Elektroniksysteme GmbH
Development and production of electronical systems

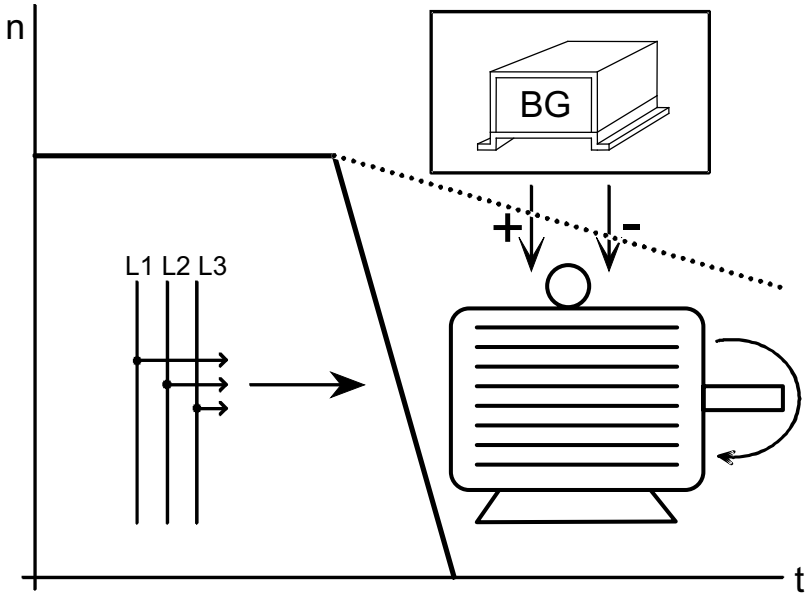
Eichelreuth 13
83224 Grassau

Phone: +49 8641 598360
Fax: +49 8641 598364

E-Mail: info@rs-steiner.com
Internet: http://www.rs-steiner.com

Start-up instructions

Electronic braking unit
Type: BG...



Contents

1. General information

All asynchronous motors (squirrel cage or slip ring motors) can be slowed down during coasting with the electronic braking unit type BG.

How it works:

A brake rotary current flowing through the motor coil is used to brake the motor. This brake rotary current creates a static magnetic field in the stator. The rotor attempts to follow this field. The rotary current brake, together with the characteristics of the used motor, effect brake moment dependent of the rpm, that results in the motor coming to a standstill.

Due to this rotary current braking, no current is produced in the rotor at standstill. As a result, the motor has no holding moment.

The brake equipment type BG is equipped with one-way rectifier and recovery diode. For the rectifying, a thristor with phase angle regulation is used. In connection with the recovery diode and motor inductivity, a constant-pulse DC current is produced. The process is defined by a precisely determined time graduation. The brake time is progressively adjustable from 1 to 45 seconds. These characteristics guarantee reliability and applicability.

Braking torque, braking current, braking time:

