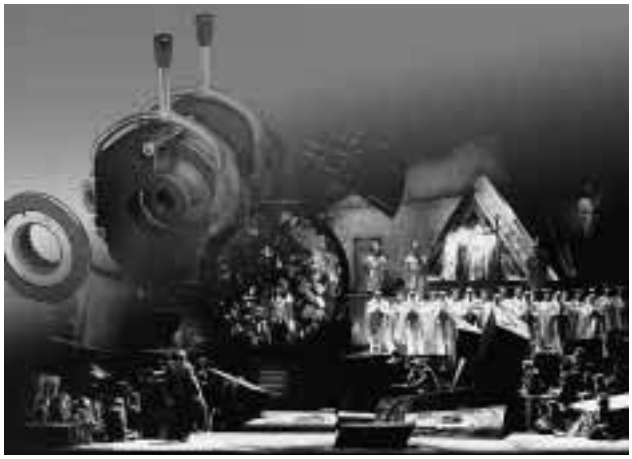


Curtain calls for Lenze brakes
Double spring-operated brakes in low-noise design as redundant brake system are used in stage technology.

Doors and gates moved by Lenze
Spring-operated brakes with manual release monitoring by micro switches and electromagnetic clutches ensure safe operation of door drives and automatic doors.

Turning, lifting, moving – Lenze spring-operated brakes support crane movements
Corrosion-resistant designs and different types of enclosures for spring-operated brakes used in cranes.

Depending on the individual application, the graduated torques listed in the table are available. A pole shim (brass film) must be placed between stator and armature plate if you want to achieve short operating times with low torques.

Size	06	08	10	12	14	16	18	20	25
Rated torques [Nm], related to the relative speed $\Delta n = 100\ min^{-1}$								80 E	
	1,5 E	3.5 N/E			25 N/E	35 N/E	65 N/E	115 N/E	175 N/E
	2 N/E	4 E	7 N/E	14 N/E	35 N	45 N/E	80 N/E	145 N/E	220 N
	2,5 N/E	5 N/E	9 N/E	18 N/E	40 N/E	55 N/E	100 N/E	170 N/E	265 N/E
	3 N/E	6 N/E	11 N/E	23 N/E	45 N/E	60 N/E	115 N/E	200 N/E	300 N/E
	3,5 N/E	7 N/E	14 N/E	27 N/E	55 N/E	70 N/E	130 N/E	230 N/E	350 N/E
	4 N/E	**8 N/E**	**16 N/E**	**32 N/E**	**60 N/E**	**80 N/E**	**150 N/E**	**260 N/E**	**400 N/E**
	4,5 N/E	9 N/E	18 N/E	36 N/E	65 N/E	90 N/E	165 N/E	290 N/E	445 N/E
	5 E	10 E	20 E	40 E	75 N/E	100 N/E	185 N/E	315 N/E	490 N/E
	5,5 E	11 E	23 N/E	46 N/E	80 N/E	105 N/E	200 N/E	345 N/E	530 N/E
	6 N/E	12 N/E				125 N/E	235 N/E	400 N/E	600 N/E

N ... Brake torque for design N (without adjuster nut)
E ... Brake torque for design E (with adjuster nut)

Holding brake with emergency stop operation ($s_{lümax}$ ca. 1.5 x $s_{lü}$)

Operating brake ($s_{lümax}$ ca. 2.5 x $s_{lü}$)

