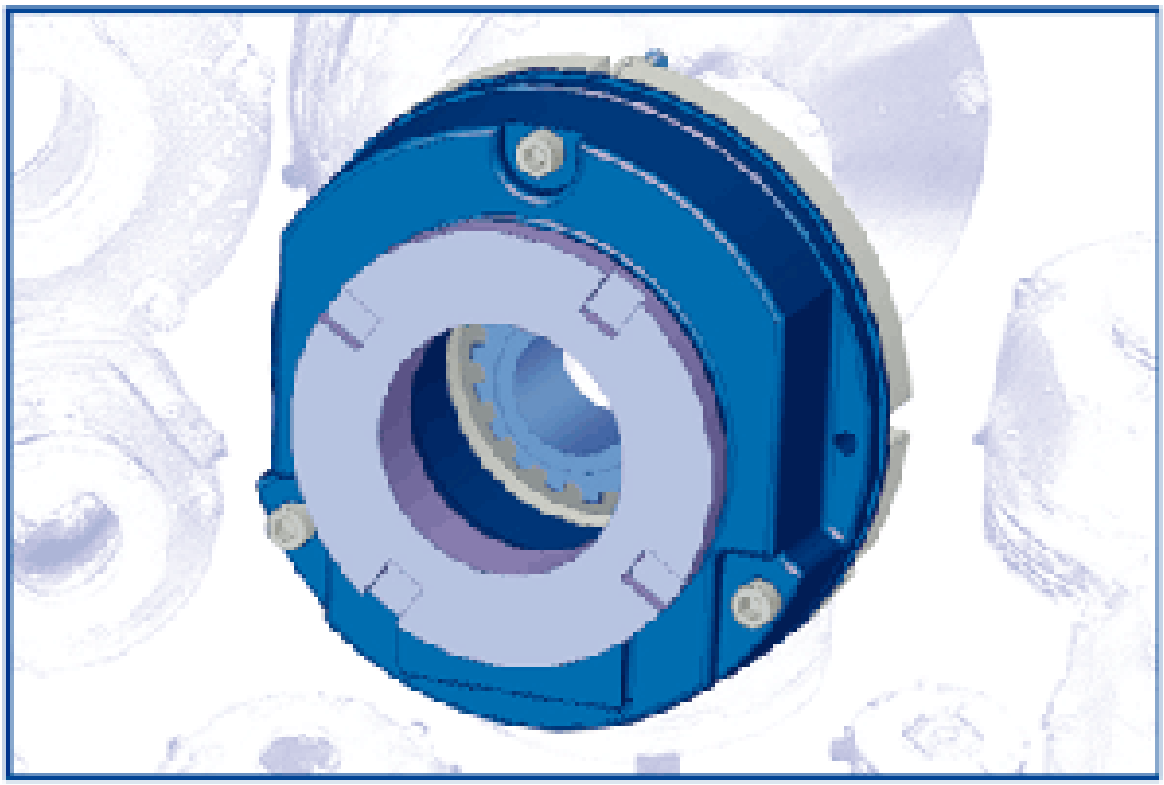
Characteristics of model “K” brake

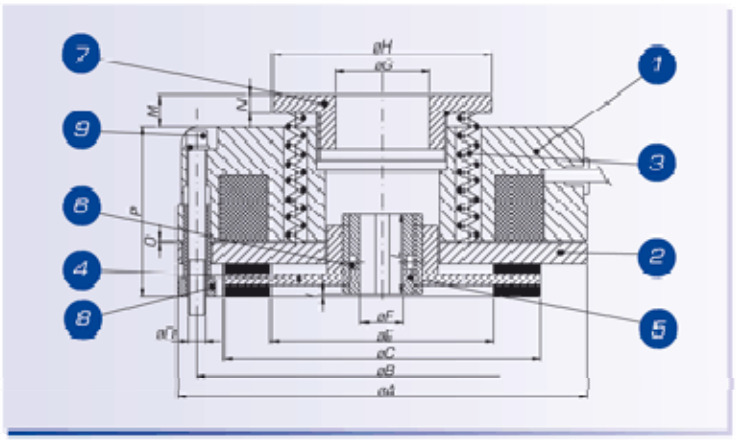
The brake model K is a spring applied d.c. brake. It has been designed to stop rotational movement of machine shaft. However the user has to ensure that the brake is in accordance with all the requests indicated in paragraph "Choice of the brake". Only if these conditions are met can the brake work correctly.

