

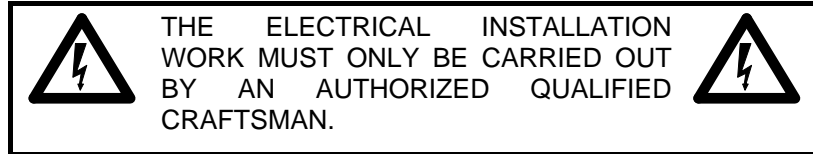
JB

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1 ELECTRICAL SAFETY



THE JB BRAKE UNIT CARRIES DANGEROUS VOLTAGE WHEN IT IS CONNECTED TO THE MAINS.

THE JB BRAKE UNIT MUST BE EARTHED BY AN EARTH CONDUCTOR CONNECTED TO THE **PE** EARTH TERMINAL OF THE HEAT SINK.

DANGEROUS VOLTAGE MAY ALSO BE PRESENT EVEN WHEN THE JB BRAKE UNIT IS SWITCHED OFF.

BEFORE STARTING WORK, CHECK THAT THE JB BRAKE UNIT IS ISOLATED BY CHECKING THE CONNECTING TERMINALS WITH A VOLTMETER.

Warning symbols

For your own safety, please pay particular attention to the instructions marked with the following symbols:



Danger! High voltage



General warning

2 NOTES ON EMC LEGISLATION

The CE mark refers to Directive 72/73/EEC (93/68) on low voltage and to [German] legislation on electromagnetic compatibility (EEC §5.2 9/92).

JB brake units are designed in accordance with standard IEC 947-4-2 for category B public mains and are within the published electromagnetic compatibility (EMC) limits.

The limits for emissions under the European standard do not preclude interference with receivers within 10 m.

Installation of JB brake units must be carried out by staff trained in EMC.

The JB brake unit meets the requirements of the following standards or equivalent documents:

1. IEC 947-4-2
2. EN 50081-2
3. EN 50082-2

JB brake units may be used only in "industry" without further measures.

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4 PREFACE

The information contained in this manual refers exclusively to JB brake units.

It is essential that you read this manual before installation and commissioning.

The limits specified in the technical data must be observed when using the brake unit.

The guarantee for manufacturers' drives/machinery does not cover defects caused by misuse or incorrect use of the brake unit.

The manual is divided into individual sections in accordance with the table of contents.

Section 1 "Electrical Safety" and Section 2 "Notes on EMC legislation" must be read before working with the brake unit.

It is essential that the user familiarises himself with the manual before using the drive/equipment or before carrying out adjustment work specific to the operations.

Please contact the manufacturer directly if you have any questions about the JB brake unit.

The manufacturer reserves the right to make product changes without prior notice.

5 PURPOSE

JB brake units are intended to brake manufacturers' unbalanced motors or three-phase motors used in conjunction with vibrating machineries.

In conjunction with an existing motor control system, or one to be installed separately, the JB brake unit is used to shorten the coasting period of the machine after it is switched off. Generally, machines with one or two drives can be braked. More than two drives are possible in special cases.

By virtue of its design, vibrating machinery can generate very high, undesirable vibrations if motor coasting is unbraked, when passing the transient frequency. When a JB brake unit is used, the motors can be braked to a standstill quickly and effectively, so that the undesirable frequencies are either strongly attenuated, or do not occur at all.

6 OPERATING PRINCIPLE

The JB brake unit operates fully electronically. A thyristor in a phase controlled system generates an adjustable direct current in conjunction with the electronic control logic. The control logic ensures that the direct current does not reach the stator, through a braking contactor, until the motor has been switched off. Said direct current creates a static magnetic field, which counters the rotary movement of the rotor. Automatic detection of standstill ends the braking process.

Stator windings are connected in series through the braking contactor, if more than one motor is to be braked (see connection diagram in the appendix).