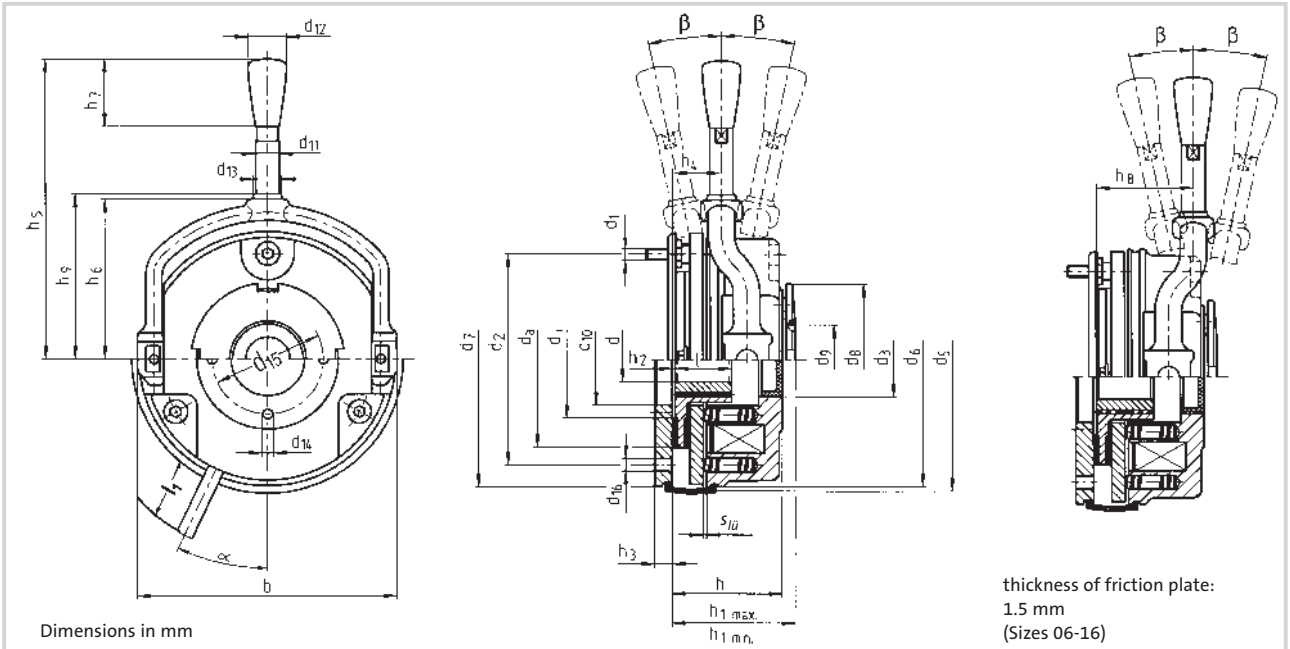
Standard brake torque

Basic module E, brake torque reduction

For the basic module E, the brake torque can be reduced by turning the detended adjuster nut in the stator. The adjuster nut can be unscrewed until the maximum dimension h_{1max} (see table on page 14).

Take into consideration that engagement times and disengagement times change depending on the brake torque. The reduction of the torque is independent of the choosen brake torque.

Size	06	08	10	12	14	16	18	20	25
Torque reduction per detent position [Nm]	0.2	0.35	0.8	1.3	1.7	1.6	3.6	5.6	6.2



Dimensions in mm

thickness of friction plate:
1.5 mm
(Sizes 06-16)

Size	b	d^{J7} 1) Pilot	d^{H7} 2) Standard	d_1	d_2	d_3^{H7}	d_5	d_{6j7}	d_7	d_8	d_9^{H8}	d_{10}	d_{11}	d_{12}	d_{13}	d_{14} 3)	d_{15} 3)	d_{16}	di	da
06	88	10	10/11/12/14/15	3xM4	72	25	91	87	87	52	24	31	8	13	9.6	4xM4	37.7	3x4.5	40	60
08	106.5	10	11/12/14/15/20	3xM5	90	32	109	105	105	60	26	41	8	13	9.6	4xM5	49	3x5.5	47	77
10	132	10	11/12/14/15/20	3xM6	112	42	134	130	130	68	35	45	10	13	12	4xM5	54	3x6.6	66	95
12	152	14	20/25	3xM6	132	50	155	150	150	82	40	52	10	13	12	4xM5	64	3x6.6	70	115
14	169	14	20/25/30	3xM8	145	60	169	165	165	92	52	55	12	24	14	4xM6	75	3x9	80	124
16	194.5	15	25/30/35/38*	3xM8	170	68	195	190	190	102	52	70	12	24	14	4xM6	85	3x9	104	149
18	222	20	30/35/40/45	6xM8	196	75	222	217	217	116	62	77	14	24	15.5	4xM8	95	4x9 4)	129	174
20	258	25	35/40/45/50	6xM10	230	85	259	254	254	135	72	90	14	24	16.5	4xM10	110	4x11 4)	148	206
25	302	30	40/45/50/55/60/65/70	6xM10	278	115	307	302	302	165	85	120	16	24	18.4	4xM10	140	6x11	199	254

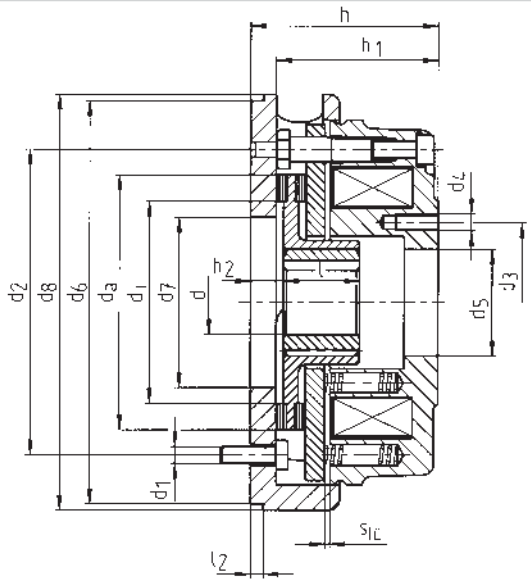
1) Pilot bore without keyway
2) Standard keyway acc. to DIN 6885/1 P9, selection of the shaft diameter depending on the load type (see operating instructions)
* bore diameter Ø 38, Keyway acc. to DIN 6885/3 P9
3) For the size 06-12, the bores are added on customer request
4) The thread in the threading surface is offset by 30° in reference to the center axle of the manual release lever

