Electromagnetic tooth brake Type 560

Lenze SELECTION

Drive elements are our world.

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Electromagnetic tooth brake - Type 560

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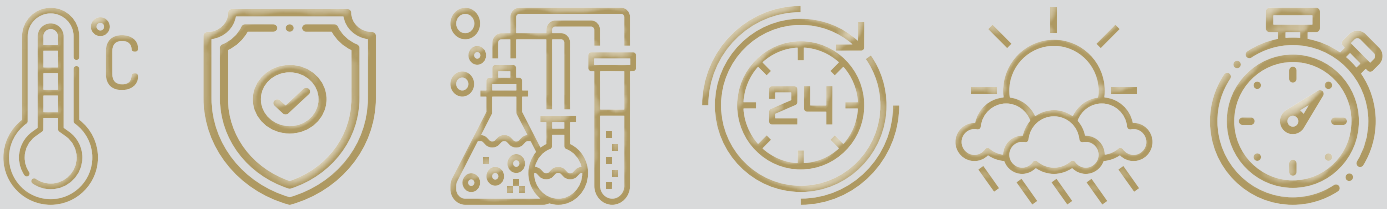
Characteristics and features

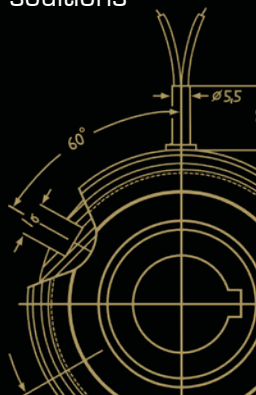
- high torque transfer despite compact dimensions
- positive-locking transmission of torque
- slip free position fixing
- high range of temperatures
- easy control via direct current
- anti-magnetic toothing for optimized magnetic flux
- application-related customized tooth geometries
- short cycle times
- uncompromizing need for safety and reliability
- integrated, easy-to-assemble system solution
- condition monitoring on demand
- oil running or dry running
- plug-and-play design available
- available in many variants also as electromagnetic tooth clutch



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 soultions 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.



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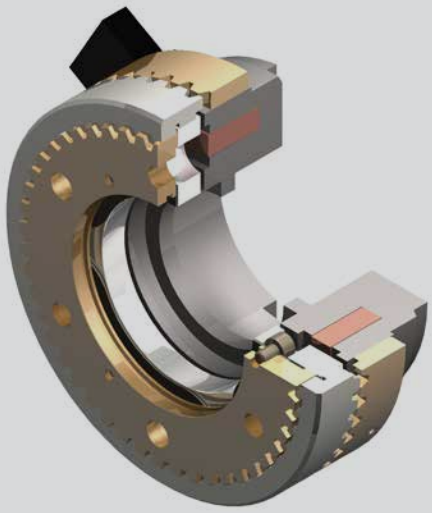
Match code

Mönninghoff tooth brakes are indicated by the following match code:



560 . A . B . C

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

Other individual characteristics:

- toothing 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 brake at any time. Together, we can develop individual and innovative solutions for extreme operating conditions.

Ordering example

Mönninghoff tooth brake
Type 560.25.4.5

Toothing	claw, no specific positioning
Voltage	24 Vdc
Bore size d	25 H7, keyway acc. to DIN 6885/1

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Brake size

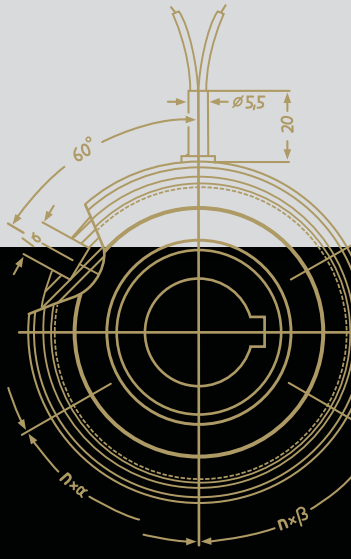
When dimensioning a Mönninghoff tooth brake, several technical preconditions should be considered:

- 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 brakes - contrary to friction brakes - must never be overloaded and safety factors must be considered
- generally, the selection of the correct brake is based on torque:

$$M = M_L \cdot K \text{ [Nm]}$$

- the transmittable torque of the brake must always be higher than the largest possible occuring torque:

$$\text{Requirement } M_Ü > M$$



P = power of motor [kW]

n = rotating speed [min^{-1}]

K = safety factor 1,5 ... 2,5

M = required torque

M_L = load torque

$M_Ü$ = nominal torque of brake (see enclosed chart)

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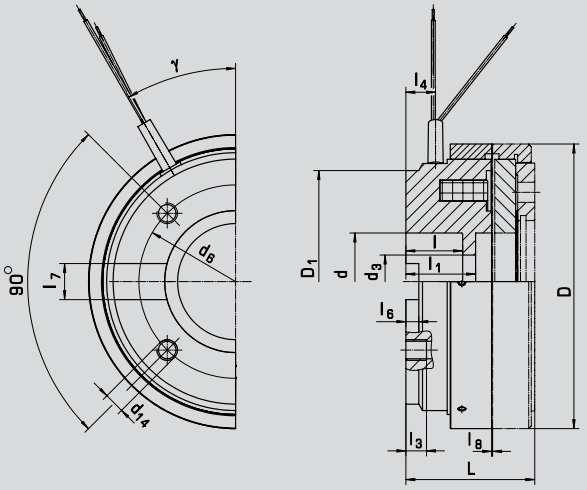
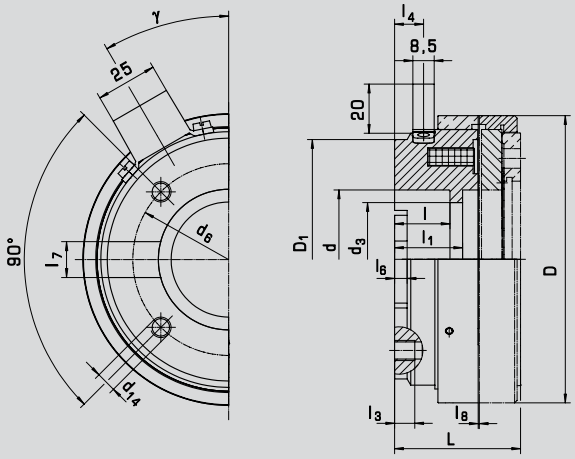
Design of stator

The following charts can be used for orientation. Special custom-made designs can have a higher power density or fulfill other application-specific demands.



Type 3:
with flying leads



Type 4:
with plug and socket

Technical Data

Size			12	13	15	21	23	25	31	32
torque		[Nm]	20	40	100	200	350	600	1200	2200
max. speed		[min^{-1}]	5000	4500	4000	3600	3000	2500	2100	1800
input power		[W]	10,5	14,5	22	29	40	56	79	82
inertia	armature	[10⁻³ kg m²]	0,06	0,12	0,37	0,52	1,85	4,51	12,8	29,2
total weight		[kg]	0,3	0,5	0,97	1,6	2,55	3,85	7,03	12,3
number of teeth	standard		200	220	260	290	280	250	195	186
	saw		25	30	36	36	38	40	40	40
dimensions		D [mm]	57	67	82	95	114	134	166	195
		D_1	50	60	74	85,5	95	120	150	178
		γ	0°	0°	30°	30°	30°	30°	30°	30°
		d K_8	26	32	35	42	55	68	75	90
		d_6	40	46	50	56	75	90	100	116
		d_{14}	M 4	M 4	M 5	M 6	M 8	M 8	M 10	M 10
		L	27	31	34,5	43	50	57	63,5	68,5
		$l_{+0,2}$	14	14	17	20	22	22	25	28
		l_1	17	19	19	22	27	29	30	34
		l_3	4	5	5	5	8	8	10	12
		l_4	6,5	7	6	6	11,5	5,5	10	12,5
		l_6	2,5	2,5	2,5	2,5	5	5	6	6
		l_7 H7	10	10	12	12	14	16	20	20
		l_8 ± 0,1	0,2	0,3	0,3	0,4	0,4	0,4	0,5	0,5