Operating sequence:

(One motor application; on the basis of the connection diagram in the appendix):

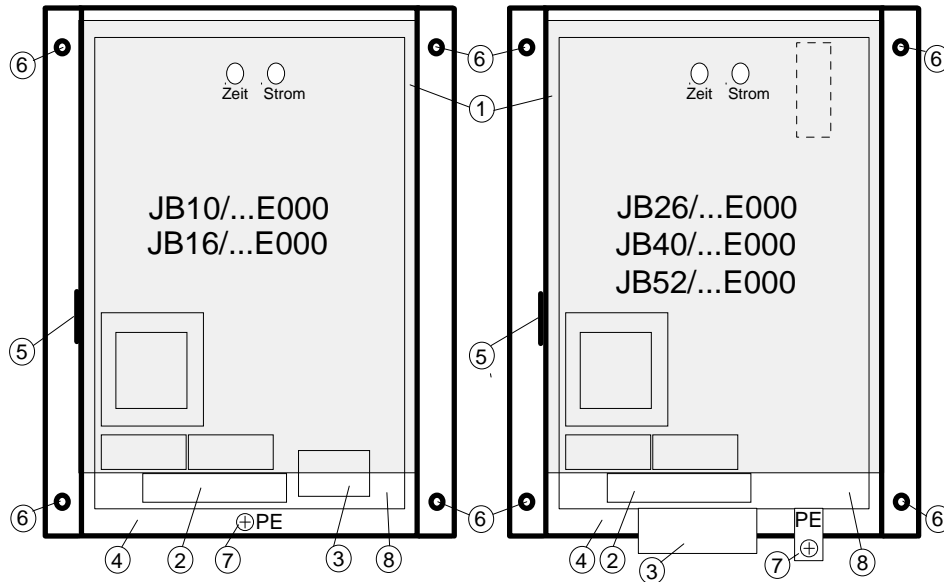
If the brake unit is live from the mains, the LED "P" (mains) will light. Contact 3/4 is broken and n2/n4 made. When the motor starts, contactor K2 is locked. The brake unit receives the "motor on" signal from the motor contactor through connection 6/7. LED "M" (motor on) thus also lights. Contact n2/n4 (= restart lockout) breaks simultaneously.

When the motor stops, contactor K2 drops out. The contact at 6/7 breaks. LED "M" goes out. After a short delay, contact 3/4 closes and LED "B" (braking on) lights. Contactor K1 picks up and the braking current flows through the motor winding, initiating braking. LED "S" (standstill display) lights during the braking process until the motor comes to a standstill. The braking process will be ended, unless the braking time has been extended with trimming potentiometer "T". Contact 3/4 breaks, contactor K1 drops out and LED "B" goes out. Contact n2/n4 is then made again. Only now is it possible to restart the motor.

7 INSTALLATION

7.1 CONSTRUCTION

The major components of JB brake units are as follows:

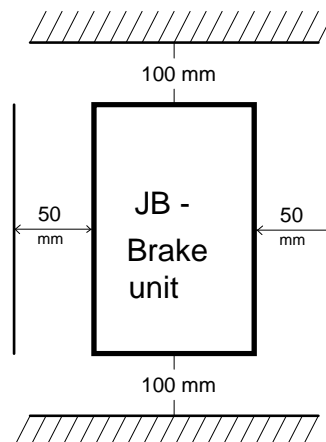


1. Perspex cover
2. 9-pole connecting terminal X1 for control signals
3. 3-pole connecting terminal X2 for power signals
4. Heatsink with thyristor
5. Rating plate
6. Mounting holes
7. PE connection screw
8. Control board

7.2 NOTES ON INSTALLATION

Cooling:

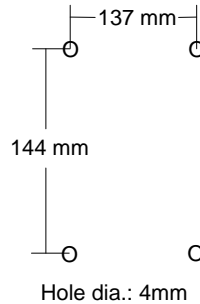
The JB brake unit is cooled by natural convection. In order to guarantee an adequate air flow, the equipment must be mounted upright and the minimum distances shown in the adjacent illustration observed. The cooling air must be as clean as possible and free of aggressive substances. Should the cooling air contain dust, the cooled areas must be cleaned regularly.



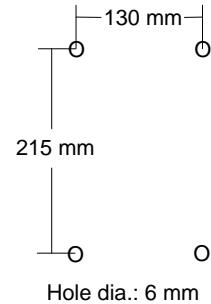
Mounting:

The JB brake unit can be fastened to a mounting plate by four screws.

