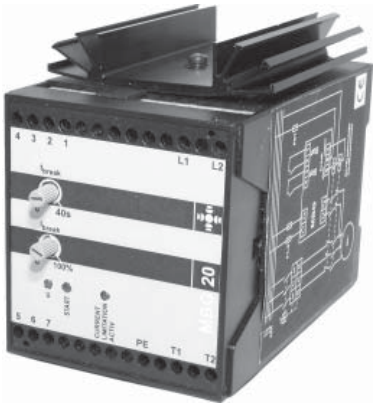
DC motor brake - Compact design

- Electronic motor brake
- No additional braking accessory required
- Intergrated brake contactor
- Brake contactor switches after de-energization
- Integrated motor contactor control
- Industrial design



Technical data

1. Functions

Electronic motor brake for asynchronous motors without additional mechanical accessory.
Integrated brake contactor
Activation of motor contactor integrated
Connection of external brake contactor possible
Brake contactor switches after de-energization

2. Time ranges

	Adjustment range	
Braking time::		
MBG 10	0s	30s
MBG 20 and 35	0s	40s

3. Indicators

LED U:	indication of supply voltage
Green LED (Start) ON:	indication brake activated
Yellow LED ON:	current limitation active (MBG20 and MBG35 only)

4. Mechanical design

Self-extinguishing plastic housing, IP rating IP40
Mounted on DIN-Rail TS 35 according to EN 50022
Mounting position: heatsink on top
Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
Tightening torque: max. 0.5Nm
Terminal capacity control circuit:
- 1 x 0.5 to 2.5mm² with/without multicore cable end
- 1 x 4mm² without multicore cable end
- 2 x 0.5 to 1.5mm² with/without multicore cable end
- 2 x 2.5mm² flexible without multicore cable end

Terminal capacity of power circuit depending on power classes

5. Control circuit

Supply voltage:	internally generated
Tolerance:	-
Rated frequency:	-
Duration of operation:	100%

6. Control input 1-2

Function:	activation of brake
Loadable:	No
Line length:	max.10m, twisted pair
Control pulse length:	min. 0.2s

7. Control input 3-4

Function:	lock of power circuit
Loadable:	No
Line length:	max.10m, twisted pair
Control pulse length:	min. 0.2s

8. Control contact 5-6

1 potential free normally open contact

Function:	connection of additional brake contactor (e.g. for extended contactor interlock)
Switching capacity:	750VA (3A / 250V AC)
Fusing:	3A

9. Control contact 6-7

1 potential free normally closed contact

Function:	connection of motor contactor
Switching capacity:	750VA (3A / 250V AC)
Fusing:	3A

10. Power circuit

MBG10:

Supply voltage:	1~ 230V	terminals L1-N
Tolerance:	±10%	
Rated frequency:	48 to 63Hz	
Current limitation:	No	
Braking cycles:	30/hour (5s and braking current 10A) 10/hour (t_{max} and braking current 10A)	
Surge voltage:	2.5kV (according to IEC 60947-1 and DINVDE 0110 Teil1)	
Insulation voltage:	345/600V (according to IEC60947-1, 4.3.1.2)	

MBG20 and MBG35:

Supply voltage:	2~ 400V	terminals L1-L2
Tolerance:	±10%	
Rated frequency:	48 to 63Hz	
Current limitation I_{max}:	20A	MBG20
	35A	MBG35
Braking cycles:	30/hour (5s and I_{max}) 10/hour (t_{max} and I_{max})	
Surge voltage:	2.5kV (according to IEC 60947-1 and DINVDE 0110 Teil1)	
Insulation voltage:	345/600V (according to IEC60947-1, 4.3.1.2)	

11. Power classes

(see table on next page)

12. Ambient conditions

Ambient temperature:	-25 to +55°C (according toIEC 68-1)
Storage temperature:	-25 to +70°C
Transport temperature:	-25 to +70°C
Relative humidity:	5% to 95% not condensing
Pollution degree:	2 (according toIEC 664-1)

13. Accessories

Sealable front cover protecting unit against unknowingly or unauthorised modification of adjusted parameters.

