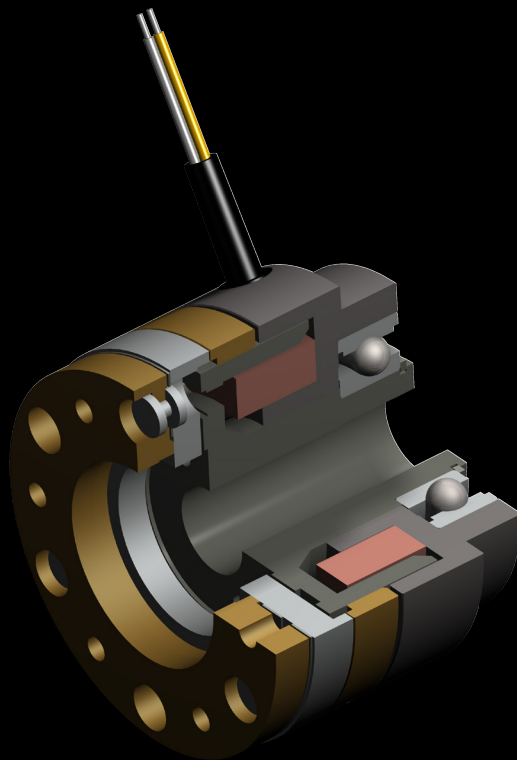


Mönninghoff

Electromagnetic tooth clutch Type 549



CHAIN & DRIVES
COMPLETE BEARINGS
& POWER TRANSMISSION

POWER > SPEED > TORQUE

Electromagnetic tooth clutch - Type 549

Characteristics and features

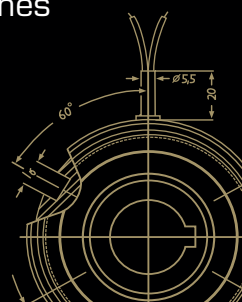
- high torque transfer despite compact dimensions
- positive-locking transmission of torque without slip
- engageable also at low relative speed
- high range of temperatures
- easy control via direct current
- anti-magnetic toothing for optimized magnetic flux
- current supply via plug and socket
- application-related customized tooth geometries
- short cycle times
- oil or dry running
- synchronized switching with fixed engagement positions
- uncompromizing need for safety and reliability
- integrated, easy-to-assemble system solution
- condition monitoring on demand



Mönninghoff power transmission represents an infinite variant diversity that is applied by all areas of modern mechanical engineering.

Our technologies are mostly designed to operate under extreme conditions. We offer high precision products for medical robotics, fail-proof security for aerospace technology or synchronization solutions for the packaging or printing industry.

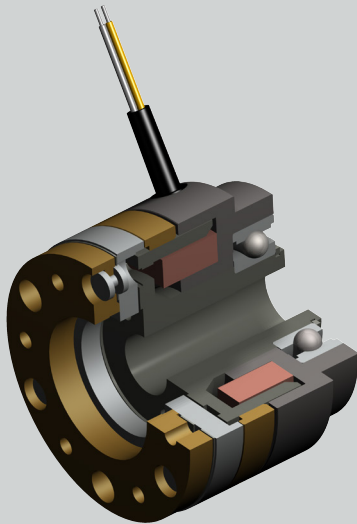
We thus address customers who have the highest standards for their own machines or systems. To them, we can offer highly complex, application-specific solutions.



Electromagnetic tooth clutch - Type 549

Match code

Mönninghoff tooth clutches are indicated by the following match code:



543 . A . B . C

- A** clutch size
- B** design of stator
- C** design of armature

Other individual characteristics:

- tothing geometries
- voltage
- bore size with keyway

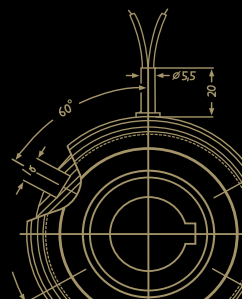
According to these characteristics, we design individual solutions concerning transmitted torque, engaging behavior or rotation speed.

Our engineers can assist with finding an application-specific clutch at any time. Together, we can develop individual and innovative solutions for extreme operating conditions.

