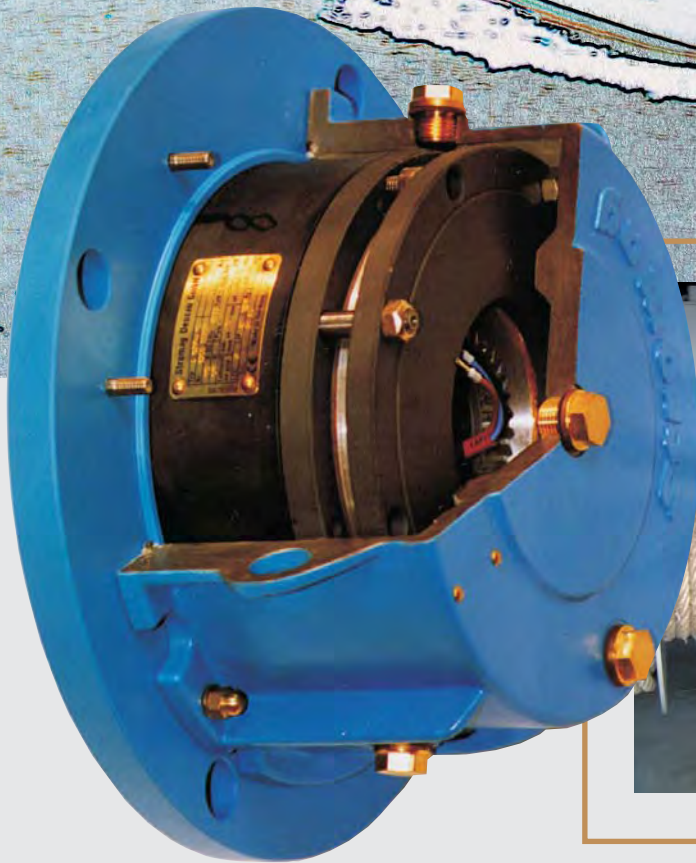
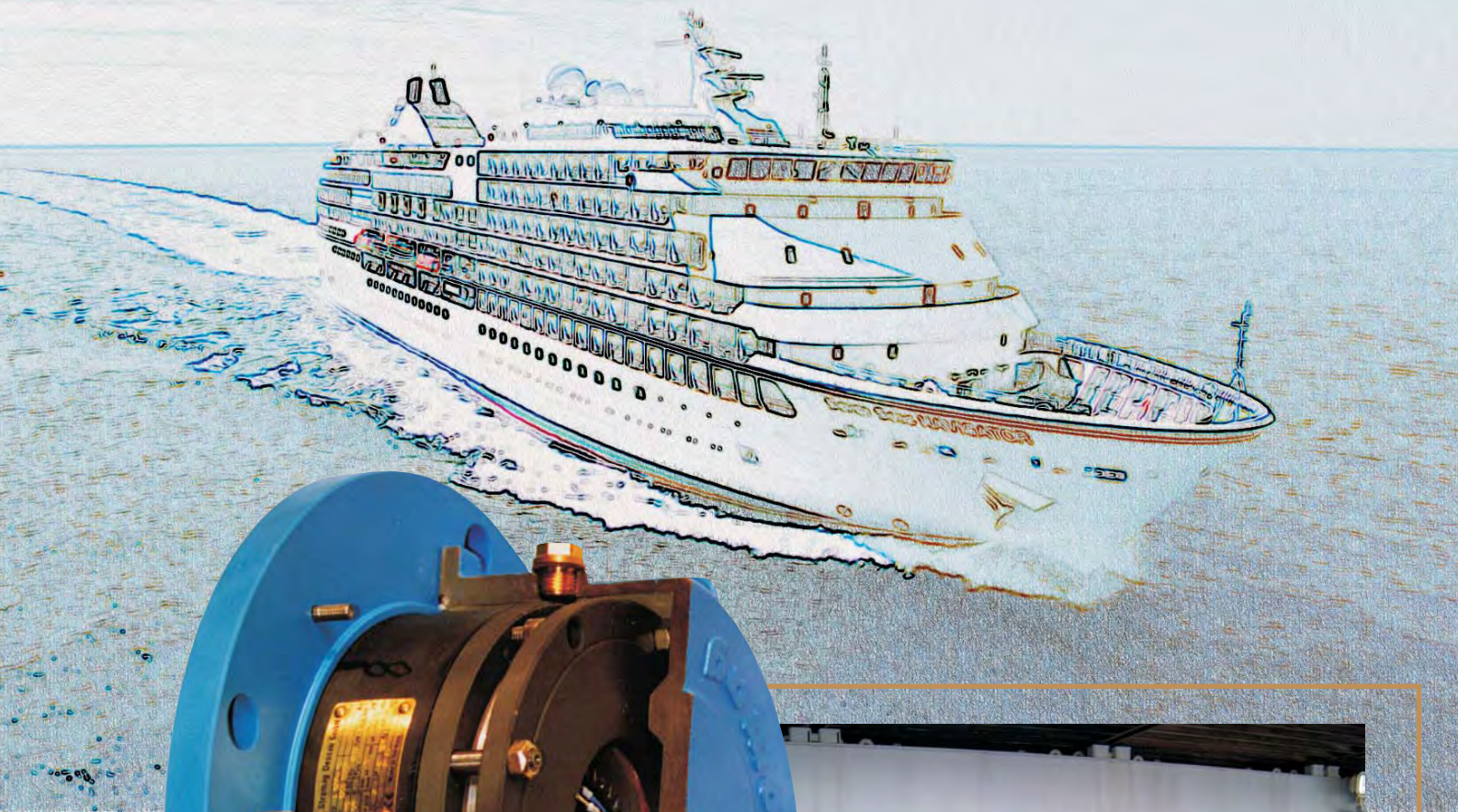