Drilling plan: JB 10 and JB 16

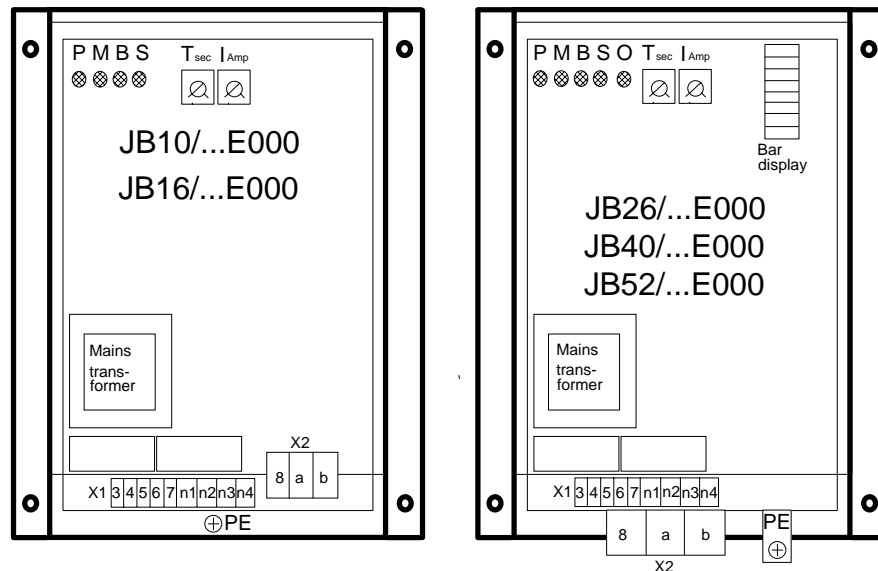


Drilling plan: JB 26 and JB 52



8 NOTES ON CONNECTION AND USE

8.1 POSITION OF THE ADJ. ELEMENTS and COMPONENTS



8.2 CONNECTIONS

- 8, a : Mains connection
- a, b : Brake current output
- 3, 4 : potential free make contact for actuating the brake contactor
- 6, 7 : Input "motor on". Connection for the potential free auxiliary contact of the motor contactor
- n2, n4 : Potential free break contact for actuating the motor contactor
- n1 : "Standstill detector" input
- PE : Protective earth conductor connection

The other terminals must not be connected.

Cross-section of connectable cable:

- 9-pole terminal strip X1: max. 1.5 mm²
- 3-pole terminal strip X2: max. 4 mm² for JB10..., JB16..
max. 35 mm² for JB26..., JB40..., JB52..

Please refer to the connection diagram in the appendix for electrical connections, or to the connection sheet packed with the unit.

8.3 ADJUSTMENT ELEMENTS



IMPORTANT NOTE:

Unauthorised resetting of the adjustment elements can cause malfunctions in the brake unit.

Trimming potentiometers:

Two trimming potentiometers are mounted on the control board.

Operation of the trimming potentiometers:

- I : Setting the brake current I_{Br}
Extreme anti-clockwise setting: minimum brake current
Extreme clockwise setting: maximum brake current
- T : Setting the subsequent braking time
Extreme anti-clockwise setting: no subsequent braking time
Extreme clockwise setting: approximately 20 seconds
subsequent braking time

8.4 MOTOR CONTROL SYSTEM AND BRAKE UNIT

The JB brake unit must be used in conjunction with an existing or newly built motor control system. Suitable connection diagrams for machines with one or two motors may be found in the appendix.

The brake unit requires only a two-phase mains connection and must be fused, as stated in the appendix. The cables to terminals X2.8/a/b must have dimensions appropriate to the brake unit fuse.

The requisite braking contactor must have the same capacity as the motor contactor. During switching the braking contactor on and off no current passes through the main contacts.



In the case of machines with two or more drives, each motor must be connected to the mains through its own motor contactor. Failure to observe this requirement will result in short-circuiting of the brake unit.



Do not open the brake contactor during braking! Do not operate the brake contactor by hand! Failure to observe this requirement can destroy the brake contactor and the brake unit.

Terminal X1.n1 is the measurement input for detecting standstill. The cable must be protected from the auxiliary switch of the brake contactor as shown in the connection diagram.

Local requirements for earthing and cables must be observed.

8.5 OVERHEATING PROTECTION (Only JB26/... JB40/... JB52/...)

These units have additional overheating protection. Should the heat sink become too hot due to over-frequent braking, LED "O" will flash. Switching on the motor will then be prevented, as contact n2/n4 will remain broken. LED "O" will go out when sufficient cooling has taken place. The motor can then be restarted.

9 COMMISSIONING

9.1 CHECKS BEFORE SWITCHING ON THE MAINS VOLTAGE

The JB brake unit is supplied unadjusted ex works, i.e. the trimming potentiometers T (time) and I (current) are set to their minimum (fully anti-clockwise). The unit must first be set to the relevant vibrating plant, as described below.