Technical data

ref. to 9. Power classes

Type	recommended for drives up to (kW)	max. rated braking current (A)	curent limitation (A)	weight (g)
MBG 10	2.2	10	No	290
MBG 20	5.5	20	yes, 20	510
MBG 35	11.0	35	yes, 35	680

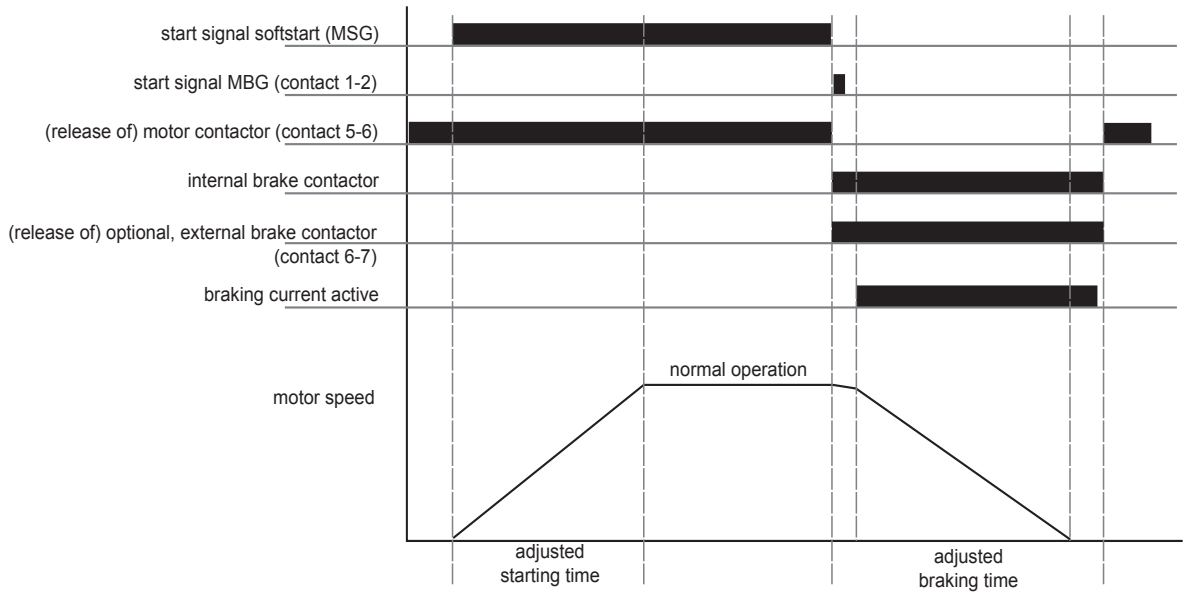
All values refer to standardised motors according to IEC 72 and UNE 20106. The actually needed braking current refers to the application and has to be ascertained by the customer. Therefore it might be necessary to choose a larger motor brake than mentioned in the table above.

Functions

DC-braking of a motor
Closing the start contact activates the motor brake. In doing this the motor contactor is opened and the brake contactor is closed. After a short delay a DC-current (rectified via a transistor using phase angle control) is sent through the motor coil. This current can be adjusted via the t_{brake} regulator.
The maximum value of this current is limited by the serial connection of motor coil, supply voltage and the thyristor. Please note that the resistance of the thyristor can be almost reduced to 0Ω (equivalent to 100% I_{brake}).
The current in the motor coil induces a magnetic field within the stator. The rotor attempts to follow this field and is thus slowed down by the speed-dependent braking torque created within the time adjusted at the t_{brake} regulator. After the interval t_{brake} has expired first the braking current is switched off and then the brake contactor is de-energised. This course of actions avoids the loss of contact material of the contactor caused by an arc-over.
After deactivating the brake contactor the motor contactor is enabled again.
It is a fact that the information necessary to exactly calculate the braking torque or braking current I_{brake} and the braking time t_{brake} is hardly known for the drive system and for all occurring moments of inertia. The necessary braking torque should therefore be recorded on-site during a test run. Please note that the coil resistance continuously changes until the motor has reached theoperating temperature.