Stromag Dessau

safety in motion

4 BZFM



Applications

Off – shore applications: on deck at windlasses, anchor winches, shipboard cranes, cargo winches, trawler winches where high protection against environment is essential.

Standard Features

Coil Body with coil	Thermal class 155, nitrocarburated and postoxidated
Armature disc	Special protection: nitrocarburated and postoxidated
Brake disc	Special protection: nitrocarburated and postoxidated
Friction Lining	Low wear rate with low torque fade over wide temperature band. High thermal capacity
Flange	To IEC standard
Cover	Manufactured of gray cast, from size 400 of seawater protected aluminium
Pinion	Nitrocarburated and postoxidated
Fixings screws	All stainless steel
Flying Leads radial or axial	1 metre long
Seals	For high protection

Optional Extra's

Cover with speedometer provision
Terminal Box
Micro switch to monitor switching states
Micro switch for wear monitoring
Condensation heaters

Switching modules

Half wave
Full wave
Quick switching units
Built in terminal box
Attached for mounting into the motor terminal box

Advantages

- ☒ Comprehensive torque range 63 – 11.000 Nm.
- ☒ Operative without cover.
- ☒ Type approvals: GL, LRS, ABS, DNV, BV, RR (on request).
- ☒ Simple assembly to motor, no dismantling of brake required.
- ☒ less wear.
- ☒ Compatibility of consumable spares.
- ☒ Simple maintenance, one time wear re-adjustment by reversing of the brake disc.
- ☒ Proven reliable design.
- ☒ Sealed inspection holes for air gap or lining wear.
- ☒ Extremely low inertia.
- ☒ High heat dissipation.
- ☒ Free from axial loads when braking and running.
- ☒ Suitable for vertical mounting, please consult Stromag Dessau GmbH.
- ☒ Many optional extras available.
- ☒ Facilities to design to customer's special requirements.
- ☒ Protection available up to IP67.
- ☒ "Asbestos free" linings as standard.
- ☒ Holding and Working brake variations.