Size	h	h_1 min.	h_1 max.	h_2	h_3	h_4	h_5 Standard	h_5 max.	h_6	h_7	h_8	h_9	l	l_1 5)	$s_{lü}$	α	β 6)
06	36.3	39.3	43.25	1	6	15.8	107	–	54.5	23	32.8	56.3	18	400	0.2	25°	12°
08	42.8	46.8	50.8	1.5	7	16.3	116	–	63	23	41.3	65	20	400	0.2	25°	10°
10	48.4	52.4	55.9	2	9	27.4	132	–	73.8	23	42.4	77.8	20	400	0.2	25°	9°
12	54.9	58.9	67.53	2	9	29.4	161	–	85	23	47.4	88.5	25	400	0.3	25°	10°
14	66.3	71.3	77.3	2	11	33	195	–	98	32	50	101.5	30	400	0.3	25°	9°
16	72.5	77.5	85.5	2.25	11	37.5	240	–	113	32	53.5	116	30	600	0.3	25°	10°
18	83.1	89.1	97.09	2.75	11	41.1	279	394 7)	124	32	59.1	128.5	35	600	0.4	25°	9°
20	97.6	104.6	114.6	3.5	11	47.6	319	416 7)	146	32	68.6	149.5	40	600	0.4	25°	10°
25	106.7	115.7	127.7	4.5	12.5	57.7	445	501 7)	170	32	88.7	175.5	50	600	0.5	25°	10°

5) Cable length
6) Hand release angle tolerance + 3°
7) Recommended lever length for 1.5 M_K

Recommended ISO shaft tolerances
up to Ø 50 mm = k6
over Ø 50 mm = m6

Brake suitable for the assembly of a speed or angle sensor

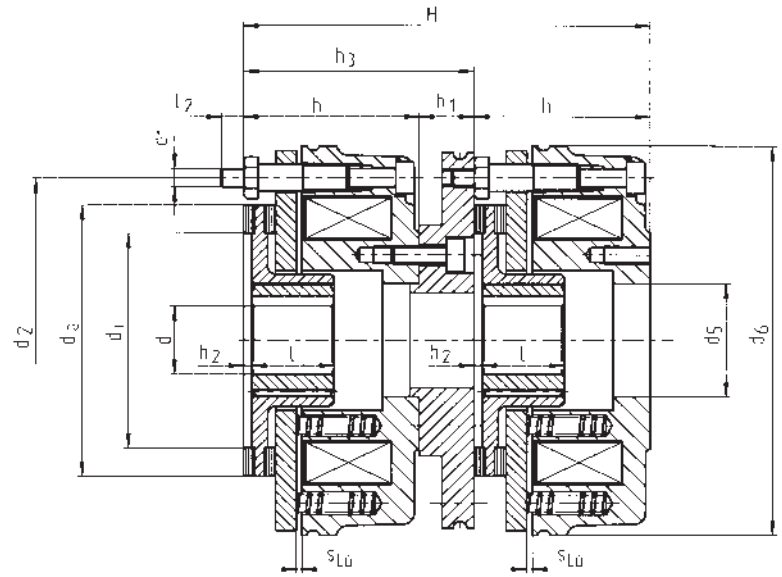


Dimensions in mm

Size	h	h_1	h_2	d^{H7} max.	d_1[1]	d_2	d_3	d_4[5]	d_5^{H7}	d_6^{h7}	d_7^{H7}	d_8	di	da	l	l_1[2]	l_2	$s_{Iü}$
06	42.3	36.3	7	15	3xM4	72	37.7	4xM4	25	95	40	98	40	60	18	400	2	0.2
08	49.8	42.8	8.5	20	3xM5	90	49	4xM5	32	115	50	116	47	77	20	400	2	0.2
10	57.4	48.4	11	20	3xM6	112	54	4xM5	42	140	60	141	66	95	20	400	2	0.2
12	63.9	54.9	11	25	3xM6	132	64	4xM5	50	162	60	165	70	115	25	400	2	0.3
14	76.5	65.5	13	30	3xM8	145	75	4xM6	60	177	80	181	80	124	30	400	2	0.3
16	83.5	72.5	13.25	38[4]	3xM8	170	85	4xM6	68	204	85	206	104	149	30	600	2	0.3
18	94.1	83.1	13.75	45	6xM8	196	95	4xM8	75	233	90	237	129	174	35	600	2	0.4
20	108.6	97.6	14.5	50	6xM10	230	110	4xM10	85	271	90	274	148	206	40	600	2	0.4
25	118.2	105.7	17	70	6xM10	278	140	4xM10	115	322	120	324	199	254	50	600	2	0.5