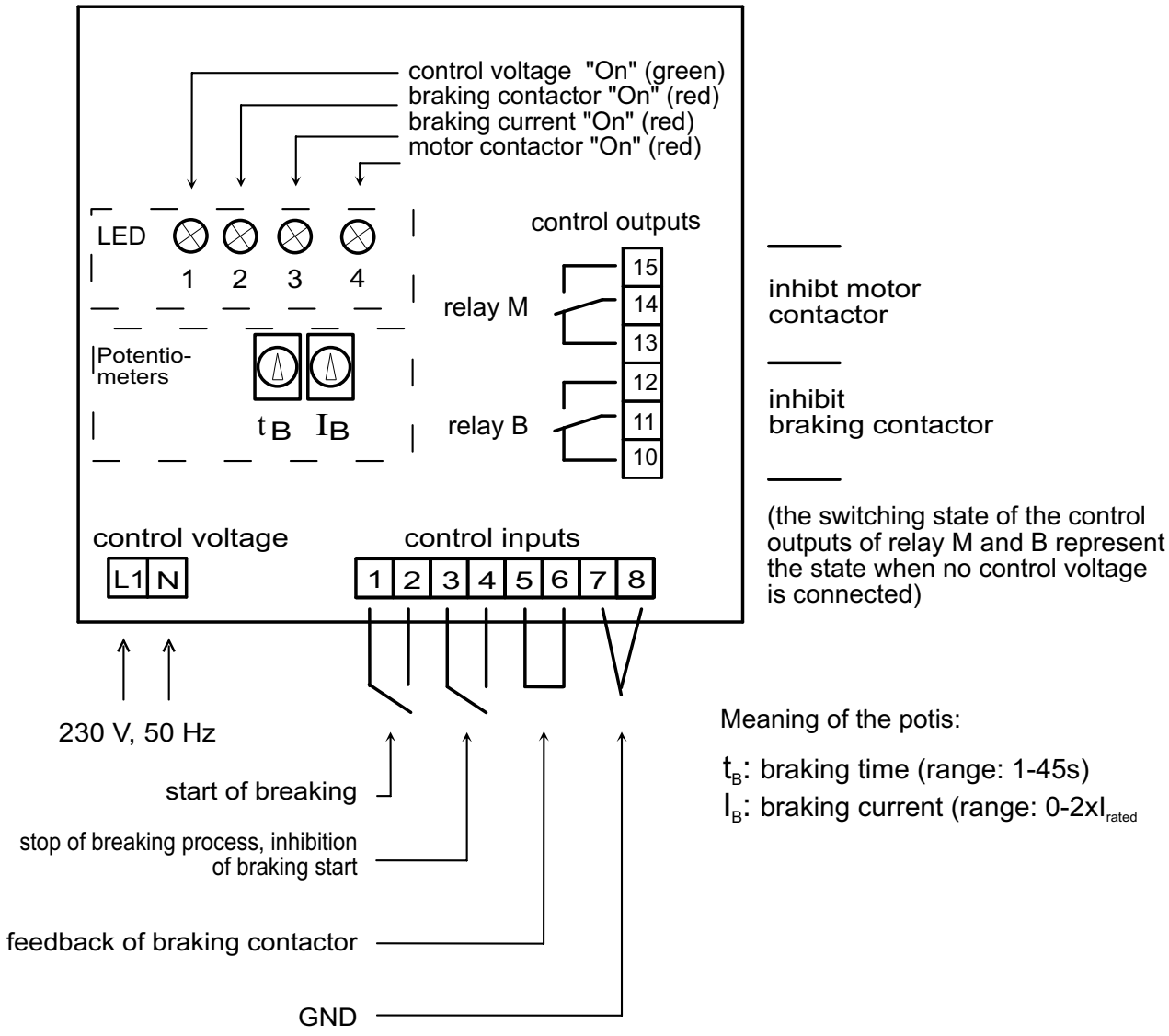
In order to compute braking torque, current and time precisely a lot of pieces of information concerning the given motor is absolutely required. However, these values can‘t be obtained that easily in general.

The following rule of thumb has proved to be rather correct:

$$I_B = 2 \times I_N$$

- I_B = brake current (A)
- I_N = rated current (A)