• Very strong structure;
• Very quiet in operating (< 70 dBa in accordance with Regulation 98/37/EEC);
• Simple to install and easy to maintain;
• Good heat dissipation due to the motor fan or cover. The motor cover, as it acts also as braking surface, must be made of steel or cast iron.
• The coil is fully encased in an epoxy resin ,unless of other construction criteria, and the mechanical parts are protected by zinc plating;
• Hand release is on request.



Series K

1. Elettromagnete • *Electromagnet* *Elektromagnet*
2. Ancora • *Armature plate* *Anker*
3. Molle di coppia • *Torque springs* *Bremsfedern*
4. Disco • *Disc* • *Scheibe*
5. Mozzo • *Splined hub* • *Nabe*
6. O-ring
7. Ghiera • *Adjuster ring* *Einstellring*
8. Registri • *Adjuster nuts* *Einstellschrauben*
9. Viti di fissaggio • *Fixing screws* *Feststellschrauben*



Tipo Brake Model		K1	K2	K3	K4	K5	K6	K7	K7/D	K8	K8/D	K9	K9/D	K10	K10/D	K11	K11/D
Coppia frenante statica *Static Braking Torque*	(Nm)	5	12	16	20	40	60	90	180	200	400	300	600	da 500 a 800	1000 1500	1000 1500	2000 2800
Velocità max di rotazione del motore *Max Speed of the motor*	(rpm)	3600	3600	3600	3600	3600	3600	3600	3600	1800	1800	1800	1800	1000	-	1000	-
Potenza / *Input Power*	(W)	15	20	25	30	45	50	55	55	60	60	65	65	140	-	155	-
Max rumorosità *Max noisiness*	(≤ dB-A)	68	69	68	69	70	70	70	70	70	69	69	69	70	-	75	-
Peso / *Weight*	(Kg.)	1,1	1,85	2,55	2,84	4,8	7	12	15	14,3	18	23	28	45	-	50	-
	A	84	104	114	124	148	160	189	189	218	218	248	248	270	-	333	-
	B	72	90	103	112	132	145	170	170	196	196	230	230	245	-	305	-
	C	61	77	88	98	119	128	151	151	176	176	204	204	220	-	275	-
	D	3XM4	3xM5	3xM5	3xM6	3xM6	3xM8	3xM8	3xM8	6xM10	6xM10	6xM10	6xM10	8xM10	-	8xM12	-
	E	35	44	62	69	79	80	90	90	103	103	132	132	120 (Z28) 150 (Z36) 150 (Z45)	-	180	-
Tolleranza foro fino a K3 H7 altri +0,01/-0,01 *Tollerance hole till size K3 H7, others +0,01/-0,01*	F*	10-11 12	11-14 15	11-15	**	**	**	**	**	**	**	**	**	**	**	**	-
	G	20	26	26	42	60	60	60	60	60	60	60	60	103	-	120	-
	H	50	61	61	79	104	104	104	104	104	104	104	104	-	-	-	-
	I	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5	-	1,5	-
	L	18	20	20	20	25	30	30	60	40	40/60	40	40	80	-	60	-
	M (max)	9	9	9	9,5	18	16	14	14	18	18	18	18	34	-	25	-
	N	4	4	4	5,5	8	8	8	8	8	8	8	8	24	-	-	-
	O min/max	0,15/0,5	0,2/0,6	0,2/0,6	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	0,2/0,7	-	0,3	-
	P	38,5	41,5	47	46,5	64	69,5	79	101,5	78	98	83	108	116	-	118	-

* The structural load of the hub is connected to the length of the motion drive shaft key. As consequence it is necessary that the length of the key has the same length of the brake hub. Less length can determine breaches of the hub.
** For the quote L and F of the hub contact our office.
Note (see section Choice of the brake)
• The value of the static braking torque may vary of +/-20% from the plate value for brakes that have not been run-in.
• For brakes using the friction material anti-sticking, the variation of the torque may be - 30/35% of the nominal torque before the running or even less, depending of the mechanical tolerances of the mechanical components and of the braking surfaces. The environmental conditions may affect this value. It always takes control of the torque of the machine before use.