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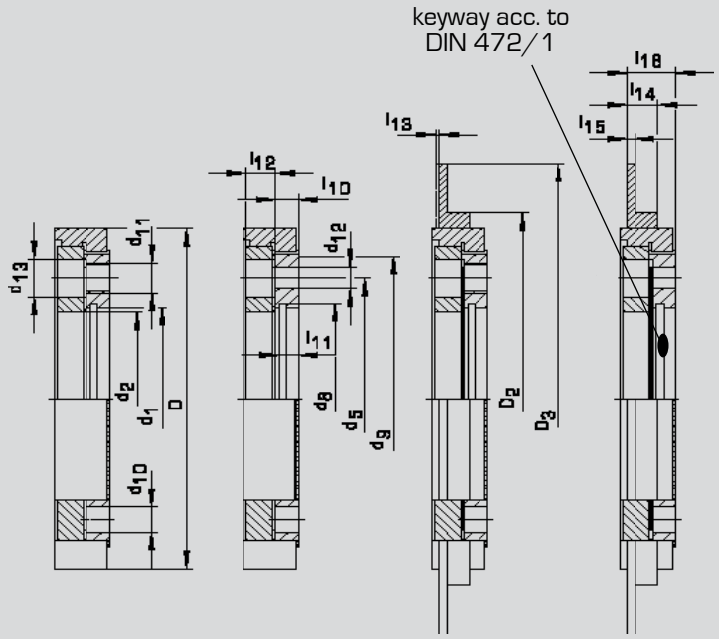
Design of armature

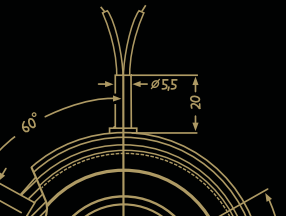


Type 4 Type 5 Type 6 Type 7

- Type 4
  with three threads and three pin bores for mounting
- Type 5
  with three through holes and three pin bores for mounting
- Type 6
  analog type 4, with additional indicator plate for condition monitoring
- Type 7
  analog type 5, with additional indicator plate for condition monitoring

Technical Data

Size				12	13	15	21	23	25	31	32
dimensions		D	[mm]	57	67	82	95	114	134	166	195
		D_2		–	74	90	107	126	146	178	215
		D_3		–	90	115	130	165	185	218	250
		d_1 H7		26	32	42	52	62	72	90	100
		d_2		22,5	31	36,5	46	55	68	80	95
		d_5		36	46	60	70	80	95	120	150
		d_8 DIN 472/1		27,2	33,7	44,5	55	65	75	93,5	103,5
		d_9		45	54	69	80	93	110	140	170
	for locating pin	d_{10}		–	4,5	4,5	5,5	7,8	9,5	9,5	11,5
		n x ß	[degree]	–	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°
	armature 4 & 6	d_{11}		M 4	M 5	M 6	M 8	M 8	M 12	M 12	M 12
		n x α	[degree]	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	6 x 60°	6 x 60°
	armature 5 & 7	d_{12}		4,8	4,8	5,8	6,8	6,8	8,5	8,5	10,5
		n x α	[degree]	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	3 x 120°	6 x 60°	6 x 60°
		d_{13}		8,5	8,5	10	12	12	15	15	19
		β	[degree]	–	60°	60°	60°	60°	60°	30°	30°
		l_{10}		3	3,5	4,8	6	6,5	8,4	11,4	11,7
		l_{11}		1,4	1,5	2,3	3	3,5	4,5	5,5	6,5
		l_{12}		4,3	4,8	6,1	8,7	9	11	13,1	14
armature play		l_{13}		0,75	1,00	1,1	1,3	1,4	1,65	2,1	2,4
		l_{14}		–	6	8,5	10	10	11,5	11,5	16
		l_{15}		–	2	2,5	3	3	3	3	6
		l_{16}		–	7,5	10,8	13,5	14	18	23	23,5



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Toothing geometries

Mönninghoff clutches and brakes 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