Please check the following points before switching on the mains voltage:

1. The brake unit must be used in conjunction with the relevant vibrating machine.
2. The details on the brake unit rating plate must match those on the motor. The nominal motor current (or its aggregate, in the case of several motors) must be $\leq I_N$ [A] (Entry under "A" on the rating plate).
3. The mains voltage must be within the voltage range specified on the rating plate (entry under "V" on the rating plate).
4. The mains must be connected to terminals a/8.
5. The brake unit must be earthed through the PE terminal.
6. Only potential free "make" contacts may be connected to terminals 6/7.
7. The output cable of the brake unit must be connected to terminals a/b. The motor(s) must be connected correctly.
8. No short circuits or short circuits to earth may be present.
9. Measures must be taken to ensure compatibility with EMC legislation (see Section 2).
10. The braking contactor K1 and the motor contactor K2 (and K3) must be electrically interlocked! See connection diagram in the appendix.

9.2 INTERLOCKING TEST WITHOUT BRAKING CURRENT

- Remove the motor fuses or switch off the motor protective switch.
- Turn trimming potentiometer "T" to its maximum (clockwise).
- Turn trimming potentiometer "I" to its minimum (anti-clockwise).

The mains voltage may now be switched on. LED "P" must light.



A dangerously high voltage will now be present at the JB brake unit.



The braking and motor contactors must never be active at the same time!

- Operate motor contactor K2 (or K3) by hand: LED "M" must light.
- Release motor contactor K2 (or K3): LED "M" will go out. LED "B" must light and braking contactor K1 must pick up.
- Operate contactor K2 (or K3) by hand while LED "B" is alight. Braking contactor K1 must drop out.

- Release contactor K2 (or K3). K1 will pick up again. After the braking time (approximately 20 seconds) has elapsed, LED "B" will go out and braking contactor K1 will drop out.
- This ends the interlocking test.
- Switch off the mains voltage.

9.3 SETTING THE BRAKING CURRENT I_{Br}

It must be ensured that the braking and motor contactors cannot be active at the same time (see 9.2, Interlocking Test).

A clamp-ammeter with t.r.m.s. response capability is required to set the braking current. Connect this meter to the line which is connected to terminal X2.b of the braking unit.

With JB26/..., JB40/..., and JB52/... units the adjustment can be achieved by means of the bar display (see below).

- The mains voltage must be switched off.
- Insert the motor fuses or switch on the motor protective switch(es).
- Set trimming potentiometer "T" to its ¼ (9 o'clock) position by turning it anti-clockwise.
- Set trimming potentiometer "I" to its minimum (fully anti-clockwise).
- Switch on the mains power.



A dangerously high voltage will now be present at the JB brake unit.

- Start the motor and let it warm up. LEDs "P" and "M" must light.
- Switch off the motor. LED "M" will go out. LED "B" will light. The braking contactor will pick up. Braking has commenced.
- Increase the braking current from zero until the motor is distinctly braked, by turning trimming potentiometer "I" slowly in a clockwise direction. Ensure that the maximum braking current of the brake unit is not exceeded by observing the readings on the ammeter.

(With JB26/..., JB40/..., JB52/... units:

The braking current can be read off the bar display on the control board. 1 bar = 10% of the maximum braking current I_{Br}).

Note: A good braking effect can usually be obtained at the ½ (12 o'clock) position of trimming potentiometer "I".

- LED "S" (standstill monitoring) will light while the braking current is flowing and the motor is still turning. LED "S" will go out at approximately 10% of the nominal speed. The braking process ends as soon as LED "S" goes out and any subsequent braking time set with trimming potentiometer "T" (up to 20 seconds) has elapsed. LED "B" will go out and the braking contactor will drop out.

Adjustment of the braking current is now completed.

10 MAINTENANCE

The JB brake unit is largely maintenance free.

However, under very dusty conditions, regular cleaning is essential.