[1] Use fixing screws acc. to DIN 6912
[2] Cable length
[3] Hand release can be mounted as option according to the drawing on page 14
[4] Keyway acc. to DIN 6885/3-P9
[5] For the size 06-12, the bores are added on customer request

Double brake (double brake torque), suitable for stage machinery and lots of other application fields



Dimensions in mm

Size	d^{H7} max.	d_1	d_2	d_5^{H7}	d_{6j7}	di	da	H	h	h_1	h_2	h_3	l	l_1[1]	l_2	$s_{lü}$
06	15	3xM4	72	25	87	40	60	84.6	36.3	12	1	48.3	18	400	8.7	0.2
08	20	3xM5	90	32	105	47	77	97.6	42.8	12	1.5	54.8	20	400	9.8	0.2
10	20	3xM6	112	42	130	66	95	109.8	48.4	13	2	61.4	20	400	12.7	0.2
12	25	3xM6	132	50	150	70	115	125.8	54.9	16	2	70.9	25	400	13.1	0.3
14	30	3xM8	145	60	165	80	124	148	65.5	17	2	82.5	30	400	13.1	0.3
16	38[2]	3xM8	170	68	190	104	149	165	72.5	20	2.25	92.5	30	600	16.4	0.3
18	45	6xM8	196	75	217	129	174	186.2	83.1	20	2.75	103.1	35	600	17.5	0.4
20	50	6xM10	230	85	254	148	206	215.2	97.6	20	3.5	117.6	40	600	17.8	0.4
25	70	6xM10	278	115	302	199	254	236.4	105.7	25	4.5	130.7	50	600	21.5	0.5

[1] Cable length
[2] Keyway acc. to DIN 6885/3-P9
Hand release as option

Noise-reduced designs

The required noise reduction for stage machinery and various other application examples can be optionally achieved by 2 measures:

1. Impact noise reduction of the armature plate
The operating noise can be minimised by using O-rings, which are installed between the magnet housing and armature plate, acting as a limit stop damper.

2. Noise-reduced aluminium rotor
Rattling noises, which can occur e.g. at load changes in the rotor-hub connection, are reduced by using a rotor with plastic sleeve.

Ratings

Size	P[1] [20 °C] [W]	$s_{lü\ max}$ Operating brake [mm]	$s_{lü\ max}$ Holding brake [mm]	max. adjustment [mm]	min.[2] Rotor thickness [mm]	$J_{Plastic\ rotor}$ [kgcm²]	$J_{Aluminium\ rotor}$ [kgcm²]	Mass stator Cpl. [kg]
06	20	0.5	0.3	1.5	4.5	0.11	0.15	0.75
08	25	0.5	0.3	1.5	5.5	0.34	0.61	1.2
10	30	0.5	0.3	1.5	7.5		2.0	2.1
12	40	0.75	0.45	2.0	8.0		4.5	3.5
14	50	0.75	0.45	2.5	7.5		6.3	5.2
16	55	0.75	0.45	3.5	8.0		15	7.9
18	85	1.0	0.6	3.0	10.0		29	12
20	100	1.0	0.6	4.0	12.0		73	19.3
25	110	1.25	0.75	4.5	15.5		200	29.1

[1] Coil power at 20°C in Watt, difference up to + 10% is possible, depending on the selected connecting voltage.
[2] The friction lining is dimensioned such that the brake can be readjusted at least five times.