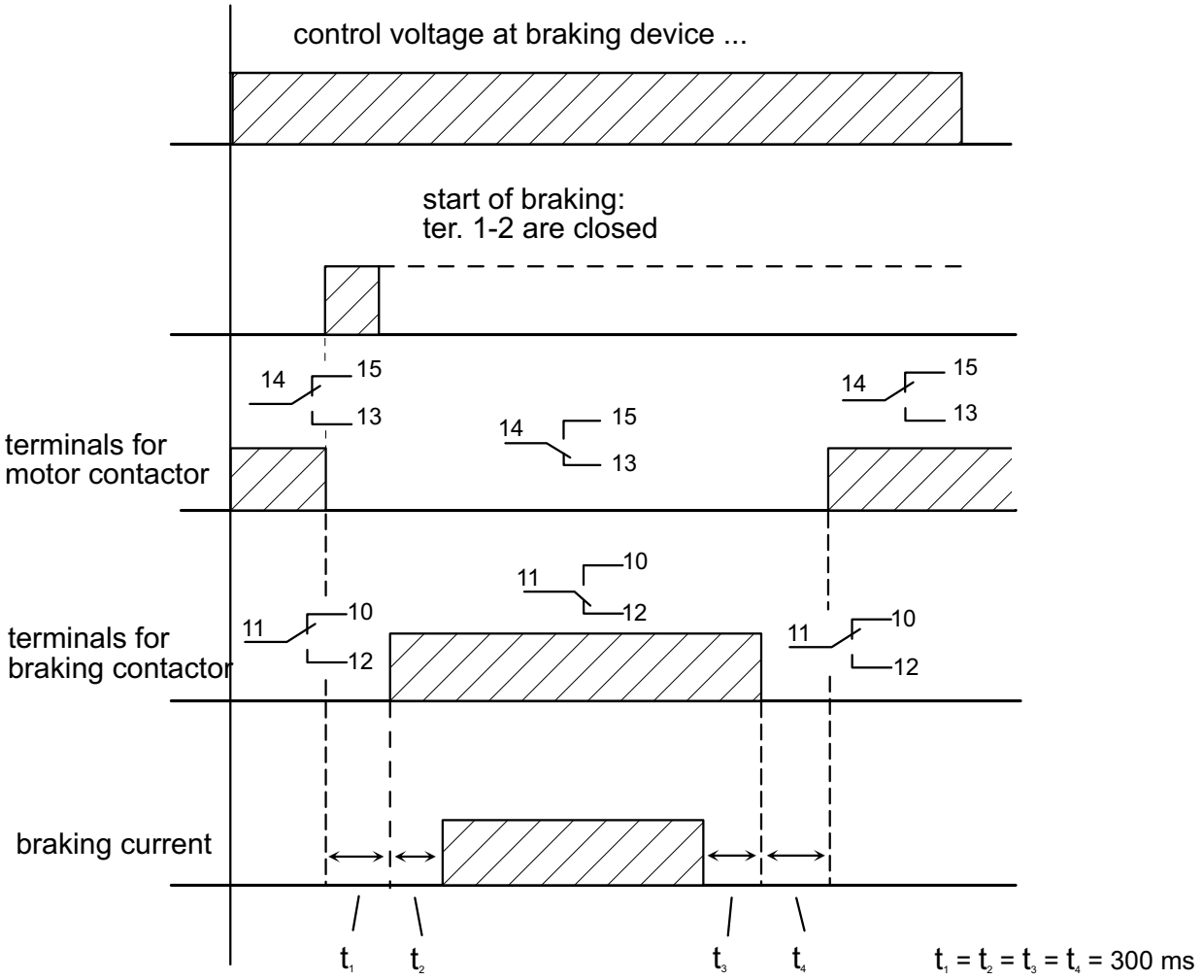
2. Control panel



Control inputs:	
1, 2	start of braking (closed for a short time or permanently)
3, 4	stop of braking process, inhibition of braking start (independent of time, e.g. with speed control)
5, 6	feedback of braking contactor
7, 8	GND