Servicing and repairing

All parts of the brake must be checked frequently as the brake wear depends on a number of factors, namely the brake inertia, the braking speed and the operating frequency. In order to know the operating times you must refer to table page "Graphics".

The substitution of the disk must be carried out considering the following principles:
- wear of the disk; the friction material must be substituted before, if put under considerable stress due to the high working temperatures;
- the disk must be substituted after a 3mm total (1,5 mm for side) consumption of friction material. The friction material has an initial thickness of 3 mm for each friction ring. For the KF serie the replacement must be done with 0,8mm of air gap value. After checking make sure that the air-gap is correctly regulated.

Brake checking must be carried out as indicated in this catalogue in "Assembling" and "Air-gap adjusting" instructions, after checking earthing carefully and when the brake is disconnected. The proper brake functioning can only be guaranteed using original components supplied by our Company. For more detailed information please inform us about the specific conditions of the brake use..

Note: when the air-gap value is 0,7 mm you must bring it necessarily to its nominal value, and in case of kf model replace the disc.
Serie K .

Operating

The brake is designed to assure, by means of the pressure springs and when no voltage is applied, the intrinsic safety equal than brake label value in Nm.
On exciting the electromagnet (1) the armature plate (2) is pulled towards the electromagnet itself, thus loading the pressure springs (3) and enabling the disc (4), which is axially movable on the toothed hub (5), to turn freely. When the current fails, the pressure springs drive the armature plate towards the disc, thus braking the motor shaft.

Important: the drilling for fastening the brake must be exempt from bevels.
For the operation of the brake, the passing holes for the fixing screws to the flange, and the adjuster nuts for the air gap adjustment, they must have a mechanical game around 0,1-0,2mm , in order to grant the correct sliding of the armature plate. Therefore the angular game of the disc refraining to the mechanical tree of the system, can be of some degrees. Such game moreover can come also from the tolerances of connection between the hub and the disc. In case there was the necessity to limit such angular game we ask you to contact our technical Office.

Characteristics of the electric coil

The electric coil allows a variation of +/- 6% of the voltage from its nominal value.
The most important characteristics are:

- Protection IP64: total protection against inside dust and water sprinklings. Only in case is protected by epoxy resin.
- Class F insulation: using of materials conform to CLASS F insulation (working temperature 155°C). This value includes also the room temperature.
- S1 Working: working with steady charge and time enough to reach the thermic balance (continuos working).

Warning
Proper working order of the brake is guaranteed when operating at room temperature. In case of greasy places or extreme temperatures, please contact our technical department.
When operating at low temperatures or in damp places it's necessary to use covers or guards to avoid the attachment of the friction material on the braking surfaces when the brake hasn't been working for a long time.

Important: no braking action is generated from the disk by completely loosening the adjuster ring. The minimum value of the braking torque, is highlighted in the chart of the regulation of the braking torque (page Characteristics). The minimun braking torque adjustment must be always higher than 30% of its nominal value.

Assembling
The assembling and disassembling sequence is represented in the picture in section "Characteristics". Place first the armature plate (2) and the electromagnet (1), in which you must insert the torque springs.
Hold the fixing screws (9) tight on the mounting flange by means of a dynamometric key with a lock out of M4=2,8 Nm, M5=5,6 Nm, M6=9,6 Nm, M8=23,2 Nm, M10=46,4Nm. The mounting flange must be made of steel or cast iron and must have a flat surface machined with 1,6 Ra roughness.
In order to comply with safety legislation the following operations should be carefully carried out:
a. Drill the motor cover with an helical drill bit with diameter M4=3,2, M5=4,2, M6=5, M8=6,75, M10=8,6 (UNI 5699).

b. Make sure the drilling is made within tolerance.

c. With the correct size thread tap and lubricant, cut the threads.

If the brake is provided already assembled, remove the air-gap adjusting devices after mounting the brake. Check and modify, if necessary, the air-gap value. In case of KF model this operation is not necessary, due the automatically adjustment of the air gap value.