Ordering example

Mönninghoff tooth clutch
Type 549.23.3.4

Tothing	standard
Voltage	24 Vdc
Bore size d	30 mm H7, keyway acc. to DIN 6885/1



Electromagnetic tooth clutch - Type 549

Clutch size

When dimensioning a Mönninghoff tooth clutch, several technical preconditions should be considered:

- for the selection of the correct size, not only the peak load but also the dynamic behavior of the drive have to be taken into account
- tooth clutches - contrary to friction clutches - must never be overloaded and safety factors must be considered
- generally, the selection of the correct clutch is based on torque:

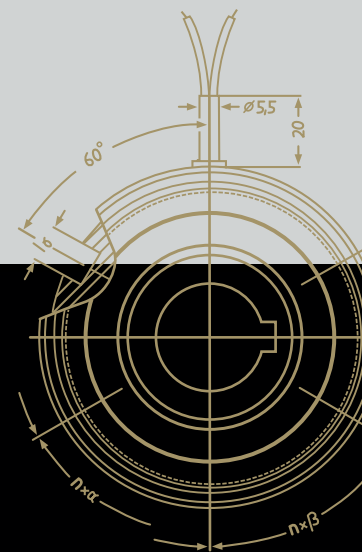
$$M = 9550 \frac{P}{n} \cdot K \text{ [Nm]}$$

$$M = (M_L + M_B) \cdot K \text{ [Nm]}$$

- the transmittable torque of the clutch must always be higher than the largest possible occurring torque:

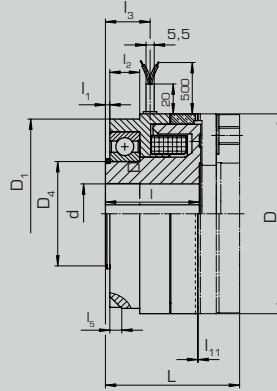
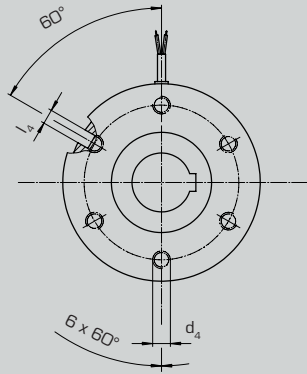
$$\text{Requirement } M_{\ddot{U}} > M$$

- P = power of motor [kW]
 n = rotating speed [min^{-1}]
 K = safety factor 1,5 ... 2,5
 M = required torque
 M_L = load torque
 M_B = acceleration torque
 $M_{\ddot{U}}$ = nominal torque of clutch (see enclosed chart)

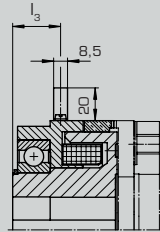
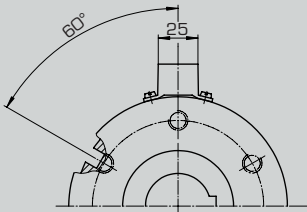


Electromagnetic tooth clutch - Type 549

Design of stator 3 & 4



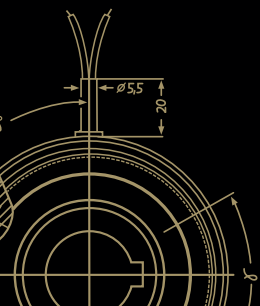
Type 3:
with flying leads



Type 4:
with plug and socket

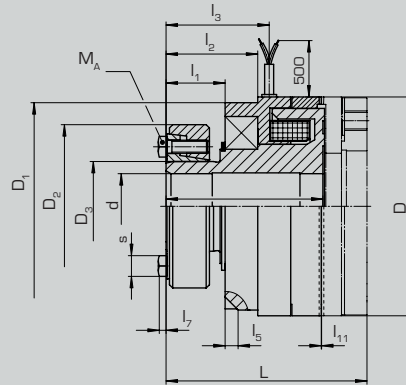
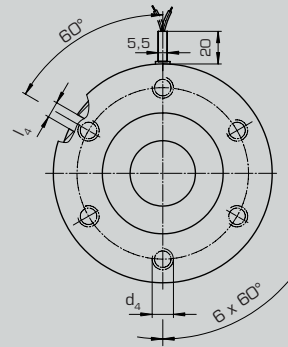
Technical data

