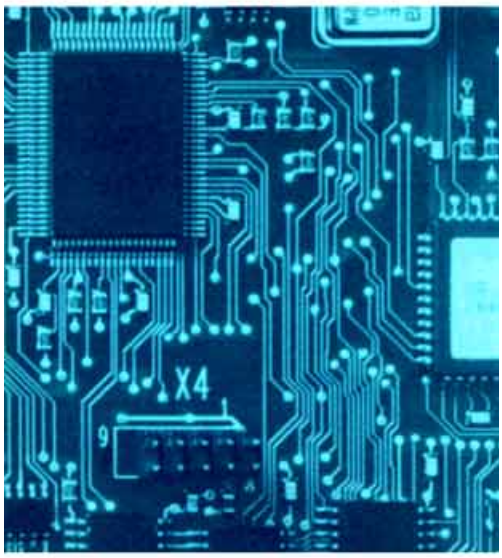

Drive Engineering – Practical Implementation

Vol. 4

SEW Disc Brakes

Technical Data
Project Planning Notes
Suggested Circuits

Edition 11/98

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SEW EURODRIVE

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Important instructions for safe and trouble-free operation

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(→ *page XX* = Appropriate sample circuits can be found on page XX)

Reference to other SEW publications

Reference to SEW Software

1 Introduction

1.1 Introduction

This brochure is designed for project planning engineers who intend to use SEW AC squirrel-cage motors, servo motors, DC brake motors or geared brake motors. It provides information about the basic principles, special characteristics, effective use and electrical connection of SEW brake motors, and provides sample circuits.

The authors made a conscious decision not to deal with safety conditions which differ from case to case and how they can be implemented in the motor control. These matters are exclusively the concern of the project planners and do not differ in any way from the requirements of other brake motors.

Furthermore, the working principle and characteristic data of SEW disc brakes are explained in the SEW catalogs dealing with AC geared motors, brake motors, geared servo motors, variable speed geared motors and DC geared motors. Detailed information about basic dimensioning principles can be found in the SEW publication “Drive Engineering – Practical Implementation Vol. 1”. This also contains all important information relating to drive calculations. The SEW project planning software “PRODRIVE” offers you support in matters relating to project planning.

Please refer to the relevant operating instructions for information about startup, operation and maintenance.

1.2 Braking tasks and how to solve them

The SEW brake system, just like the entire product range, has a modular structure. A characteristic solution is offered for all normally encountered tasks through the appropriate combination of mechanical and electrical parts of the brake system. The table below provides an overview of the typical properties and refers to useful notes in the relevant section.

Tasks / application conditions	See section
Positioning	1.3.2 2.2.2
Hoist operation	1.3.2 2.2.2
High starting frequency	1.3.2 2.2.2
Long brake service life	1.3.2 1.3.5 2.2.1
Low noise level	1.3.2
High ambient temperature / restricted ventilation	1.3.2 2.2.3
Avoiding a brake connecting harness	2.2.2.2
Low and fluctuating ambient temperatures	2.2.4
Brake control system in the switch cabinet	2.2.5
Brake motors with plug connection	2.2.6 2.2.7 2.2.8
Electronically controlled drives with mechanical brake	3 4 5
Explosion protected brake motor	6
Variable speed drives with brake	7
Centrifugal coupling with brake	8