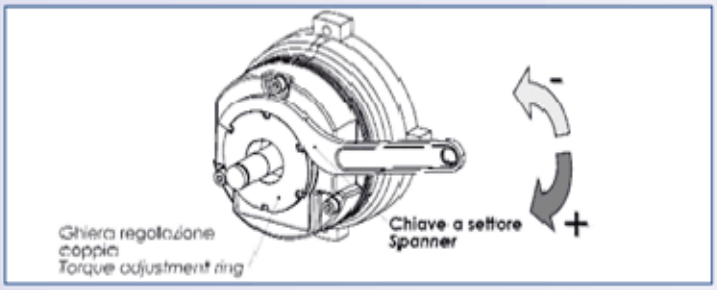
Air-gap adjusting
Adjusting of the air-gap is made operating the adjusting-screws (8) after loosening the fixing screws (9). Please allow for a cooling down period before adjusting the air-gap after brake operating.
The nominal value for the air-gap (tolerance +0.05-0) is reported in the page "Characteristics".The maximun value allowed for the air-gap is 0,7 mm. The performances of the brake could be modified if this value is passed due to the consumption of friction material. The maximum admissible consumption is of 0.5+O/ 0.1, which added to the value of the air-gap brings to the maximum air-gap value. Incorrect maintenance of the air-gap adjustment will prevent brake to work properly during motor revolution this causing an overheating of all the parts of the brake and an inevitable interruption of the working. You can calculate when it's necessary to adjust the air-gap using the formula shown at page "Dimensional Calculation" of this catalogue.

Braking Torque adjustment

• The model “K” allows the adjustment of the braking torque. The user will adjust the braking torque according to the load, the motor rotation speed and the braking time.
• In the table below are highlighted indicative distances (dependent on the tolerances of the mechanical components) in mm of the adjuster nut by the electromagnet, in order to obtain the desired braking torque, which must always be verified after assembly of the brake and prior to use on the machine (see drawing).
• You can adjust the braking torque, if the load allows it, under the 100% value in order to have a less wear of the friction material. You’ll find this variation (%) in the graph below. The highlighted area delimits the safety value.

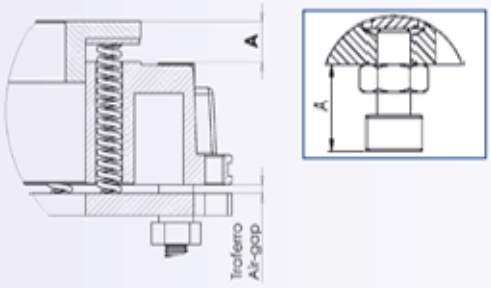
Coppia frenante in funzione quota "A" (distanza piano superiore ghiera – piano magnete (K1-K9/D) / distanza piano testa vite TCEI – piano magnete (K10-K11/D)
Braking torque accordino to the "A" (distance upper plane torque adjusting ring – magnet plan (K1-K9/D) / distance head TCEI screw plane – magnet plane (K10-K11/D

		K1	K2	K3	K4	K5	K6	K7	K7/D	K8	K8/D	K9	K9/D	K10*	K10/D*	K11*	K11/D
		A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm	A [mm] Nm %	A [mm] Nm %	A [mm] Nm %	A [mm] Nm %
100 %	Max	5,2 **5,0**	4,6 **12,0**	4,6 **16,0**	5,9 **20,0**	8,2 **40,0**	8,2 **60,0**	8,2 **90,0**	8,2 **180,0**	8,2 **200,0**	8,2 **400,0**	8,2 **300,0**	8,2 **600,0**	18,6 **800,0** 100%	18,6 **1500,0** 100%	22,4 **1700,0** 100%	22,4 **2550,0** 100%
75 %		6,9 **3,75**	6,1 **9,0**	6,2 **12,0**	7,1 **15,0**	10,7 **30,0**	10,3 **45,0**	9,9 **67,5**	9,9 **135,0**	10,7 **150,0**	10,7 **300,0**	10,7 **225,0**	10,7 **450,0**	20,6 **762,0** 95,2%	20,6 **1430,0** 95,3%	23,4 **1666,0** 98,0%	23,4 **2499,0** 98,0%
50 %		8,7 **2,5**	7,6 **6,0**	7,6 **8,0**	8,5 **10,0**	13,2 **20,0**	12,5 **30,0**	11,7 **45,0**	11,7 **90,0**	11,2 **100,0**	11,2 **200,0**	13,2 **150,0**	13,2 **300,0**	22,6 **725,0** 90,6%	22,6 **1361,0** 90,7%	25,4 **1599,0** 94,0%	25,4 **2399,0** 94,0%



*regolazione coppia frenante tramite viti TCEI e quindi sprovvisto di ghiera. Si riporta in tabella anche il valore percentuale (%) di coppia ottenuto con la regolazione.