Voltages available

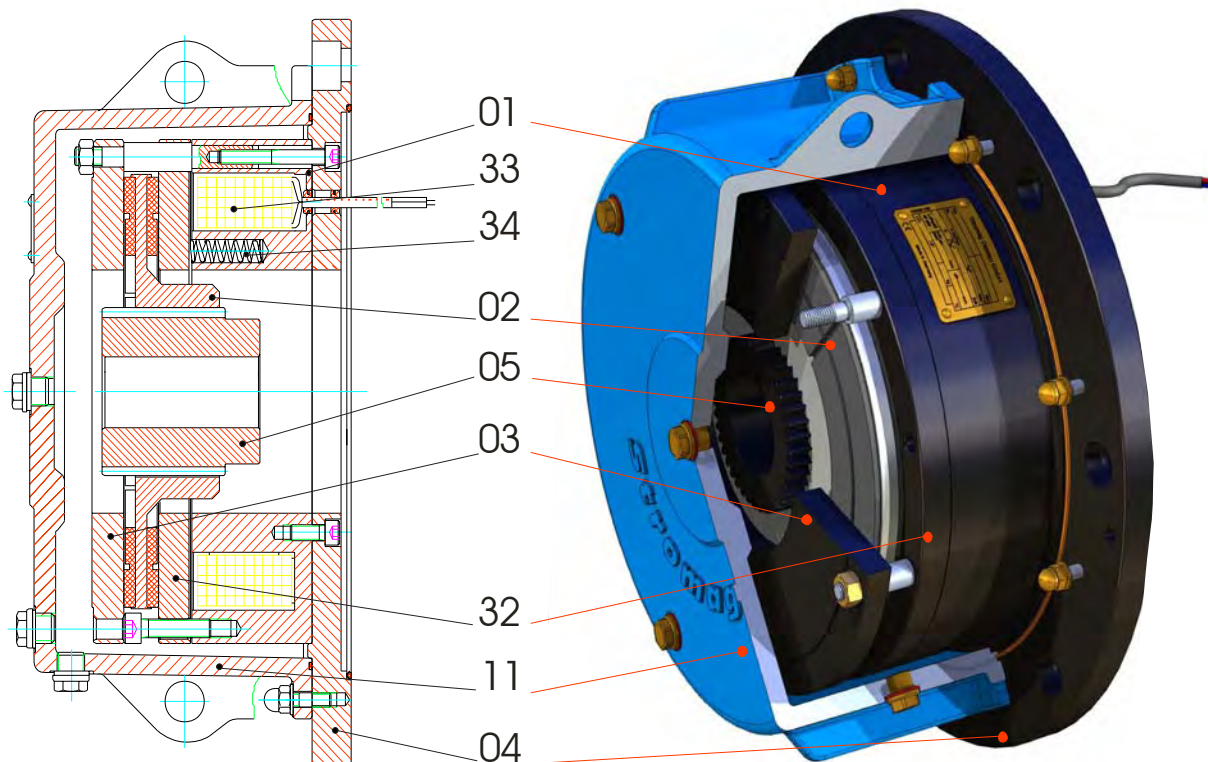
Usual voltage: 110 VDC, Standard 24 V DC, 103 V DC, 190 V DC and 207 V DC.

Other voltages on request.

Coils available to suit: AC – supplies with integral Half and Full wave rectification.

We suggest the following alternative - Customer to take standard voltage with rectifier which Stromag Dessau can provide.

Designation of individual components



- 01 coil body
- 02 friction disc with friction lining
- 03 brake disc
- 04 flange
- 05 pinion
- 11 cover
- 32 armature disc
- 33 coil
- 34 compression spring

Brake operation

The brake **4 BZFM** is a spring-loaded electromagnetic double-face brake which brakes without current and is released electromagnetically.

The brake is screwed to a motor or any other machine part by means of cyl. screws via the flange (04).

The coilbody (01) contains a coil (33) which is potted with a synthetic resin compound in accordance with thermal class 155, (max. limit of temperature 155°C).

If the coil (33) is not excited, the springs (34) press the armature disc (32) against the friction disc with friction lining (02), which is firmly clamped between the torsion-protected armature disc (32) and the brake disc (03) and thus prevented from rotating. The braking effect is transmitted from the geared friction disc with friction lining (02) via the pinion (05) and a fitting key to the shaft. If the coil is connected to a direct voltage as specified on the identification plate, the

magnetic force will draw the armature disc (32) to the coil body (01) overcoming the spring pressure. The friction disc with friction lining (02) is released, the braking effect is cancelled and the brake is released.

☒ **Micro Switch**

Optional availability, Inboard Proving Switch, one common contact, one normally open contact and one normally closed contact.

This can be interlocked with motor contactor for parking brake duty, ie. brake release before starting motor.

☒ **Brake termination**

Three standard versions:

- 1a) Flyaway leads, radial, usually 1 meter long through PG Cable Gland in flange.
- 1b) Flyaway leads, radial, usually 1 meter long.
- 2) IP66 terminal box, for easy connection and removal, at execution with terminal box the brake complies with protection IP66!
- 3) Versions for AC supply with built-in full wave or half wave rectification inside the terminal box.

Please note that when the brake is electrically connected to an AC motor and switched on the AC side, care must be taken so that the load does not drive back into the motor and generate a voltage that may hold the brake off, i.e. in hoist and lift applications. If in doubt please contact the Stromag Dessau GmbH.