11 FAULT FINDING

Please make a note of the following details before reporting a defect to our service department:

- type of the braking unit (see rating plate)
- braking unit number (see rating plate)
- defects established

12 APPENDIX

12.1 TECHNICAL DATA

Nominal mains voltage	230, 400, 500 from JB26/... also 690 V
Mains voltage ranges	with 230V: 200 - 240 V with 400V: 380 - 430 V with 500V: 440 - 550 V with 690V: 600 - 700 V
Nominal mains frequency	50/60 Hz

Allocation table:

JB type / Motor nominal current/ Braking current / Fuse

JB type	max. (Aggregate)- Motor nom.current I_N [A]	max. braking current I_{Br} [A]	Braking unit fuse F1/F2 [A, time lag] *)
JB 10/...	10	36	16
JB 16/...	16	60	25
JB 26/...	26	100	50
JB 40/...	40	160	63
JB 52/...	52	200	80

*) Choose fuse max. $1.5 \times I_N$ (aggregate)-motor nom. current

Braking time	adjusted automatically by stand- still monitoring at terminal X1.n1. Subsequent braking time of 0 - 20 sec. by trimming pot. T
Braking contactor	same capacity as motor contac- tor
On duty time	10 %
Indicating lights	4 x LED (JB10/..., JB16/...); 5 x LED and bar display with JB26/..., JB40/..., JB52/...
Contact loading	at terminals X1.3/4 and n2/n4: 250V AC / 5A 30V DC / 5A

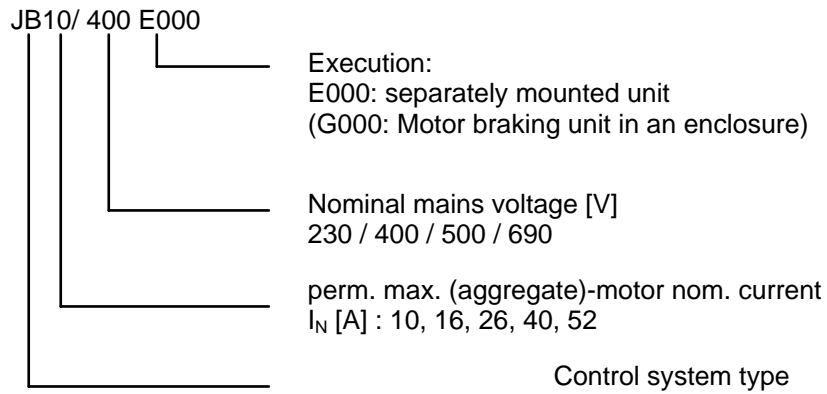
OTHER DATA

Tests	IEC 947-4-2, Categorie B; EN 50081-2 EN 50082-2
Type of cooling	air self-cooling
Max. installation altitude	1000 m (if over 1000m: please consult manufacturer)
Perm. moisture stress	DIN 40040 F
Degree of protection (DIN 40050)	IP 20

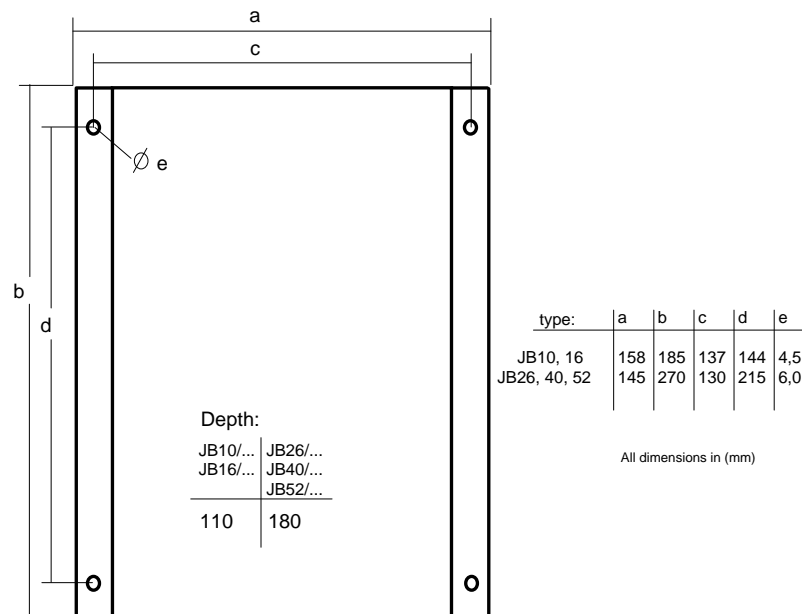
Operating temperature	0°C to + 40°C
Storage and transport temp.	- 10°C to + 85°C
Installation position	vertical
Weight	1.3 kg (JB10., JB16.) 7,5 kg (JB26., JB40., JB52.)
Dimensions	158 x 185 x 110 mm for JB10..., JB16... 145 x 270 x 180 mm for JB26..., JB40..., JB52..