**braking torque adjustment made by TCEI screws and not by adjusting ring. In the chart 4 there is the percentage (%) value obtained with the regulation*



Nota: i valori riportati in tabella sono indicativi.
Note: the values reported in the chart are aproximate

Brake Accessories - IP66 Protection system

Dust seal (Fig. 1)
• It prevents penetration of dust or other fragments into the braking area. The dust seal is pulled over the brake into the grooves provided.
Hand release device (Fig. 2)
• This device releases the brake manually and goes back to its original position after operating.
Friction plate (Fig. 3)
•We suggest to use the friction plate when the flat machined surface available for brake assembling can't be used as braking surface. The friction plate can also be used with the dust seal.
Mounting flange (Fig. 4)
• The mounting flange must be used when no suitable braking surface is available. It can also be used with the dust seal.

Tipo Type	K1	K2	K3	K4	K5	K6	K7 K7/D	K8 K8/D	K9 K9/D
A	80	94	103	120	145	156	184	208	238
B	20	22	25	25	30	33	33	35	20 - 10
C	72	90	103	112	132	145	170	196	230
D	30	40	40	60	120	130	154	180	205
E	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
F	6	7	7	9	9	11	11	11	11
G	84	104	114	124	148	160	189	218	248
H	30	45	50	56	62	74	84	100	120
I	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
L	100	115	135	143	185	185	200	225	280
M	88	108	119	130	150	165	195	223	253
N	4.5	5.5	5.5	6.5	6.5	8.5	8.5	8.5	10.5
O	20	30	35	40	45	55	65	75	90
N° Viti Screws Nr.	3	3	3	3	3	3	3	6	6

FIG. 1

FIG. 2

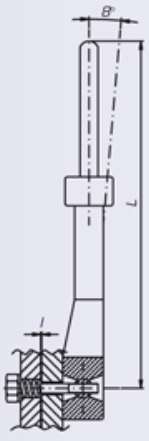


FIG. 3

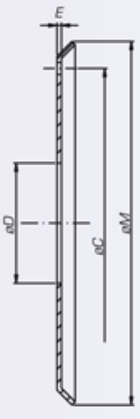
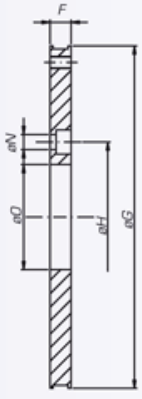
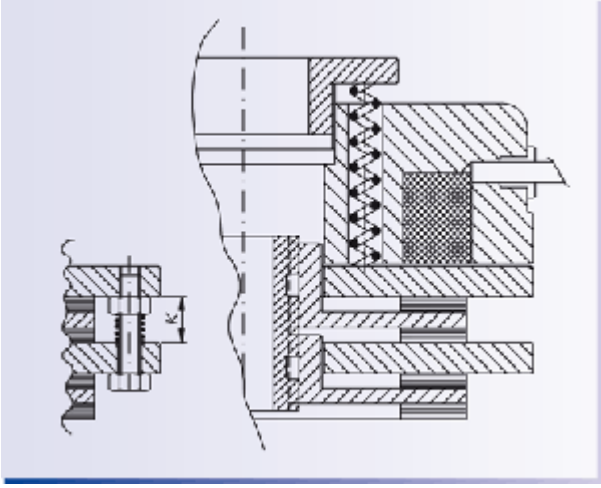


FIG. 4



Vertical assembly of double disc brake

Carry out the vertical assembling of double disc brake using the device as shown in the drawing. The brake is privided already assembled. When mounting the brake on the motor keep the K value +0,2 higher than disc thickness.



Hand Release Device

We can supply on request a brake hand release device. This is composed by a plastic material, glass loaded device placed on the electromagnet housing, two special bolts with a pin and a spring. The device positioning seat is made on the electromagnet housing, coinciding with the fixing holes for the bolts. The same holes are made also on the armature plate. To carry out the hand release assembling, place the armature plate coinciding with the fixing holes. Then insert the T.E headed washer, the spring in the armature plate and the electromagnet, with the threaded part towards the electromagnet.