As a result of this way of braking no current is induced inside the rotor when the motor has stopped. The motor therefore has no holding torque.

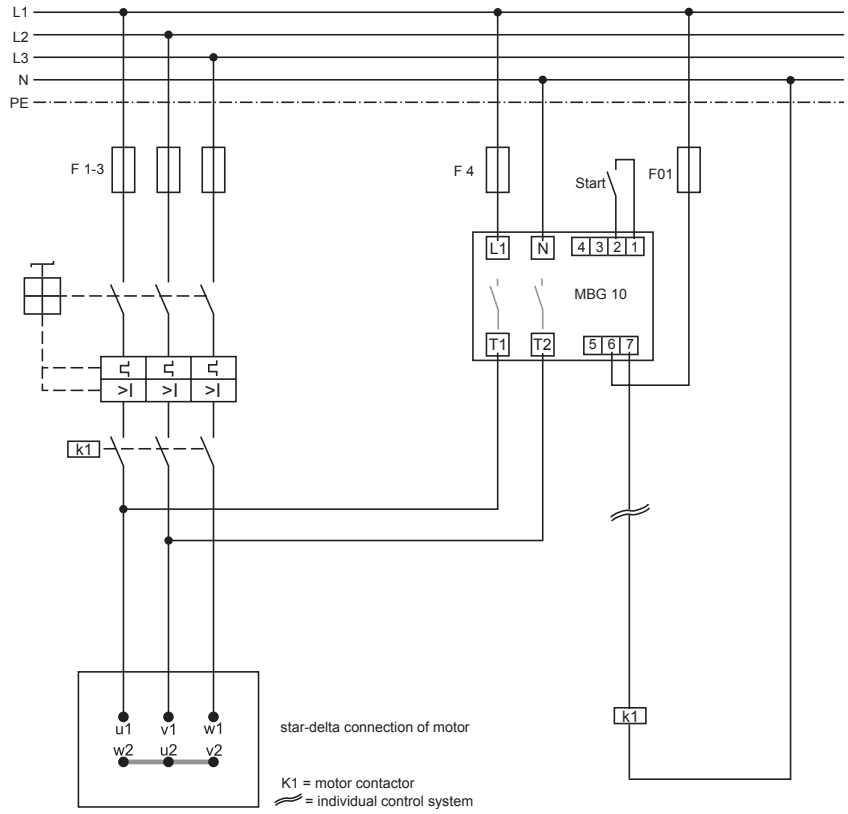
Current limitation
Because the motor brake MBG10 has no emergency shutoff or safety limitations it can happen that the device is damaged by high braking currents. Therefore it is necessary that during a first test run the braking current is increased slowly and does not exceed the maximum braking current of 10A. The braking current has to be monitored with a True-RMS measuring device duringthis test run. For both types the MBG20 and MBG35 the device is protected against high braking currents. If the actual current exceeds the nominal current the LED "Current limitation active" is illuminated and the current is limited to the nominal current.