Brake torques depending on the speed and permissible limit speeds

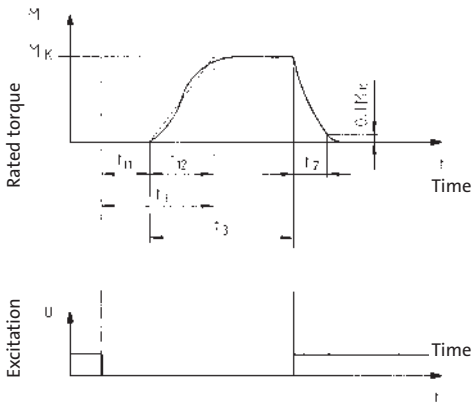
Size	Reference Rated torque at $\Delta n=100 min^{-1}$ [%]	Brake torque at Δn_0 [min^{-1}] [%] 1500	3000	max.	max. speed Δn_{0max} [min^{-1}]
06	100	87	80	65	12400
08	100	85	78	66	10100
10	100	83	76	66	8300
12	100	81	74	66	6700
14	100	80	73	67	6000
16	100	79	72	66	5300
18	100	77	70	66	4400
20	100	75	68	66	3700
25	100	73	66	66	3000

The wear increases with higher speeds

The operating times are valid for DC switching at nominal air gap $s_{lü}$ and coil at nominal temperature. They are average values which may vary depending on the method of rectification and the air gap $s_{lü}$.

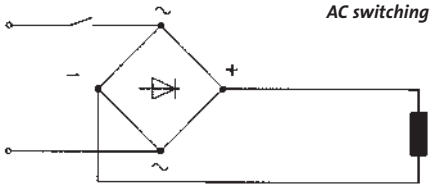
The engaging time t_1 for AC switching is approx. ten times higher than for DC switching.

Torque-time diagram related to the excitation voltage

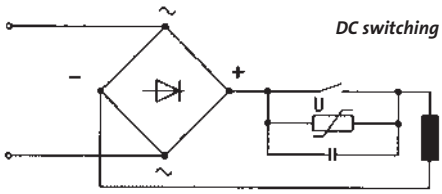


t_{11} = Delay time
t_{12} = Rise time of brake torque
t_1 = Engaging time
t_2 = Disengaging time
t_3 = Slipping time

AC switching

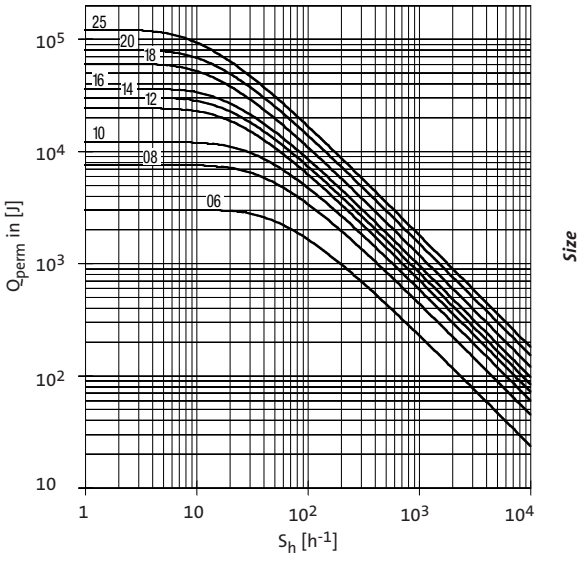


DC switching



Size	Brake torque Rated value at $\Delta n = 100 min^{-1}$ M_K[1] [Nm]	Maximum permissible friction work per one operation only Q_E [J]	Transition operating frequency $S_{hü}$ [h^{-1}]	operating time [ms] [2] for $s_{lüNom}$ Engaging DC switching			Disengaging
				t_{11}	t_{12}	t_1	t_2
06	4	3000	79	15	13	28	45
08	8	7500	50	15	16	31	57
10	16	12000	40	28	19	47	76
12	32	24000	30	28	25	53	115
14	60	30000	28	17	25	42	210
16	80	36000	27	27	30	57	220
18	150	60000	20	33	45	78	270
20	260	80000	19	65	100	165	340
25	400	120000	15	110	120	230	390

[1] Minimum brake torque for run-in friction pairs.
[2] Operating times apply to 205 V DC.



Permissible friction work Q_{perm} depending on the operating frequency S_h

Installation

If no suitable opposing surface is available, a mounting flange or a friction plate (6) can be used.

- ▶ fit the hub (4) onto the shaft (5) and secure axially
- ▶ now fit rotor (3) onto hub (4)
- ▶ insert the fixing screws (10) through the holes provided in the stator and fit those to the counter friction surface
- ▶ remove transport clips
- ▶ check air gap $s_{lü}$
- ▶ the friction surfaces must be kept from oil and grease
- ▶ connect electrically

Life

The brake has to be adjusted when reaching $s_{lümax}$.
The necessary friction work depends on a number of factors, namely the inertia to be braked, the braking speed, the operating frequency and thus the temperature at the friction faces. Therefore, no general statement can be made about the friction work available until adjustment, which is valid for all operating conditions. For more detailed information, please indicate the specific operating conditions. (Please contact the manufacturer).