PLC input:	
2, 4, 6	inputs for PLC controlling (+24V DC)
7, 8	GND

Chronological description of a braking process

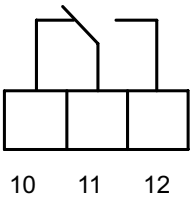
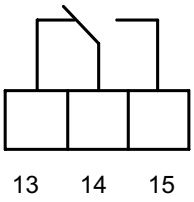
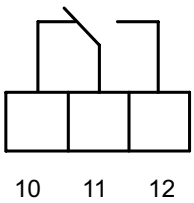
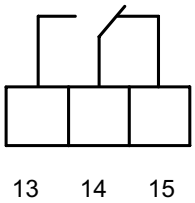
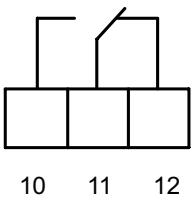
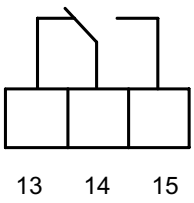
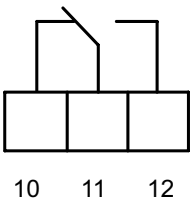
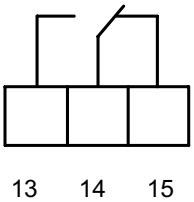


The different switching states are interrupted by safety intervals when the brake current is switched on and off. With the help of those intervals a current-free switching of contactors is ensured. As a matter of fact erroneous switchings (e.g. by defective contactors) can therefore be avoided.

Sequence of functions:

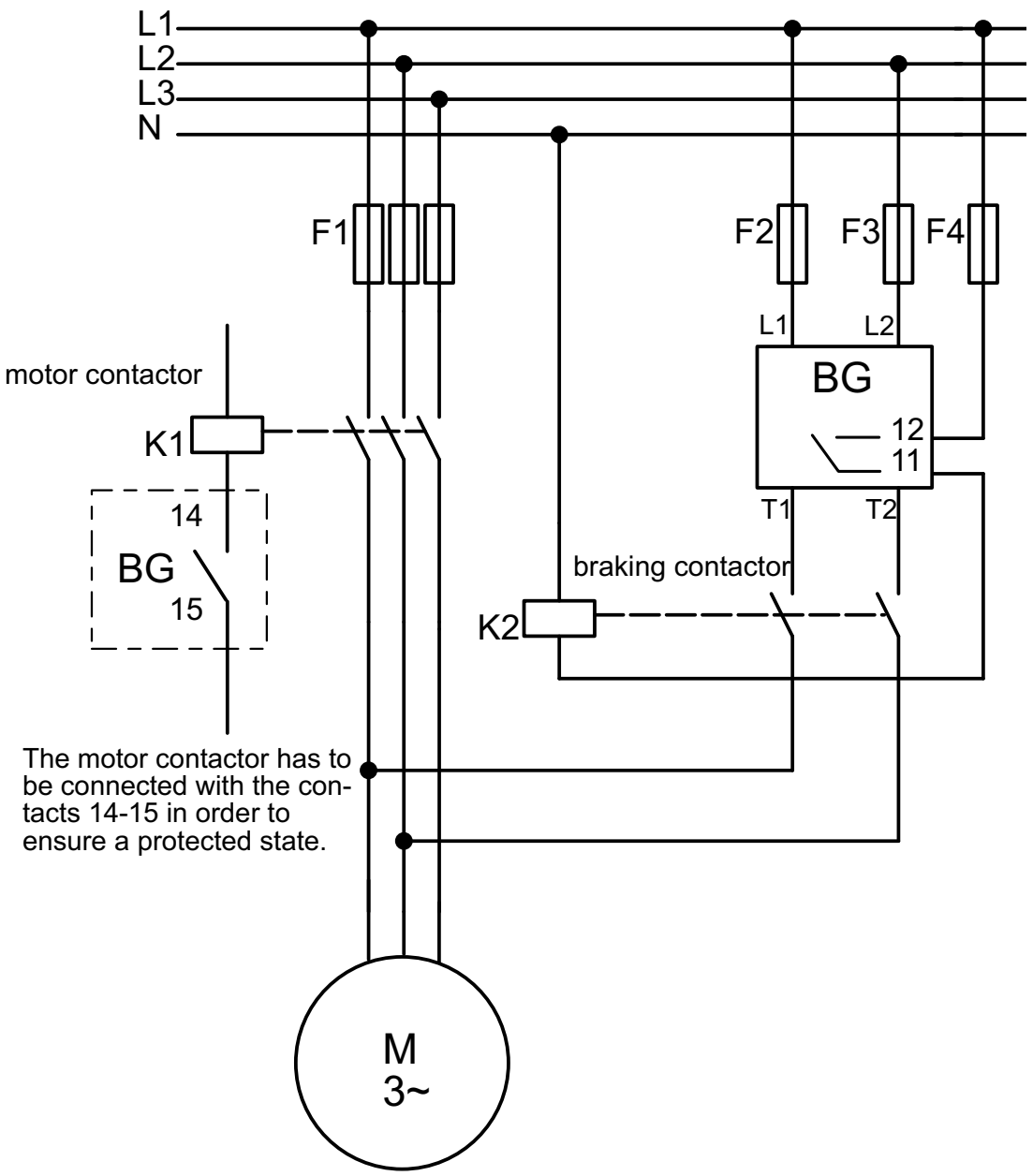
After connection of the operating voltage (230V AC / 50-60Hz) the contacts 14-15 are closed. This switching state indicates “ready for operation”.The electric circuit for the motor contactor should be connected with contacts 14 -15 in order to get a fundamental bolting device protection. After the end of the safety interval the contacts 11-10 switch on the brake contactor.