Size		13	15	21	23	25		
torque	M_j [Nm]	25	50	75	150	300		
max. speed	n [min ⁻¹]	1500	1500	1500	1500	1500		
input power	P_{20} [W]	19	21	27	36	57		
inertia	rotor	0,15	0,37	0,87	2,06	4,88		
	armature 4	0,22	0,58	1,22	2,94	6,34		
	armature 6	0,32	0,83	1,95	4,67	9,16		
weight	armature 4	0,87	1,45	2,37	3,85	6,76		
	armature 6	0,94	1,6	2,62	4,23	7,23		
spring force	[N]	100	120	140	260	700		
number of teeth	standard	260	332	388	392	356		
bore	keyway acc. to DIN 6885/1	d H7	[mm]	10 - 15	10 - 22	20 - 32	25 - 40	30 - 50
	keyway acc. to DIN 6885/2 <i>max</i>			10 - 17	10 - 25	20 - 35	25 - 42	30 - 55
dimensions	D	[mm]	67	82	95	114	134	
	D ₁		58	75	88	105	127	
	D ₄		25	35	45	55	70	
	d ₄		M5	M6	M8	M10	M12	
	L		55	61	68	76	90	
	I -0,1		41	44	48	53	63	
I ₁		2,5	3,5	3	3	3		
I ₂		11	12	14	18	20		
I ₃		19,2	21,5	23	27	30		
I ₄		6	8	10	10	10		
I ₅ x 45°		5	6	6	6	8		
I ₁₁ +0,1		0,2	0,2	0,2	0,2	0,2		

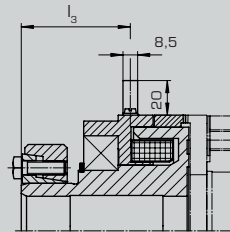
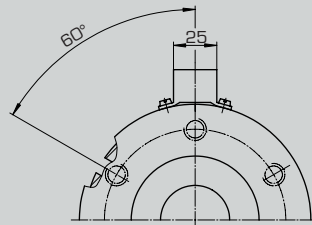


Electromagnetic tooth clutch - Type 549

Design of stator 7 & 8



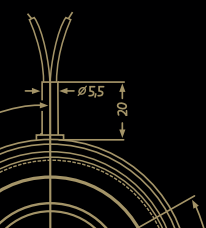
Type 7:
with flying leads



Type 8:
with plug and socket

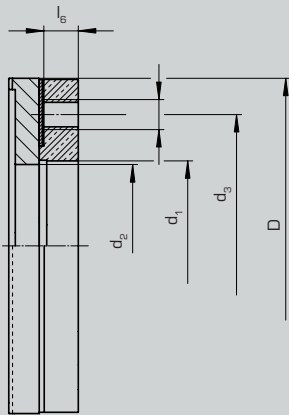
Technical data

Size			13	15	21	23	25
torque	M_{10} [Nm]		25	50	75	150	300
max. speed	n [min ⁻¹]		1500	1500	1500	1500	1500
input power	P_{20} [W]		19	21	27	36	57
	rotor		0,2	0,52	1,16	2,6	6,47
	armature 4		0,22	0,58	1,22	2,94	6,34
	armature 6		0,32	0,83	1,95	4,67	9,16
weight	armature 4	[kg]	1	1,75	2,8	4,45	7,9
	armature 6		1,07	1,9	3,05	4,83	8,37
spring force		[N]	100	120	140	260	700
number of teeth	standard		260	332	388	392	356
bore	keyway acc. to DIN 6885/1	d H7 [mm]	15 - 17	20 - 25	25 - 30	30 - 35	40 - 45
tightening torque for screws	M_A	[Nm]	5	5	12	12	12
key-wide	s	[mm]	8	8	10	10	10
dimensions	D	[mm]	67	82	95	114	134
	D ₁		58	75	88	105	127
	D ₂		47	60	72	80	100
	D ₃		20	30	36	44	55
	d ₄		M5	M6	M8	M10	M12
	L		71	84	93	104	123
	l -0,1		57	67	73	81	96
	l ₁		18,5	26,5	28	30,8	36
	l ₂		29,5	38,5	42	48,8	56
	l ₃		35,2	44,5	48	54,8	63
	l ₄		6	8	10	10	10
	l ₅ x 45°		5	6	6	6	8
	l ₇		4	4	4	4	4
	l ₁₁ +0,1		0,2	0,2	0,2	0,2	0,2