☒ **Emergency release by means of emergency release screws**

For mechanical release in case of emergency or for the adjustment of the system emergency release screws are available.

☒ **Flange to IEC**

Manufactured to suit your motor on B-side to our brake with IEC connection dimensions.

☒ **Condensation heaters**

Inboard condensation heaters can be provided.

☒ **Speedometer installation**

If a speedometer connection is required for the brake, the brake cover is provided with connecting bores in accordance with "Euro dimensions". The type of protection only maintains when the speedometer is rigidly connected to the cover by means of a flange gland which is sealed by round ring.

☒ **Special Surface Finishes**

All components are surface finished with a special surface protection against abrasive environment; e.g. against saline atmosphere on deck, etc.

Calculations

Full Load Torque = FLT
Load torque = Nm
Torque = Nm
Power = kW
Constant = 9550
Speed = rpm

Initial torque, size of brake = FLT x Factor (25% - 200%)

Calculating Maximum Stops per Hour using Braking Tables "Permissible heat capacity", page 8

Example:

Motor = 15 kW; 1500 rpm

J = Total inertia of Load + motor = 2.04 kgm²

M_L = Load Torque = 20 Nm

M_{SN} = Brake Torque = 100% FLT

$$\text{Motor FLT} = \frac{\text{kW} \times 9550}{\text{rpm}} = \frac{15 \times 9550}{1500} = \underline{95.5 \text{ Nm}}$$

Brake selection = 4 BZFM 10 (100 Nm)

$$\begin{aligned} \text{KJ per switching} &= \frac{J \times n^2}{182000} \times \frac{M_{SN}}{M_{SN} \pm M_L} \\ &= \frac{2.04 \times 1500^2}{182000} \times \frac{100}{100 + 20} \\ &= 25.21 \times \frac{100}{120} = \underline{21 \text{ kJ per switching}} \end{aligned}$$

From 4 BZFM Table "Permissible heat capacity", page 8,
at 1500 rpm

4 BZFM 10 Brake will stop approx. 50 times per hour.

To Calculate Stopping Time

$$\text{Stopping Time} = \frac{J \times \text{rpm}}{9.55 \times (M_{SN} \pm M_L)}$$

Example:

Brake = 4 BZFM 10 (100 Nm)

Motor = 15 kW; 1500 rpm

J = Total inertia of load + motor = 2.04 kgm²

T_L = Load Torque = 20 Nm

$$\text{Stopping Time} = \frac{2.04 \times 1500}{9.55 \times (100 + 20)}$$

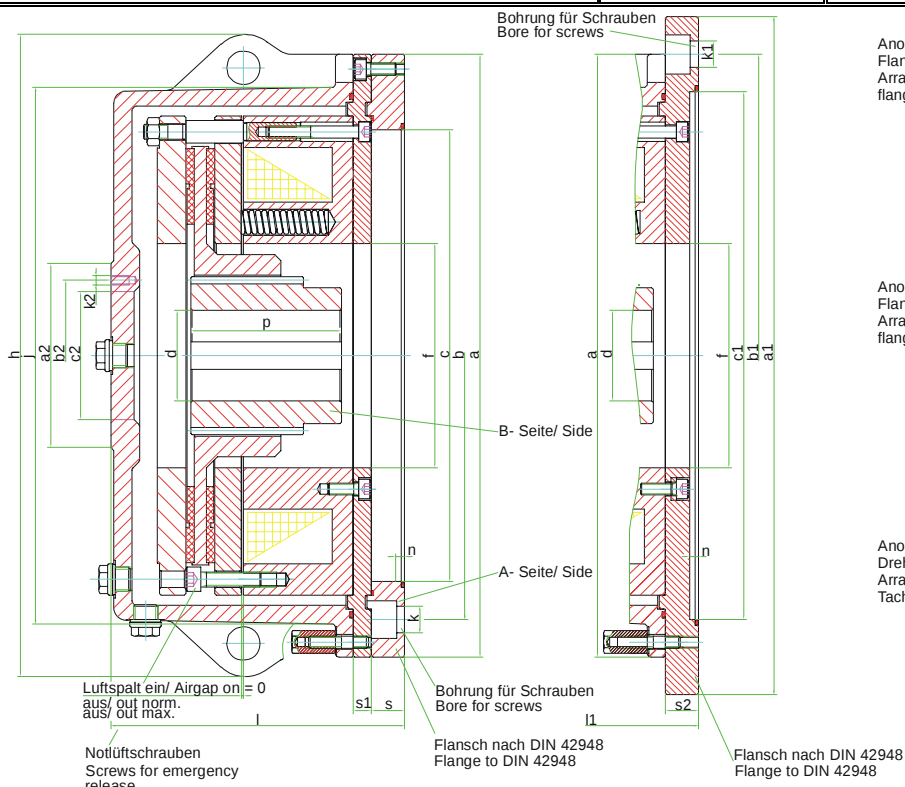
Stopping Time = 2.67 seconds + Brake response time