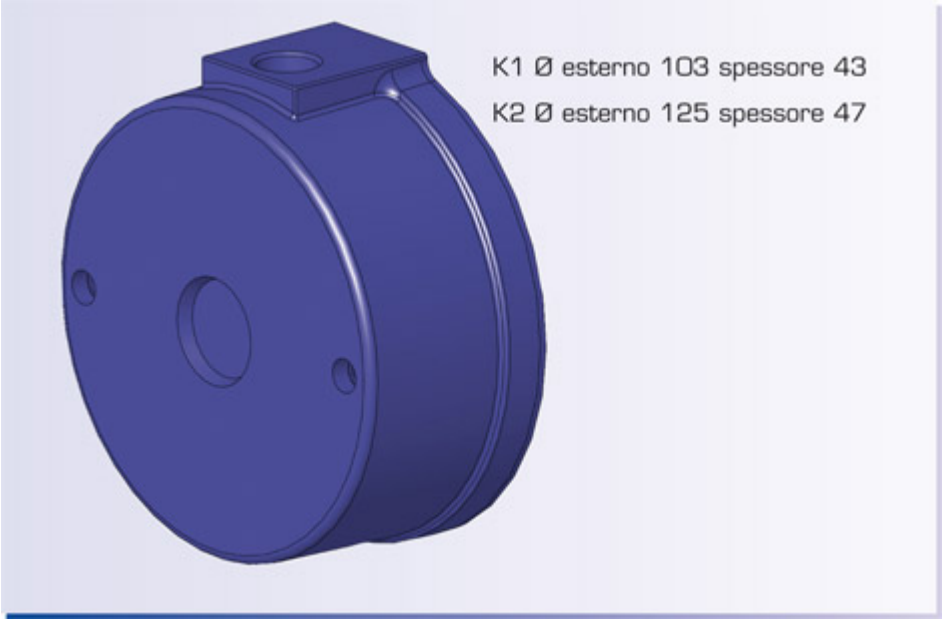
Screw with the pin while keeping the aluminium device in vertical position and move the armature plate at a distance of about 0,7÷1 mm from the electromagnet surface. If this operation is not properly carried out, the brake may have a misperformance, such as:

1 If the bolts are too tight on the hand release the brake looses its braking torque, as the armature plate stroke is restricted.

2 If the bolts are too loose on the hand release the system doesn’t work and the hand release might not run properly as the operator is not able to release the brake and increases his strenght on the release level, thus causing its breaking. In order to avoid this misworking see below the max allowed strokes and its related loads.

3 With just one bolt too tight the braking torque changes and the friction material wear is not omogeneus.

Tipo Model	Corsa senza sforzo Movement without effort (mm)	Corsa di sgancio Movement of release (mm)	Massimo sforzo sulla leva Max effort on handle (Kg)
K1/AC1	7	15	1.5
K2/AC2	6	10	3.5
K3/AC3	6	8,5	4.5
K4/AC4	6	8,7	4.5
K5/AC5	6	9	11
K6/AC6	8	12.5	12
K7/AC7	8	13.5	17
K7/D/AC7D	9	13.5	17
K8/AC8	9	14.5	19.5
K8/D/AC8D	9	14.5	19.5
K9	9	16.5	25
K9/D	9	16.5	25



The used brake work in class S2-S3. For the braking torque value contact our technical dept.

Operating Times

If using P-PR rectifiers with working on continuos duty higher than 15/operations per minute, a dropout of 2 seconds between each operation is necessary.
Note: Dissipations show in the graphic are valid only referring RPM indicated in the table.