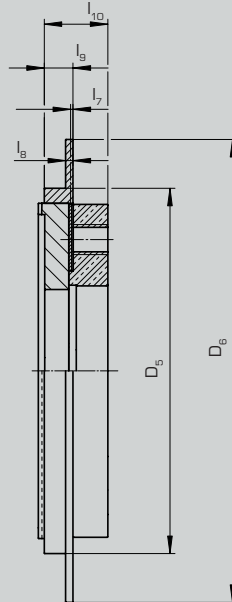


Electromagnetic tooth clutch - Type 549

Design of armatures



Type 4

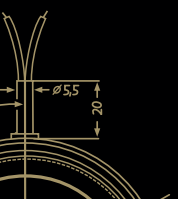


Type 6

- Type 4 with three threads and three pin bores for mounting
- Type 6 analog type 4, with additional indicator plate for condition monitoring

Technical data for armatures

Size		13	15	21	23	25
dimensions	D [mm]	67	82	95	114	134
	D_5	74	90	107	126	146
	D_6	90	115	130	165	185
	d_1 H7	35	47	52	62	68
	d_2	30	38	48	54	67
	d_3	52	65	75	90	105
	l_6	6	7,5	9,5	11,5	13,5
	$l_7 + 0,2$	0,6	0,6	0,6	0,7	0,8
	l_8	2	2,5	3	3	3
	l_9	6	8,5	10	10	11,5
l_{10}	12	15,2	18,2	21,3	25,4	



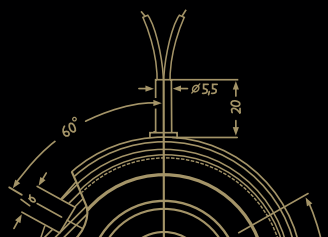
Electromagnetic tooth clutch - Type 549

Toothing geometries

Mönninghoff clutches offer a large variety of application-specific designs of toothing. The amount of possible geometries or fixed points is endless and our engineers can help to design an optimized version at any time.

Toothing examples

	<p>Standard</p> <ul style="list-style-type: none">• transmits torque in both directions with little backlash• also available backlash free• with increased flank angle also available as torque limiter with fixed position engagement		<p>Spaced</p> <ul style="list-style-type: none">• transmits torque in both directions with large amount of backlash• can be engaged at higher speeds
	<p>Saw (counter-) clockwise</p> <ul style="list-style-type: none">• transmits nominal torque in both directions• in reverse direction approx. 10% of torque can be transmitted• can be engaged at higher speeds		<p>Stepped (counter-) clockwise</p> <ul style="list-style-type: none">• transmits nominal torque in both directions• in reverse direction approx. 20% of torque can be transmitted with little backlash• can be engaged at higher speeds