12.2 TYPE KEY

The designation of the JB brake unit on the rating plate is made up as follows:



12.3 DIMENSIONS



12.4 LINE REACTOR - Allocation / Dimensions / Weight

Only with the brake unit Type JB16/500E000 a line reactor must be inserted into the inlet to clamp „8”. This line reactor is delivered loose.

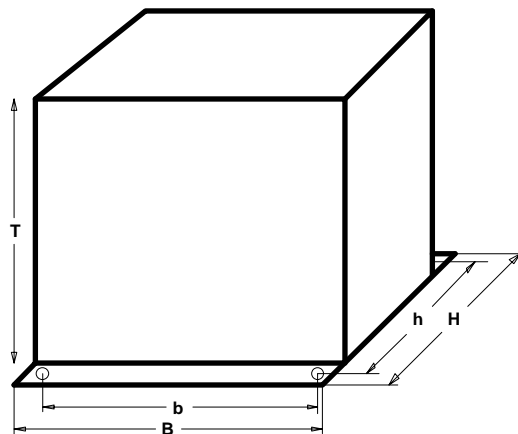
With the types JB26, 40, 52 the line reactor is already built in the unit.

HINWEIS: Brake unit typ JB10/... (all Mains voltage) and JB16/... (230V und 400V mains voltage) do not need a serial line reactor.

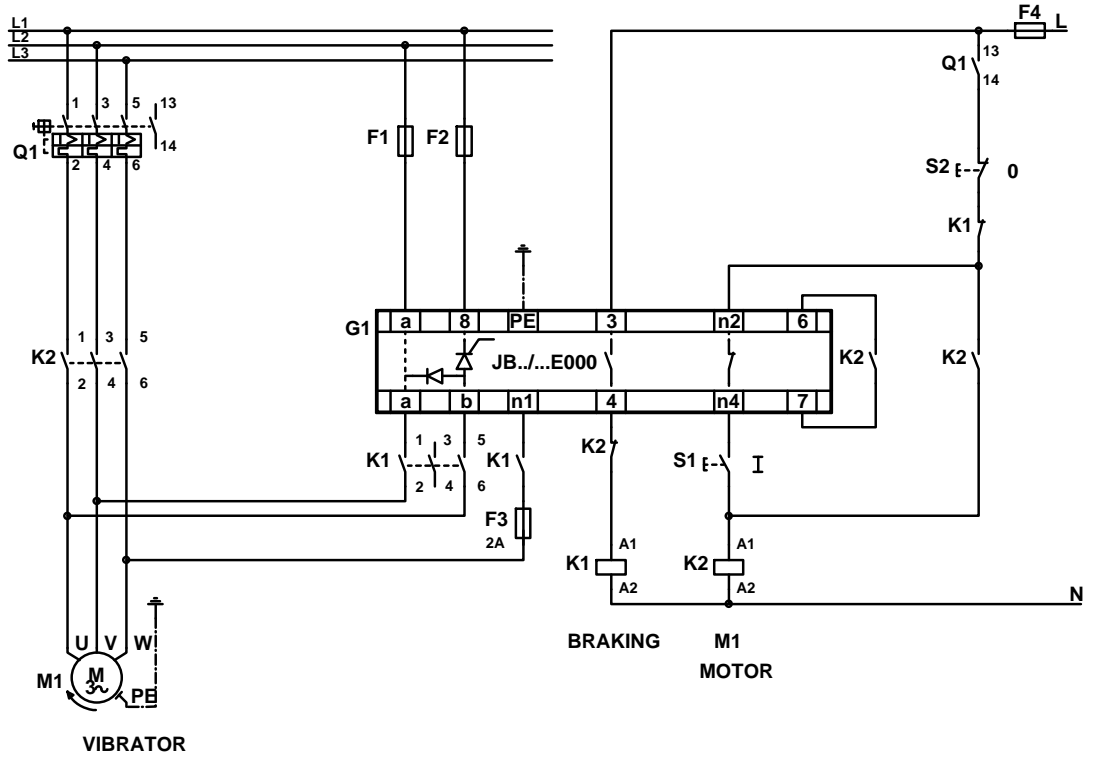
Zuordnungstabelle: JB-Typ / Netzdrossel

JB-Type	Type	Dimensions (B x H x T) [mm]	Netzdrossel		
			Drilling mass (b x h) [mm]	Bore- hole \varnothing [mm]	Weight [kg]
JB16/500..	KS 0,075	90x75x110	47x57	4	1,5