Standard

- 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

Spaced

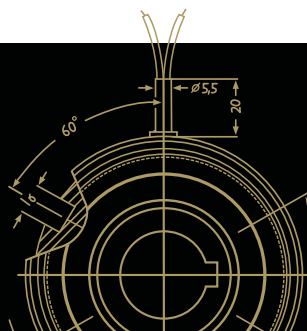
- transmits torque in both directions with large amount of backlash
- can be engaged at higher speeds

Saw (counter-) clockwise

- transmits nominal torque in both directions
- in reverse direction approx. 10% of torque can be transmitted
- can be engaged at higher speeds

Stepped (counter-) clockwise

- 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



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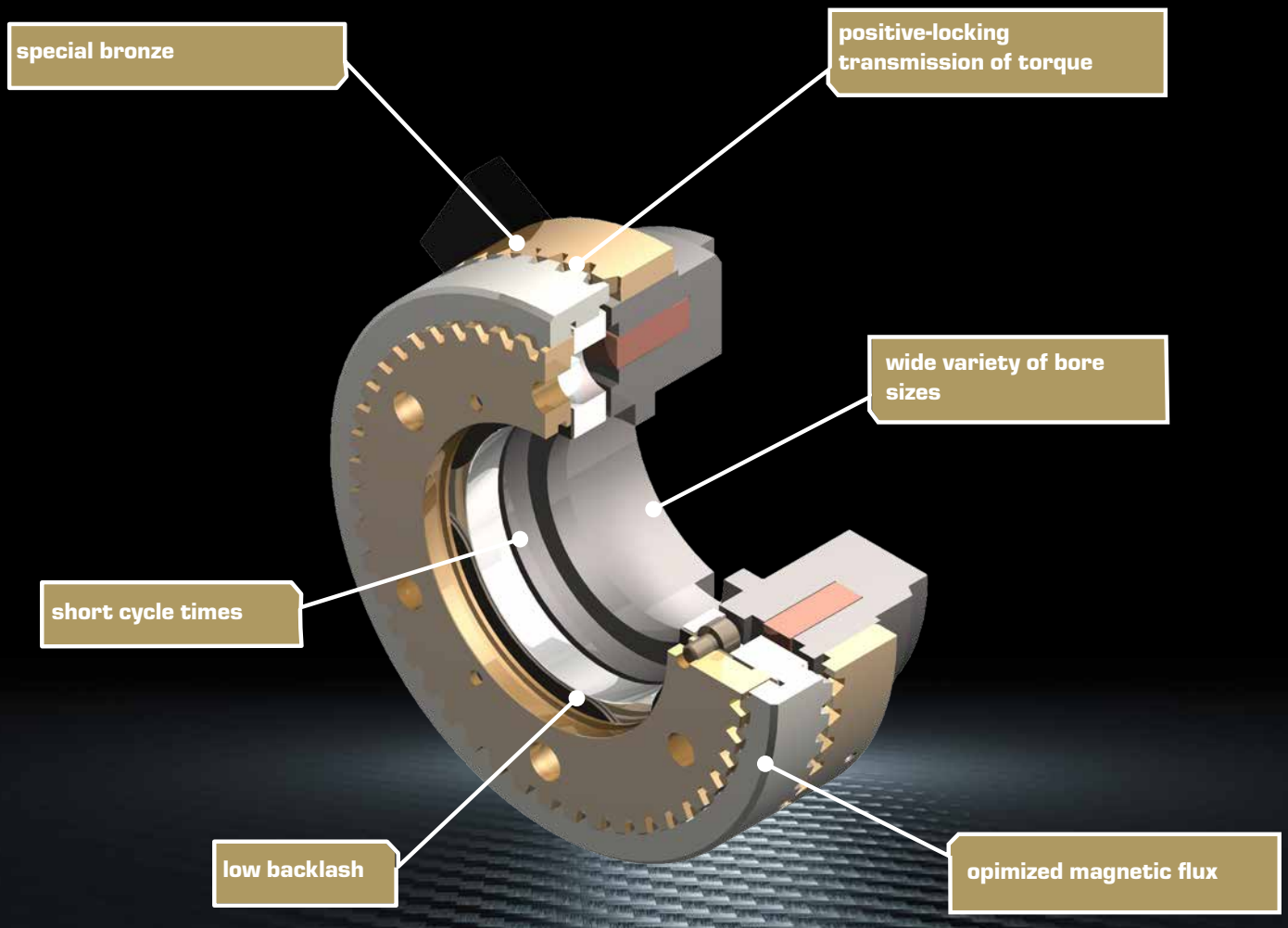
Voltage