Table 1: Properties / types of the SEW brake system and their descriptions

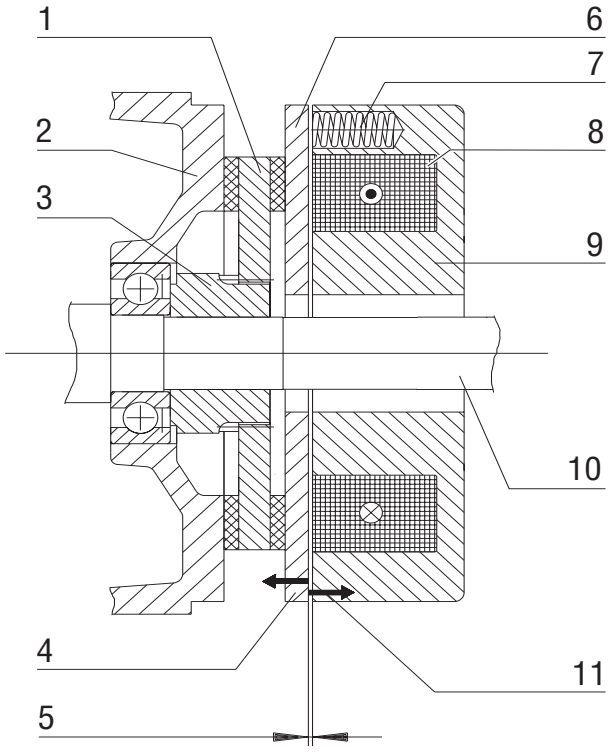
1.3 Principles of the SEW brake

1.3.1 Principles of project planning

The SEW brake is a DC-operated electromagnetic disc brake with a DC coil which is opened electrically and braked using spring force. The system satisfies fundamental safety requirements: the brake is applied if the power fails.

The principal parts of the brake system are the brake coil itself (accelerator coil + coil section = holding coil), consisting of the brake coil body **(9)** with an encapsulated winding and a tap **(8)**, the moving pressure plate **(6)**, the brake springs **(7)**, the brake disc **(1)** and the brake bearing end shield **(2)**.

The significant feature of SEW brakes is their very short length: the brake bearing end shield is a part of both the motor and the brake. The integrated construction of the SEW brake motor permits particularly compact and sturdy solutions.



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1	Brake disc	5	Working air gap	9	Brake coil body
2	Brake bearing end shield	6	Pressure plate	10	Motor shaft
3	Carrier	7	Brake spring	11	Electromagnetic force
4	Spring force	8	Brake coil		

Fig. 1: Block diagram of the brake

1.3.2 Basic function

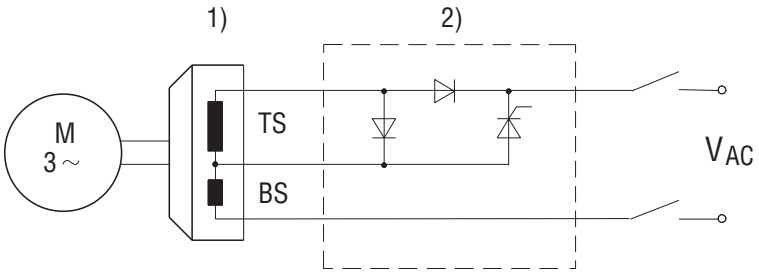
In contrast to other DC-operated disc brakes, SEW brakes operate with a two coil system. The pressure plate is forced against the brake disc by the brake springs when the electromagnet is de-energized. The motor is braked. The number and type of the brake springs determine the braking torque.

When the brake coil is connected to the appropriate DC voltage, the spring force **(4)** is overcome by magnetic force **(11)**, thereby bringing the pressure plate into contact with the brake coil body. The brake disc moves clear and the rotor can turn.

Particularly short response times

When switching on:

A special brake control system ensures that only the accelerator coil is switched on first followed by the holding coil (entire coil). The powerful impulse magnetization (high acceleration current) of the accelerator coil produces an especially short response time, particularly in large brakes, without however reaching the saturation limit *(→ Fig. 2)*. The brake disc moves clear very swiftly and the motor starts up with hardly any braking losses.



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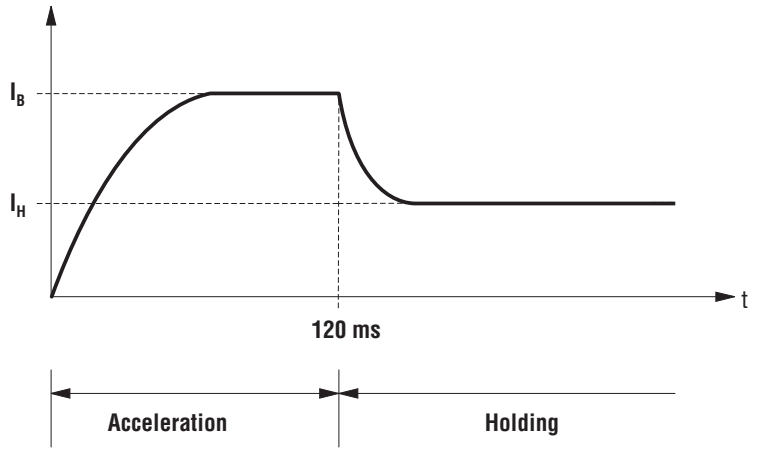