Switching status of the relays:

Step	Description	Switching state of relay B	Switching state of relay M
1	device without control voltage		
2	device on ready status (relay M and LED 4 are on)		
3	position during the state of braking (at the same time LED 2 and 3 light)		
4	position after state of braking (cf. step 2)		

3. Wiring

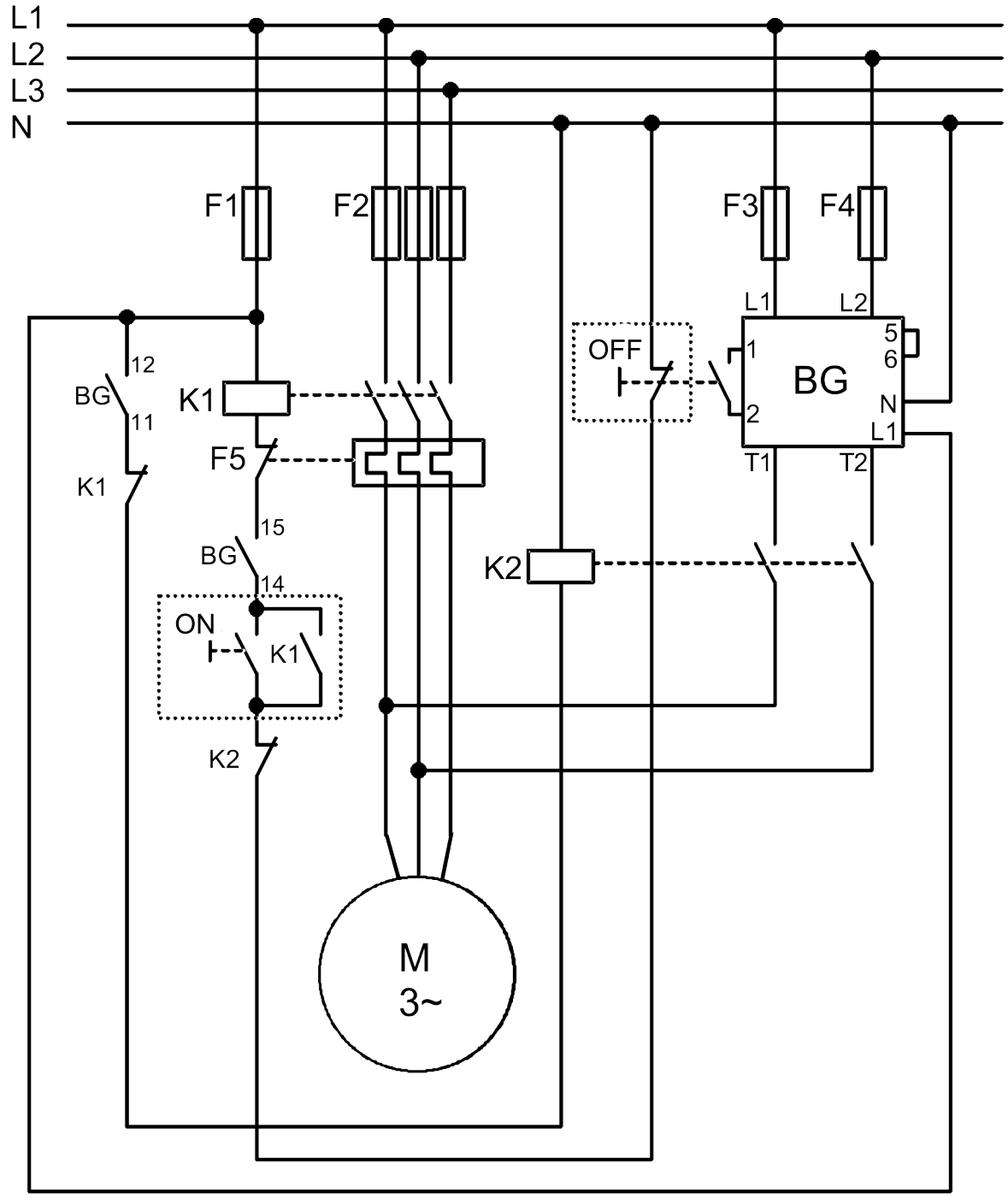
Standard:



Please consider the following issues:

- When activating the braking unit the motor has to be seperated from mains connection (i.e. K1 is open).
- In order to activate the braking unit BG terminals 1-2 have to be closed for a short time. However, they can also be closed permanently. After the specified brake time has passed by a new activation is necessary.

Wiring with the integration of the motor control:

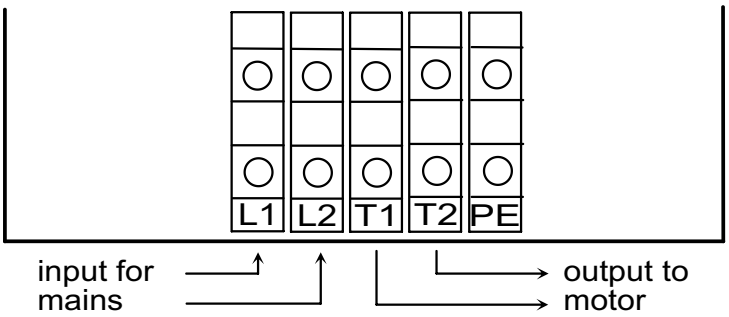


- **ON:** switch on the motor
- **OFF:** switch off the motor by activating the braking unit BG

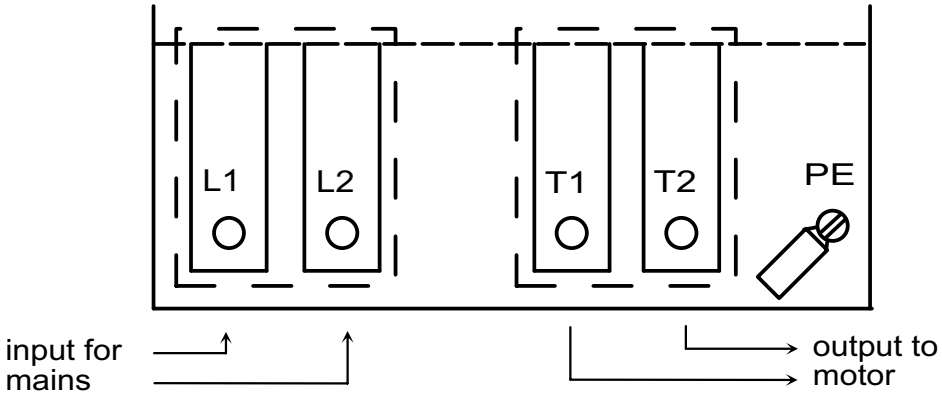
Apart from the internal bolting device in the BG an additional one is available with the help of the auxiliary terminals 11-12 and 14-15.

