II

BD...B type series

Construction
For frame sizes 80 to 132 motors, the brake is enclosed in a flameproof adapter housing mounted on the non-drive end of the motor to form a single unit. The ignition protection type is II 2G Ex d(e) IIB + H2 T4 or II 2D Ex tD A21 IP65 T120°C.

The system is completely maintenance-free for the lifespan of the brake linings.

Connection
The brake coil is energized by a silicon rectifier fitted inside the flameproof enclosure. The brake can be controlled from the AC or DC side.

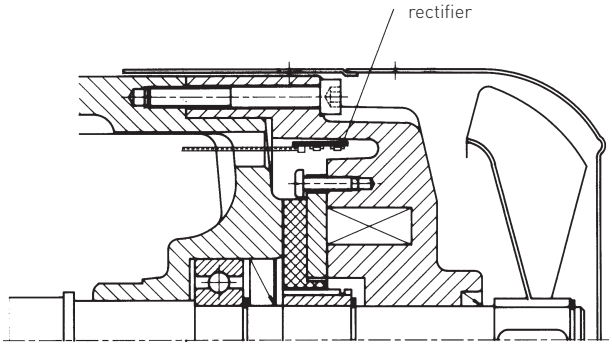
For operation from the DC side, a brake coil connection is fed into the terminal compartment. In addition, the motor is equipped with a protective resistor. If this layout is to be used for AC brake operation, a connection is not required in the terminal box. Instead, the connection shown in the circuit diagram must be established. On pole-changing and rectifier-supplied motors, the brake coil must be supplied from an external power source.

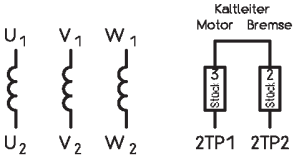
Motor voltages
Frame sizes 80 to 112: 230 V to 690 V
Frame size 132: 400 V to 690 V

Brake voltages
For brake coil data, see page 108.
Non-standard voltages are available at extra cost.

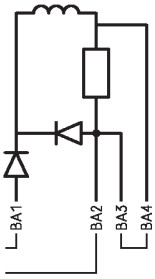
Protective devices
To protect the motor from excessive temperatures to DIN EN 60079-14 VDE 0165, three series-connected PTC thermistor temperature sensors are installed in the winding head (warmest point) of the three stator winding phases.

In addition, each motor is equipped with a PTC thermistor temperature sensor in the brake coil and on the non-driveend shield. The temperature sensor are connected in series and protect the motor and brake from overloading or overheating.



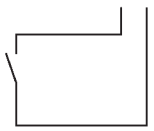


Terminals BA1 and BA2 can be connected directly with the motor terminals to supply the brake. Please compare motor/brake voltage to determine whether connection must be made to U1/U2 or to U1/V1.



Terminals BA3 and BA4 must be bridged.
It is also possible to apply an external voltage to terminals BA1 and BA2. Please note the voltage rating on the rating plate. Terminals BA3 and BA4 must be bridged.

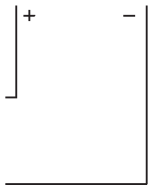
For fast brake response (DC-side switch-off), the bridge between BA3 and BA4 can be replaced with a contact. The contact must switch at the same time as the brake voltage supply.



For emergency release of the brake, e.g. to rotate the motor by hand, a DC voltage can be applied across terminals 1 and 4 (disconnect other wiring first and observe polarity).

Voltage U = U~ x 0.45.

Voltage U~ ; see brake voltage on the rating plate.



Operating data
For electrical motor ratings not specified in the operating data on page 104 (e.g. torque data), see the specifications for three-phase motors starting on page 60.

Switching times, over travel
The table on the next page shows nominal brake response and recovery times and revolutions following power-off. The values were obtained in series testing.

Switching times, overtravel

Frame size BD ... B	Response time AC switch-off t_{11} ~ [ms]	DC switch-off t_{11} = [ms]	Recovery time t_2 [ms]	Overtravel[1] AC switch-off revolutions	DC switch-off revolutions
80M1-2	150	30	90	10	2
80M2-2	150	30	90	11	2
90S-2	250	45	110	15	2
90L-2	250	45	110	16	3
100L-2	300	50	150	19	3
112M-2	300	50	150	24	3
132S1-2	350	50	230	25	4
132S2-2	350	90	230	27	4
80M1-4	150	30	90	4	1
80M2-4	150	30	90	4	1
90S-4	250	45	110	5	1
90L-4	250	45	110	5	1
100L1-4	300	50	150	6	1
100L2-4	300	50	150	7	1
112M-4	300	50	170	11	1
132S-4	350	90	230	12	2
132M-4	350	90	230	13	2
80M1-6	150	30	90	3	1
80M2-6	150	30	90	3	1
90S-6	250	45	110	4	1
90L-6	250	45	110	4	1
100L-6	300	50	150	6	1
112M-6	300	50	150	7	1
132S-6	350	90	230	7	1
132M1-6	350	90	230	8	2
132M2-6	350	90	230	8	2
80M1-8	150	30	90	2	1
80M2-8	150	30	90	2	1
90S-8	250	45	110	3	1
90L-8	250	45	110	3	1
100L1-8	300	50	150	3	1
100L2-8	300	50	150	4	1
112M-8	300	50	150	6	1
132S-8	350	90	230	7	2
132M-8	350	90	230	7	2

Note:
1) The overtravel of the motors was measured without additional centrifugal masses.