- standard voltage is 24 Vdc
- special voltages between 6 and 196 Vdc on request
- 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



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System solutions

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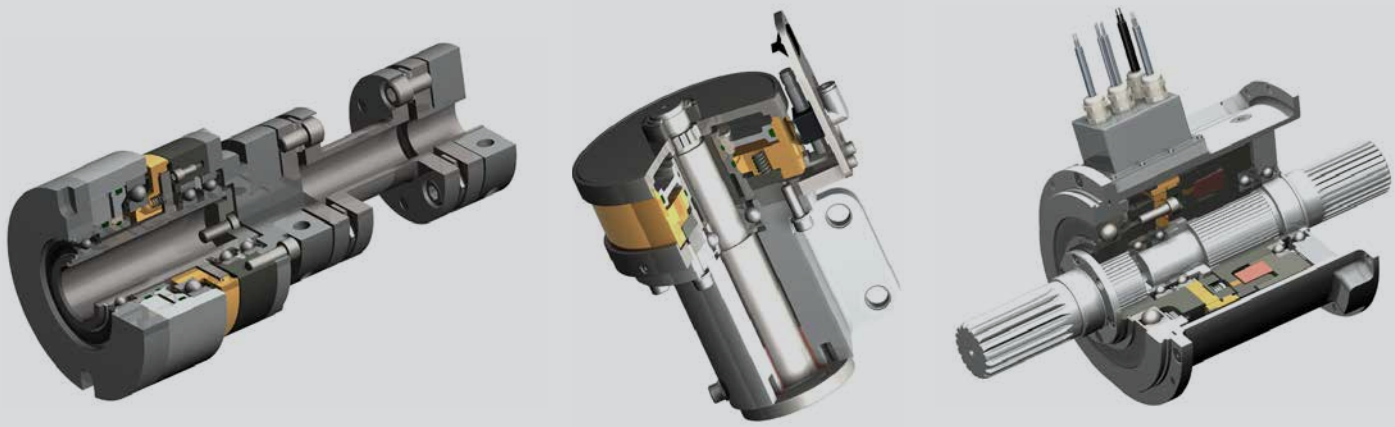
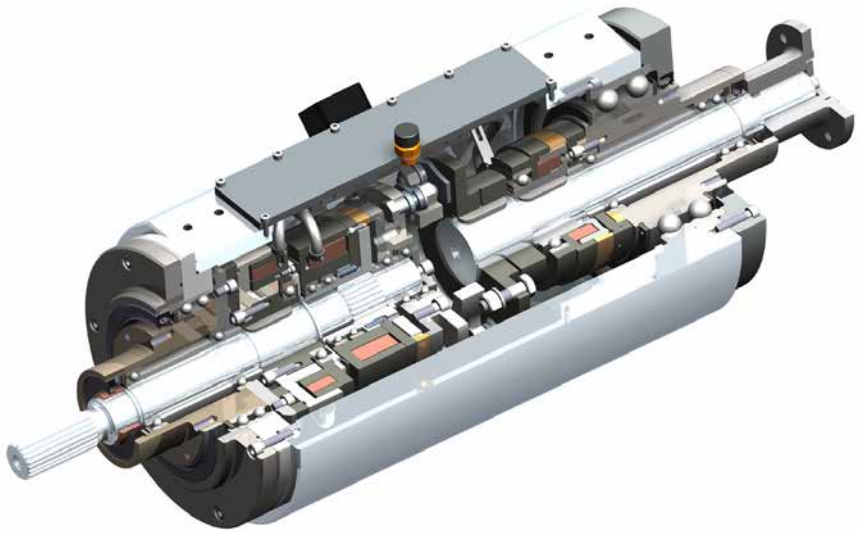
You need more?

Mönninghoff couplings 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.