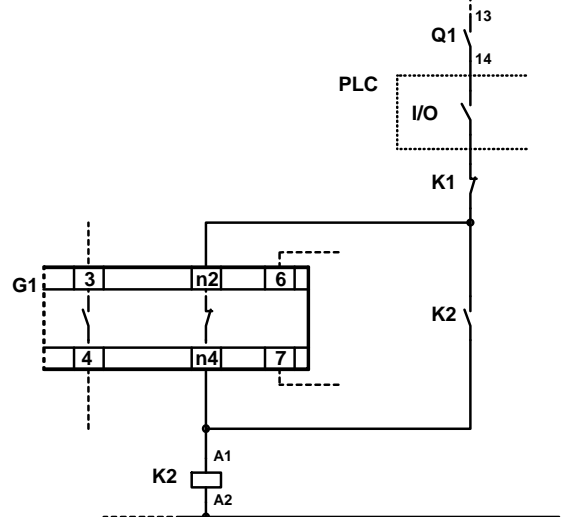
Dimensional drawing:
Line reactor



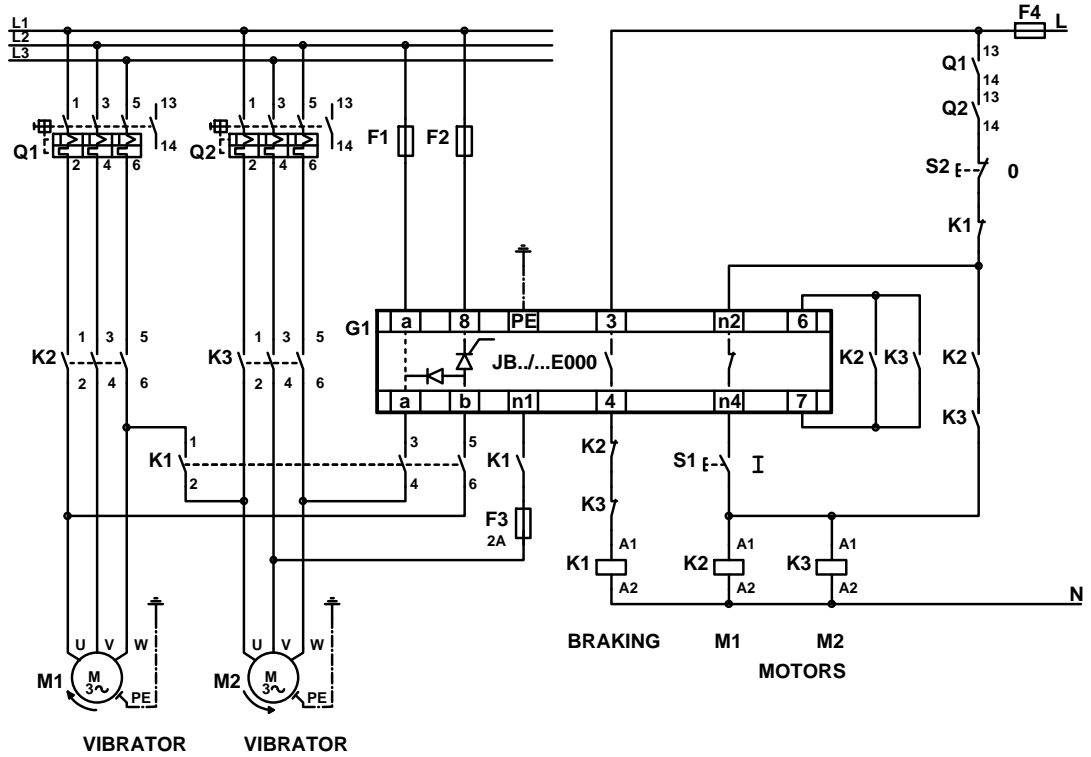
12.5 CONNECTION DIAGRAMM (example for 1 motor)