Electromagnetic Spring Applied Brake Protection IP 67 (IP 66)

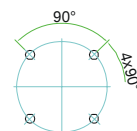
4 BZFM

Stromag Dessau

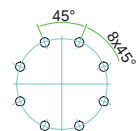
safety in motion



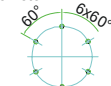
Anordnung der Bohrungen k und k1 bis Flanschgröße A400 nach DIN 42948
Arrangement of the bores k and k1 up to flange size A400 to DIN 42948



Anordnung der Bohrungen k und k1 ab Flanschgröße A450 nach DIN 42948
Arrangement of the bores k and k1 from flange size A450 to DIN 42948



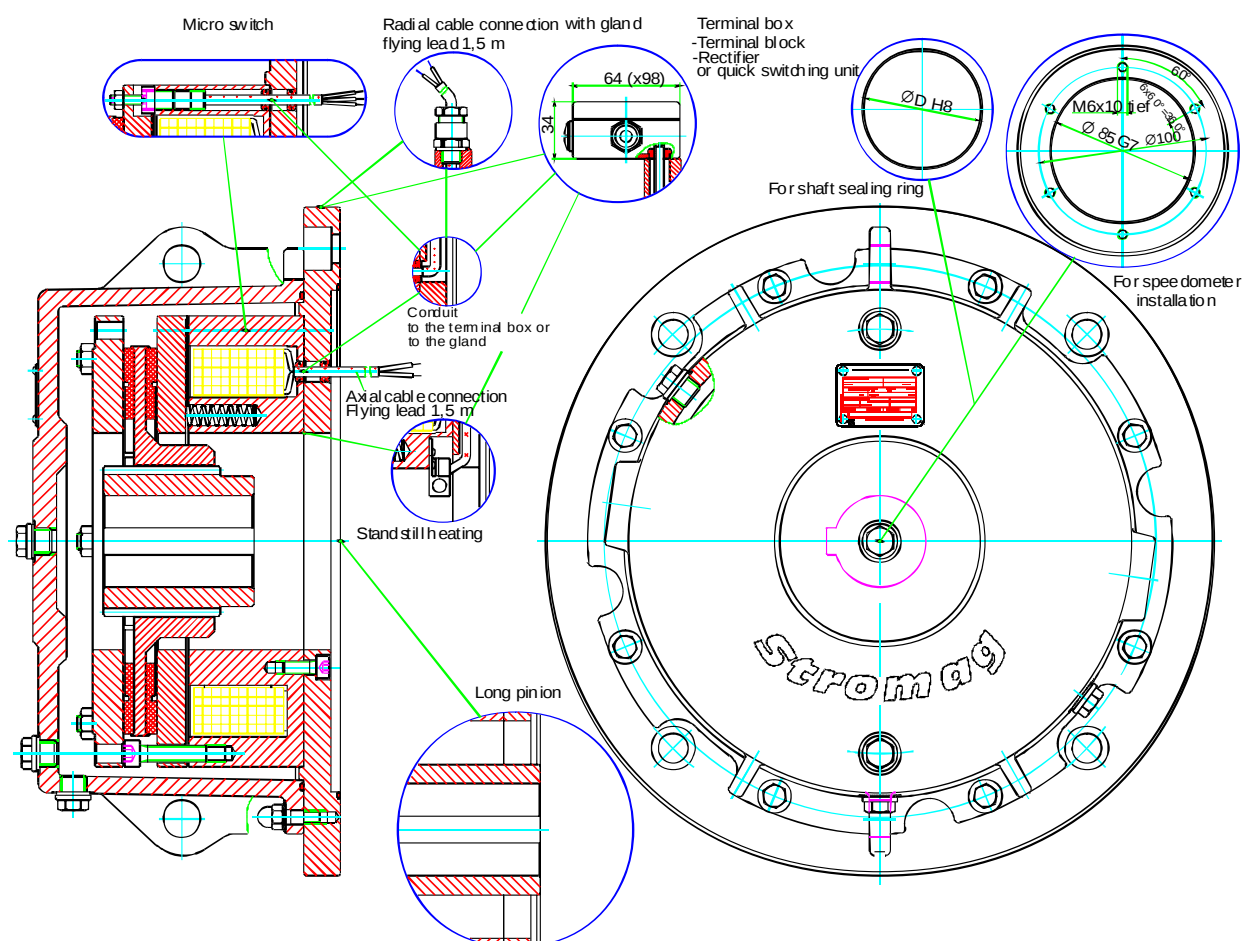
Anordnung der Bohrungen k2 für Drehzahlgeber
Arrangement of the bores k2 for Tachometer