4. Power unit of the BG

Connection of BG 20 and BG 35 (frame size A):



Connection of BG 60 and higher (frame sizes B, C, D):



5. Operation

To begin with, all electrical connections are to be made according to the accompanying wiring diagrams: L1, L2, T1 (U), T2 (V). The electronic braking units must be connected to the power supply according to the VDE specifications so that they can be disconnected from the mains using a suitable switching means (i. e. master switch, contactor, protective power switch).

Wiring:

The mains power supply and motor power supply, as well as the control wiring, are to be in separate ducts or conduits. In order to avoid malfunctions it is advisable to install the electronic signal wiring separate from the power supply and/or protective control wiring and either to twist the feed and return signal lines or to use shielded control lines.

Fuses:

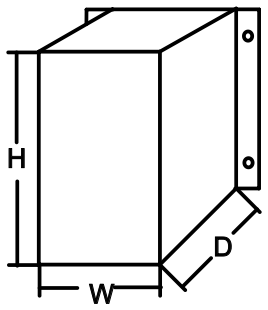
The mains fuse protection is dependent on the recommended or employed power-transmission cross-section, and must be carried out in accordance with DIN 57100, Part 430/VDE 0100 and part 430/6.81.

6. Survey of the individual types

Type	Rec. motor power [kW]	Max. braking current [A]	Rec. semi-conductor fuses [A]	Mains fuse [A]	Rec. cross-section [mm²]	Weight [kg]	Frame size	Dimensions WxHxD [mm]
BG 20	5,5	18	25	20	2,5	1,1	A	140x200x115
BG 35	11	32	40	40	6	1,2	A	140x200x115
BG 60	15	60	50	40	6	2,3	B	260x160x170
BG 100	22	100	80	50	10	2,5	B	260x160x170
BG 150	30	150	125	80	16	2,9	B	260x160x170
BG 220	55	220	160	100	35	3,4	B	260x160x170
BG 300	75	300	250	160	70	3,4	B	260x160x170
BG 400	100	400	400	250	120	6,9	C	360x200x200
BG 500	140	500	500	300	185	6,9	C	360x200x200
BG 750	200	750	630	400	2x120	7,4	C	360x200x200
BG 1000	250	1000	850	400	2x150	7,6	C	360x200x200
BG 1500	315	1450	1000	630	2x240	9,2	D	360x400x240
BG 2000	400	2000	1200	800	2x300	10,5	D	360x400x240

Errors and technical modifications excepted (Date: 2015/02)

Nominal values of the devices according to DIN VDE0660, part 500 und part 102).



7. Technical data

Rated voltage	110-400V AC (+-10%) (Option: 500V AC, 690V AC)
Control voltage	230V AC (+-15%) (other voltages available upon request)
Frequency:	45-65Hz (self-synchronizing)
Terminals:	L1, L2 or L1, N
Operating temperature:	-20-50°C
Storage temperature:	-40-70°C
Relative Humidity:	95% (not condensing)
Max. altitude:	1500m
Potential free contacts:	250V AC/4A respectively 24V/3A
Monitoring of fault:	temperature exceedance of heat sink
Installation:	vertical, electrical connections below
Control inputs:	floating activation or 24V PLC level
Number of brakings:	30/h with max. current
Regulations:	EMC Directive 2014/30/EU LVD 2014/35/EU
Kind of protection:	IEC 536 (1976)
IP- protection:	IP20 (EN60529)

Errors and technical modifications excepted (Date: 2016/05)

Extra equipment:

- additional fans for higher ambient temperatures or a greater number of brakings
- display for indicating the braking current
- integrated braking contactor
- model IP54
- electronic current limitation (constant current)
- external setting of braking time, current and torque
- controlling rpm with the help of a linear load independent braking when the motor stops
- braking of several motors at the same time