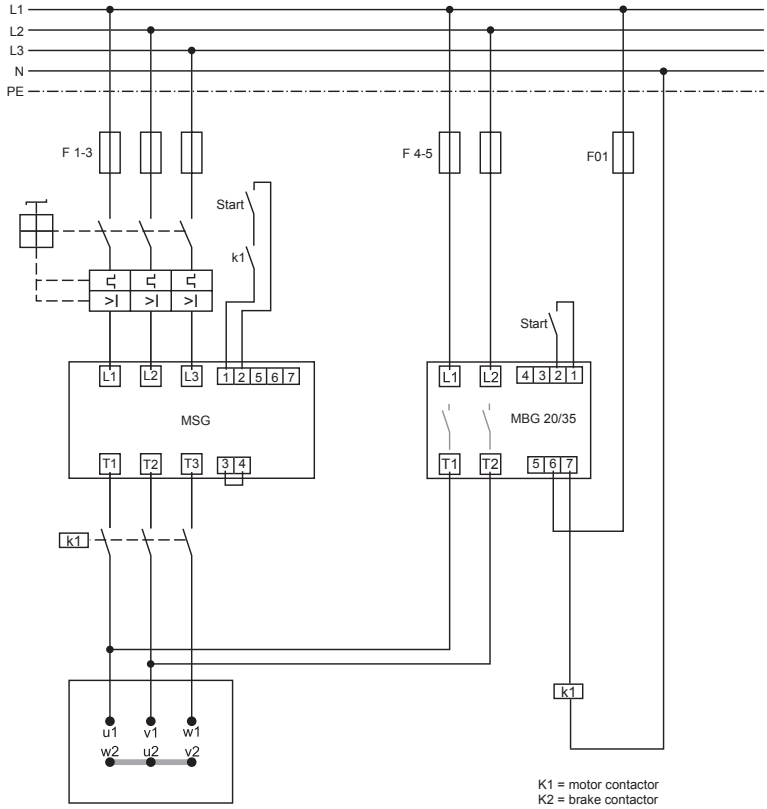
Timing sequence for one working cycle including softstart (e.g. with MSG) and braking with MBG

Connections

Example of standard wiring for MBG10

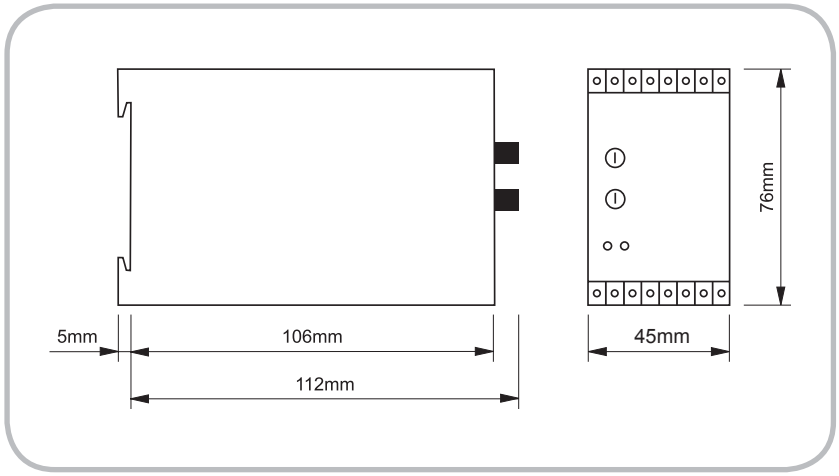


Extended wiring for MBG20 and softstarter (e.g. MSG)

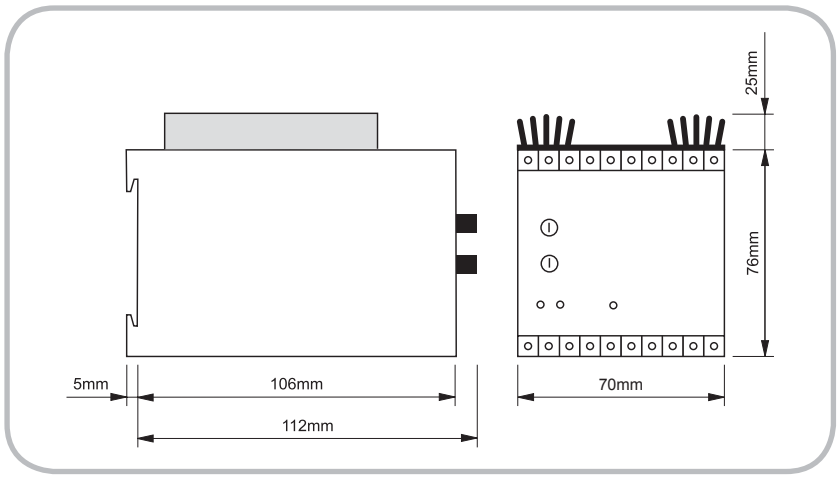


Dimensions

MBG10



MBG20



MBG35