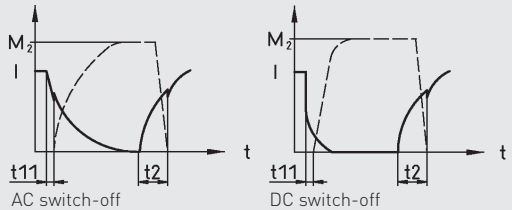
Brake torque, wear values

Through a combination of different coupling springs and brake disks, the brake torques can be adjusted (see table).

Brake torque[1], wear values

Frame size BD...B	Rated torque M_2 [Nm]	Wear $Qr_{0,1}$ [J]	$Qr_{ges.}$ [J]	Brake disk new thickness [mm]
80	8	$65x10^6$	$162x10^6$	6,9
	10[2]	$65x10^6$	$162x10^6$	6,9
	11,5	$13x10^6$	$13x10^6$	6,9
	16	$13x10^6$	$13x10^6$	6,9
90	16	$100x10^6$	$500x10^6$	8
	20[2]	$100x10^6$	$500x10^6$	8
	23	$20x10^6$	$20x10^6$	8
	32	$20x10^6$	$20x10^6$	8
100	32	$130x10^6$	$600x10^6$	10,4
	40	$130x10^6$	$600x10^6$	10,4
	46[2]	$30x10^6$	$45x10^6$	10,4
	64	$30x10^6$	$45x10^6$	10,4
112	32	$130x10^6$	$600x10^6$	10,4
	40	$130x10^6$	$600x10^6$	10,4
	46[2]	$30x10^6$	$45x10^6$	10,4
	64	$30x10^6$	$45x10^6$	10,4
132	60	$130x10^6$	$700x10^6$	11,15
	75	$130x10^6$	$700x10^6$	11,15
	86[2]	$65x10^6$	$130x10^6$	11,15
	100	$65x10^6$	$130x10^6$	11,15

Note:
1) Tolerance -20%/+40% at 1m/s friction speed
2) Standard torque



t11 = Response times
t2 = Recovery time

The possible friction work Qr can be calculated according to the following formulae. Please take the wear limits from the table.

$$Q_r = \frac{J \times n^2}{182,4} \times \frac{M_2}{M_v} \quad [J]$$

$$M_v = M_2 + (-)^* M_L \quad [Nm]$$

Q_r [J] = Existing friction work per braking operation
$Q_{r\,0,1}$ [J] = friction work per 0.1 mm of wear
$Q_{r\,ges.}$ [J] = Friction work up to brake disk change
J [kgm²] = Moment of inertia
N [rpm] = Rotation speed
M_2 [Nm] = Rated torque
M_V [Nm] = Retardation torque
M_L [Nm] = Load torque

* Sign in brackets (-) applies in case of load braking downwards

Beispiel:

	C	D	112	M	-	2	S
	1	2	3	4	5	6	7
	1 2 3	4 5 6	7 8 9	10 11	12	13 14 15 16 17 16	17 20 21 ...

Typenschlüssel

Pos.	Feature	Code	Meaning
1	Explosion protection (optional)	d	flameproof enclosure
		B	B-series
		C	**C**-series
2	Explosion protection	C	flameproof IIC
		CE	flameproof IIC + increased safety
		B	flameproof IIB
		e (E)	increased safety
		n	non sparking Version
		S	Du**s**t ignition proof
3	Type of motor	AR	terminal box
		D	Three-phase motor designed in Nordenham
		DP	Three-phase motor designed in Tamel, **P**oland
		E	single-phase motor (a.c.)
		F	on-site converter housing
		IGL	Integrating converter-housing
		M	external brake type ATB
4	Frame size	- 63	shaft height 63
		- 71	etc.
		...	
5	Core length	K, S	small
		M	medium
		L	long
		L1	etc.
		...	
–	Bindestrich		
6	No. of poles	4	4-pole
		8/4	8/4-pole
		12/8/4	12/8/4-pole
		...	
7	Design	**The order must be maintained as follows:**	
		X	increased output
		Y	high efficiency to Australien MEPS standard
		Y2	high efficiency IE2 to EN 60034-30
		Y2.7	max. 7-fold starting current
		Y3	high efficiency IE3 to EN 60034-30
		Y3.1	high efficiency IE3 to EN 60034-30 (version .1)
		Y4P	preminum efficiency IE4 to EN 60034-30 (permanent magnet motor)
		YT	high efficiency to Australien HEPS standard
		H	high-voltage motor
		A	axial-cooling, unidirectional fan, noise class 2
		AR	axial-cooling reduced, noise class 3
		W	water-cooled, noise class 4
		B	brake integrated
		D	terminal box - flameproof enclosure Ex d
		E	terminal box - increased safety Ex e
		F	external fan
		G	encoder
		I	integrated inverter
		IT	IT-protective scheme
		K	direct cable connection
		0	without fan
		R	speed pulse generator (built in)
		S	special brake type Kendrion (built-on non drive end)
		SM	special brake type ATB (built-on drive end)
		SMN	special brake type ATB (built-on non drive end)
		SV	special brake type VIS (built-on drive end)
		SVN	special brake type VIS (built-on non drive end)
		U	peak voltage stability 2.15 kV
		0, 1, 2, ...	design no.

If it isn't specified, single-positions could be dropped.