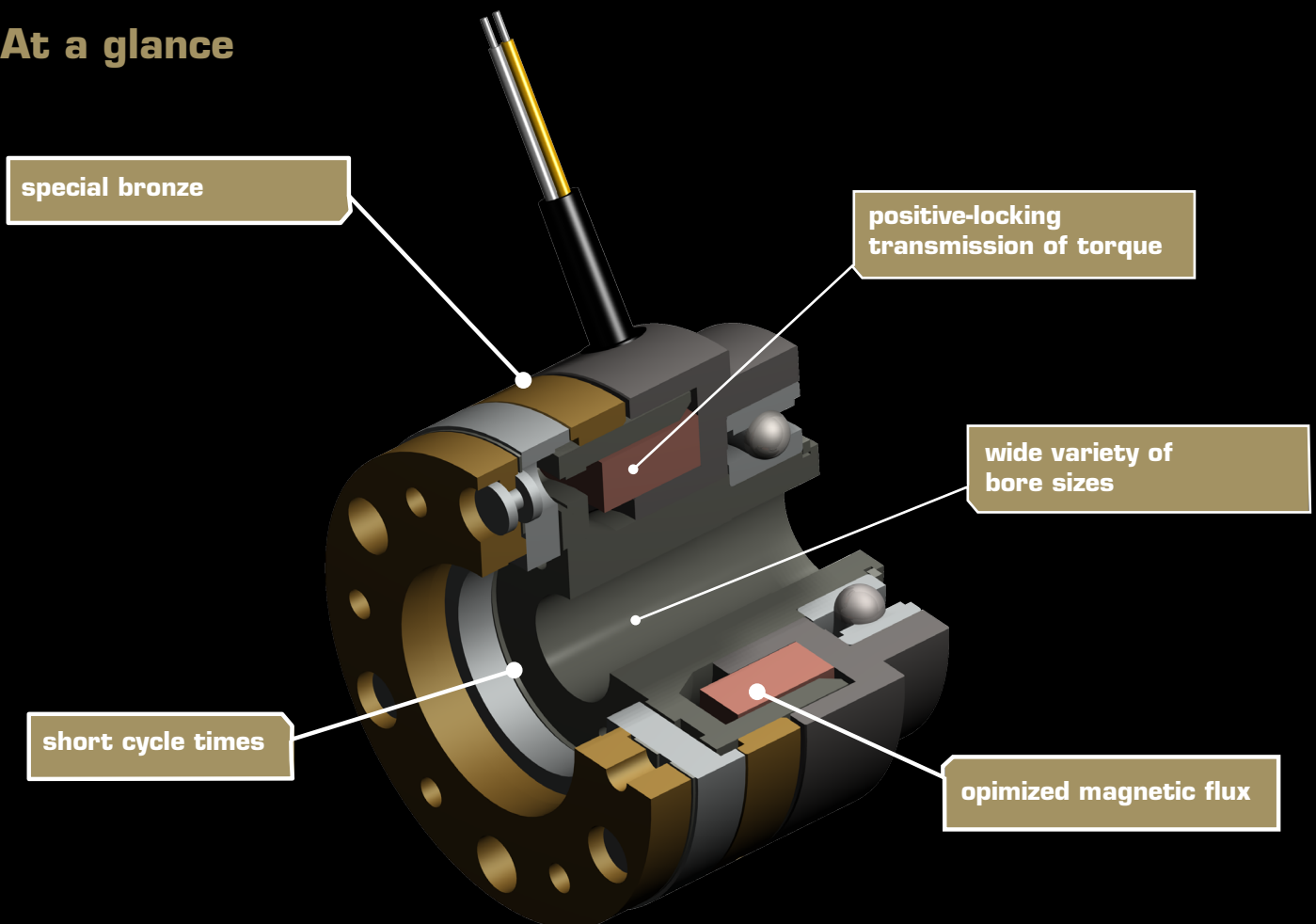


Electromagnetic tooth clutch - Type 549

Voltage

- standard voltage is 24 Vdc
- special voltages between 6 and 196 Vdc on request
- normally off clutch
- the permissible voltage tolerance is -10% to +5% according to VDE 0580
- in order to avoid induced voltage peaks, it is advisable to use varistors at unusually high switching frequency