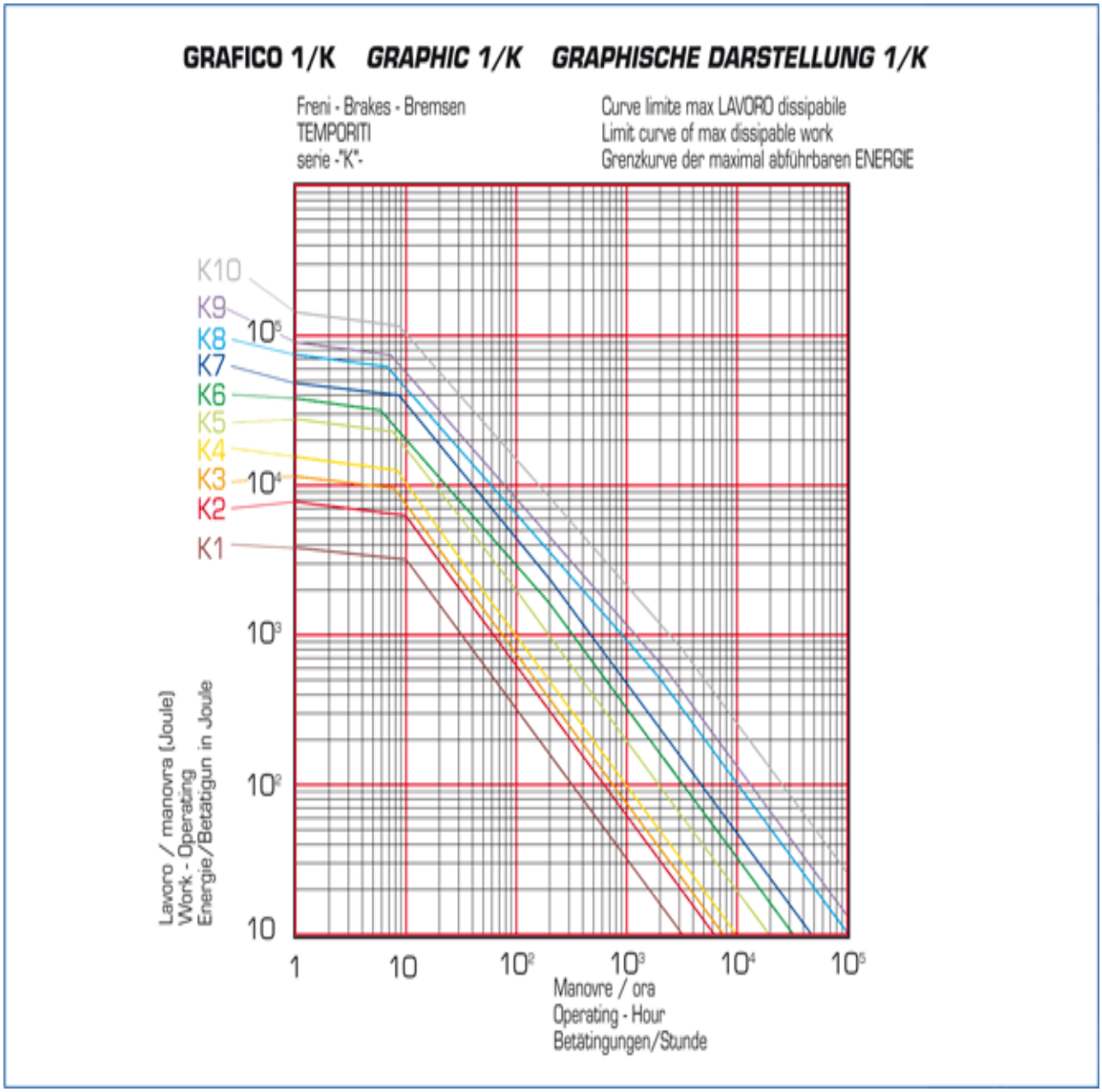


GRAFICO 2/K ***GRAPHIC 2/K*** ***GRAPHISCHE DARSTELLUNG 2/K***

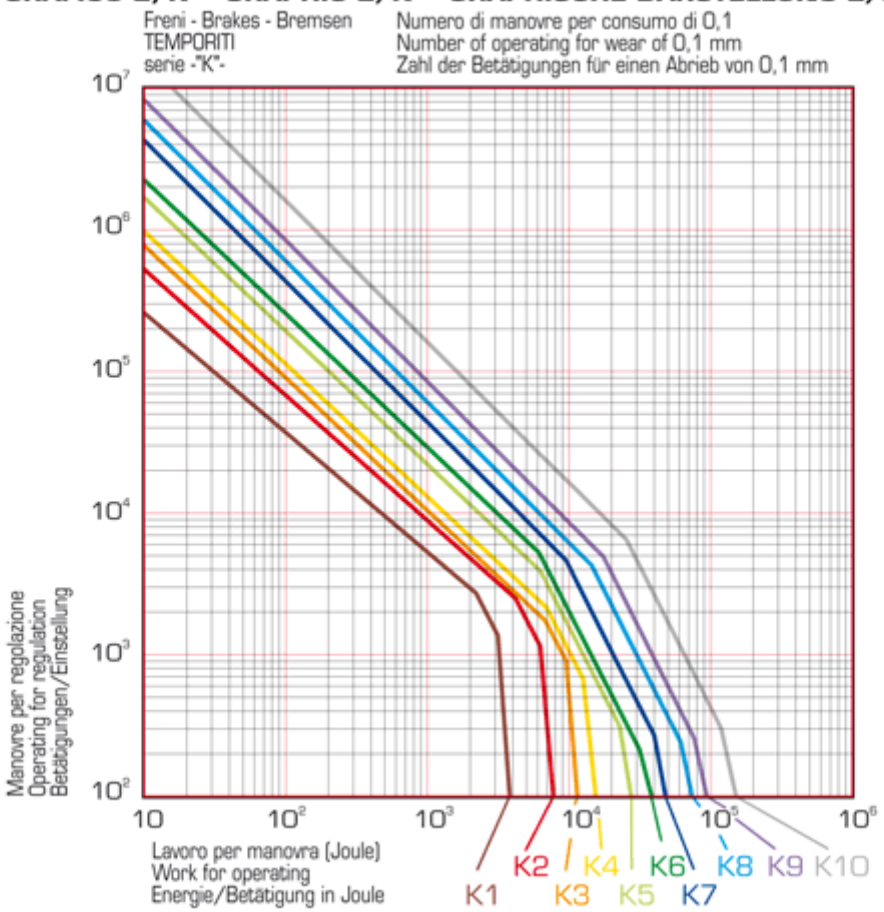
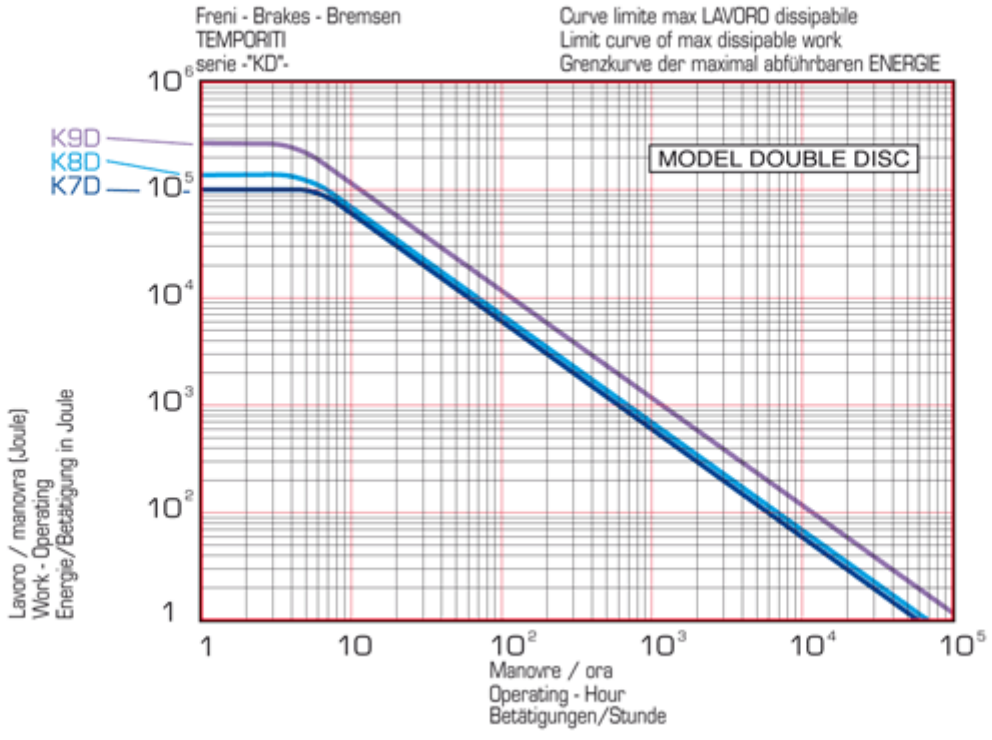


GRAFICO K/D **GRAPHIC K/D** **GRAPHISCHE DARSTELLUNG K/D**



Note: Dissipations show in the graphic are valid only referring RPM indicated in the table.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