Brake size 4BZFM			6,3	10	16	25	40	63	100	160	250	400	630	1000
switchable torque	M _{SN}	Nm	63	100	160	250	400	630	1000	1600	2500	4000	6300	10000
transferable torque	M _Ü	Nm	69	110	176	275	440	690	1100	1750	2750	4400	6930	11000
airgap off norm.		mm	0,4	0,4	0,4	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,6
airgap off max.		mm	1,2	1,2	1,2	1,2	1,5	1,8	2,1	2,4	2,8	2,8	2,8	3,0
max. speed	n	min ⁻¹	6000	6000	6000	5500	4700	4000	3600	3200	2800	2400	2200	2000
mass mom. of inertia	J	kgm ²	0,0012	0,0019	0,0026	0,0050	0,0133	0,0271	0,0366	0,06	0,1266	0,267	0,47	0,76
weight	m	kg	23	32	40	56	73	107	138	205	275	380	574	725
nom. voltage	U	V DC	110	110	110	110	110	110	110	110	110	110	110	110
nom. power	P	W	110	122	142	164	214	249	332	403	530	675	698	827
nom. current	I	A	1.00	1,11	1,29	1,49	1,95	2,27	3,02	3,66	4,82	6,13	6,34	7,52
usual borings	diameters	a	mm	A 250	A 250	-	A 300	A 350	A 400	A 450	A 550	A550	-	-
	a1	mm	A 300	A 300	A 300	A 350	A 400	A 450	A 550	A 660	A660	A660	A800	A800
	a2	mm	120	120	120	120	120	120	120	120	194	300	320	300
	b	mm	215	215	-	265	300	350	400	500	500	-	-	-
	b1	mm	265	265	265	300	350	400	500	600	600	600	740	740
	b2	mm	100	100	100	100	100	100	100	100	100	100	100	100
	cH7	mm	180	180	-	230	250	300	350	450	450	-	-	-
	c1H7	mm	230	230	230	250	300	350	450	550	550	550	680	680
	c2G7	mm	85	85	85	85	85	85	85	85	85	85	85	85
	dmin	mm	28	28	38	38	38	48	48	60	65	90	90	100
	d	mm	38	38	42	42	55	60	60	75	90	110	120	140
	dmax	mm	40	40	55	55	60	75	75	110	125	140	160	180
	f	mm	82	86	98	104	130	149	144	190	210	210	235	275
	h	mm	252	275	296	322	376	426	458	532	574	654	737	800
	j	mm	193	214	233	256	306	356	380	450	491	559	627	690
	k	mm	13,5	13,5	-	13,5	17,5	17,5	17,5	17,5	17,5	-	-	-
	k1	mm	13,5	13,5	13,5	17,5	17,5	17,5	17,5	22	22	22	22	22
	k2	mm	M6	M6	M6	M 6	M 6	M 6	M 6	M 6	M 6	M 6	M6	M6
lengths	l	mm	-	147	-	165	196	196	209	-	274	-	-	-
	l1	mm	126	141	145	165	184	184	203	232	252	305	354	381
	n	mm	6	6	6	6	6	6	6	7	6	7	7	7
	p	mm	70	70	80	80	90	100	100	130	171	205	245	245
	s	mm	-	15	-	15	22	22	19	-	29	-	-	-
	s1	mm	-	11	-	11	12	12	16	-	22	-	-	-
	s2	mm	18	20	20	26	22	22	29	24	29	30	33	33