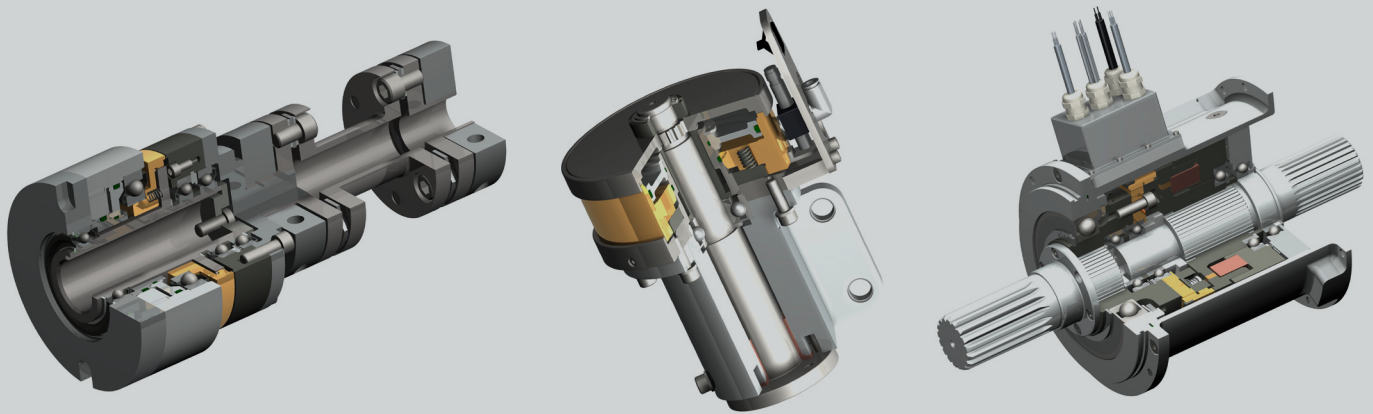
At a glance



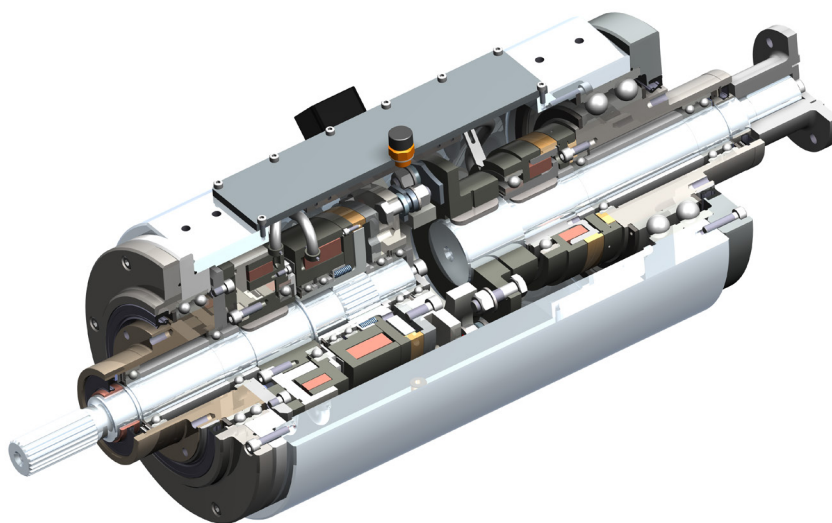
System solutions

You need more?

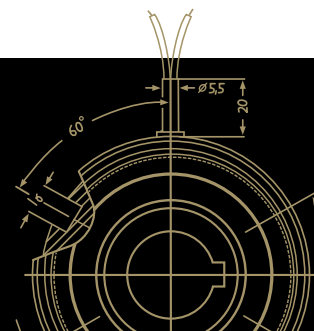
Mönninghoff clutches can be combined with a variety of many other power transmission elements. Such complex high-tech systems can solve any application-specific tasks and can fulfill any customer-specific wishes.



In many cases, a combination of different drive elements is needed to solve the applications particular problems and difficulties. Being not just supplier but technological partner to our customers, our extensive engineering is part of extraordinary and challenging power transmission projects.



**Our product is the know-how,
with hardware as an added bonus.**



Driven by excellence

Why Mönninghoff

- intensive dialog with our customers' engineers
- decades of experience and competence
- deep understanding for all areas of mechanical engineering
- highly modern and flexible machine park
- enthusiasm for quality
- flexibility, inventiveness and communication skills of our employees
- commitment to Germany and Bochum as industrial location



Helps you find a customer-specific power transmission solution for extraordinary circumstances.



For the competent processing and smooth handling of your orders and delivery dates.



Feels committed to protect and preserve the high value of your machine and to secure its availability.



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