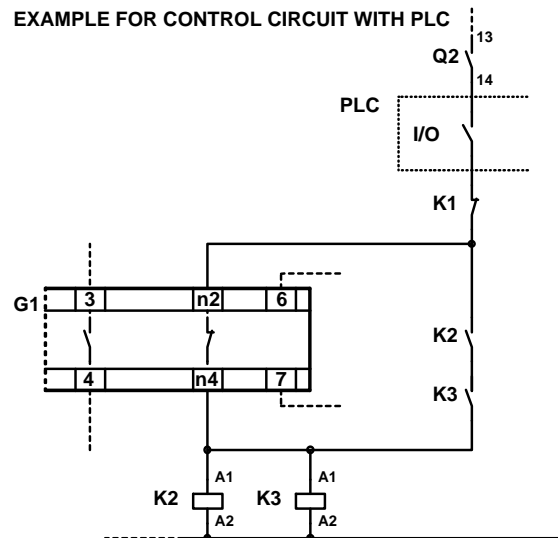
EXAMPLE FOR CONTROL CIRCUIT WITH PLC



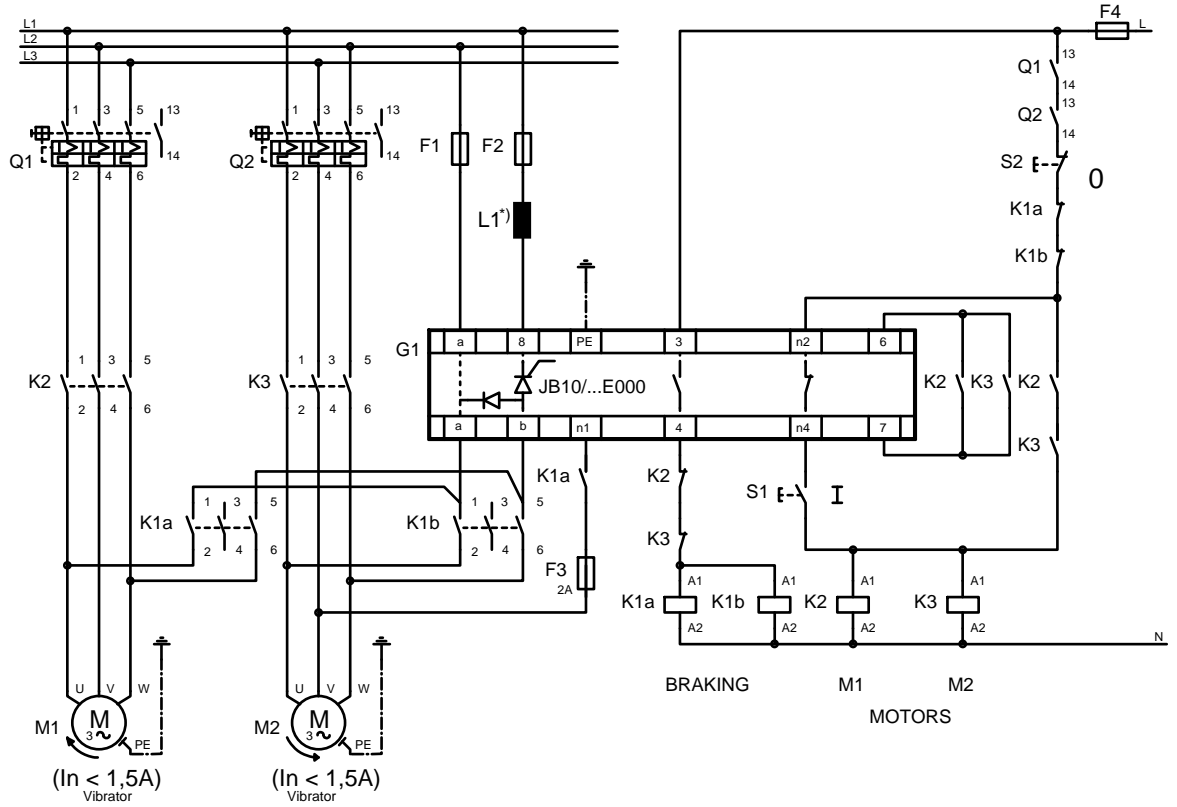
12.6 CONNECTION DIAGRAMM (example for 2 motors)



EXAMPLE FOR CONTROL CIRCUIT WITH PLC



12.7 CONNECTION DIAGRAM JB10/...E000 (example 2 motors each with $I_n < 1,5A$)



Direction of rotation:
Please note the operating manual!

Example for control circuit with PLC

*) L1: See Chapter 12.4