other voltages available With keyways to DIN 6885 /1

Optional Accessories



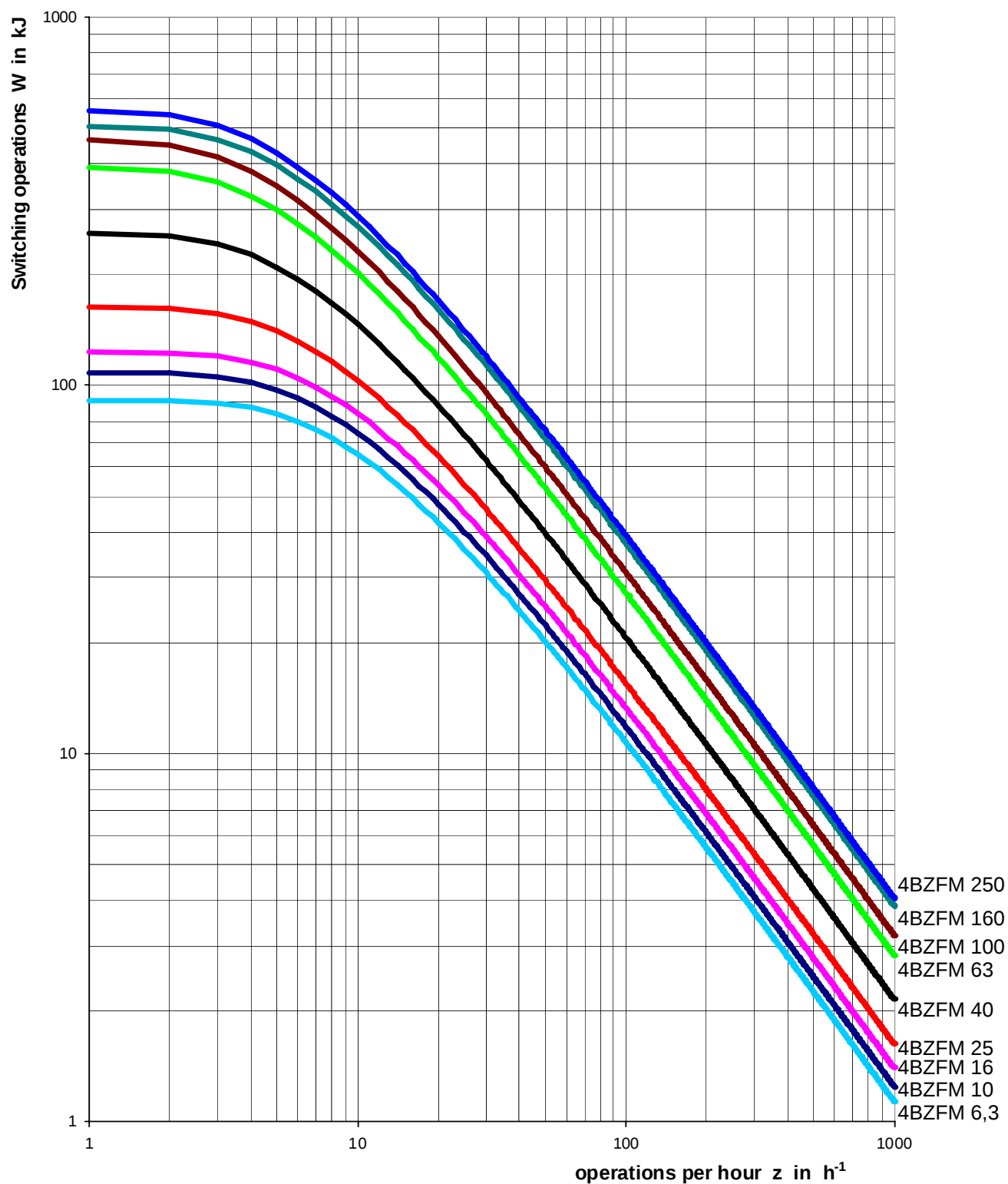
Example of designation

4 BZFM 10 110 VDC 38H7 VOR A300 MS KK GR HZ SB

brake type _____
 brake size _____
 nominal voltage _____
 bore diameter with key way _____
 bore diameter, prebored _____
 flange size _____
 with micro switch _____
 with terminal box _____
 with rectifier _____
 with condensation heater _____
 with quick switching unit _____

Permissible Heat Capacity

Switching operations per switching in relation to the number of switchings
 $W = f(z)$ for $n = 1500 \text{ rpm}^{**}$



****** permissible switching operations per switching at other speed ratings on request

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