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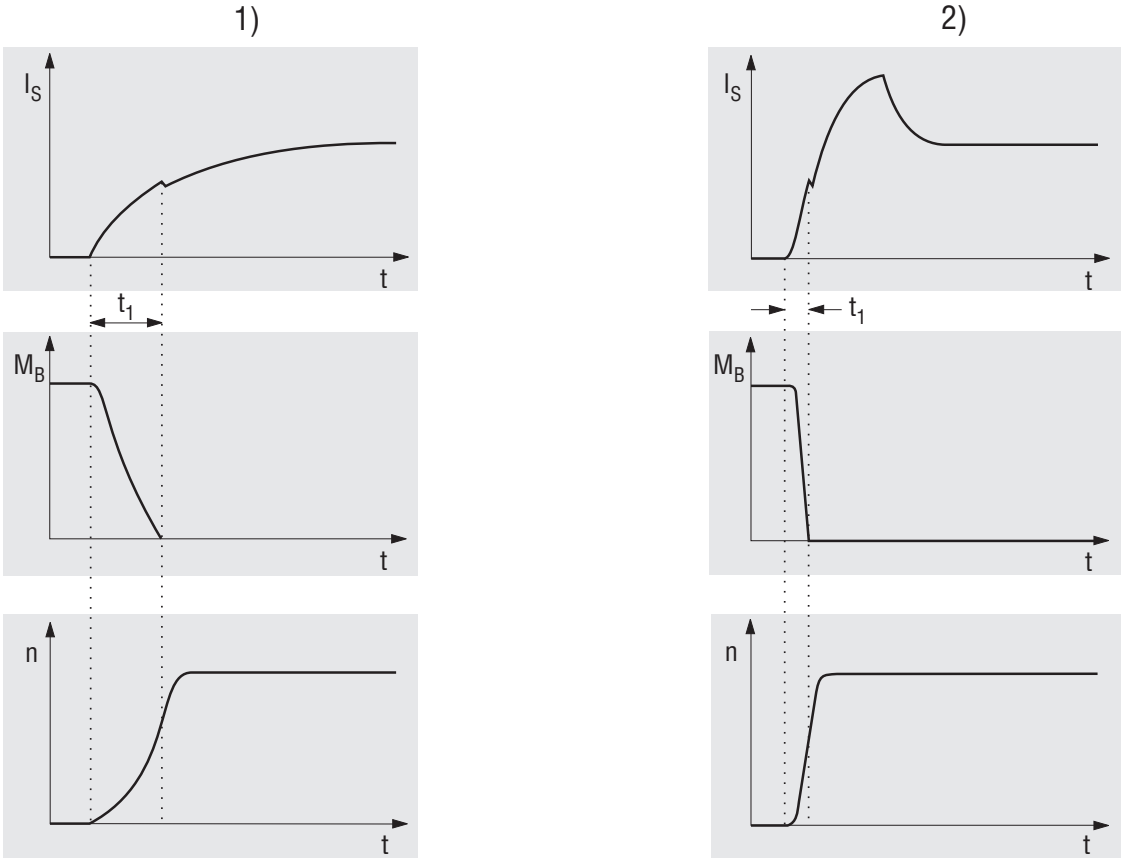
BS	Accelerator coil	1)	Brake	I_B	Acceleration current
TS	Coil section	2)	Brake control system	I_H	Holding current
BS + TS = Holding coil					

Fig. 2: Functional principles of the two coil brake

The particularly rapid response times of SEW brakes add up to a shorter motor startup time, minimum startup heating and therefore less energy consumption and negligible brake wear during startup *(→ Fig. 3)*. These factors pay dividends to the user in the form of an extremely high starting frequency and long brake service life.

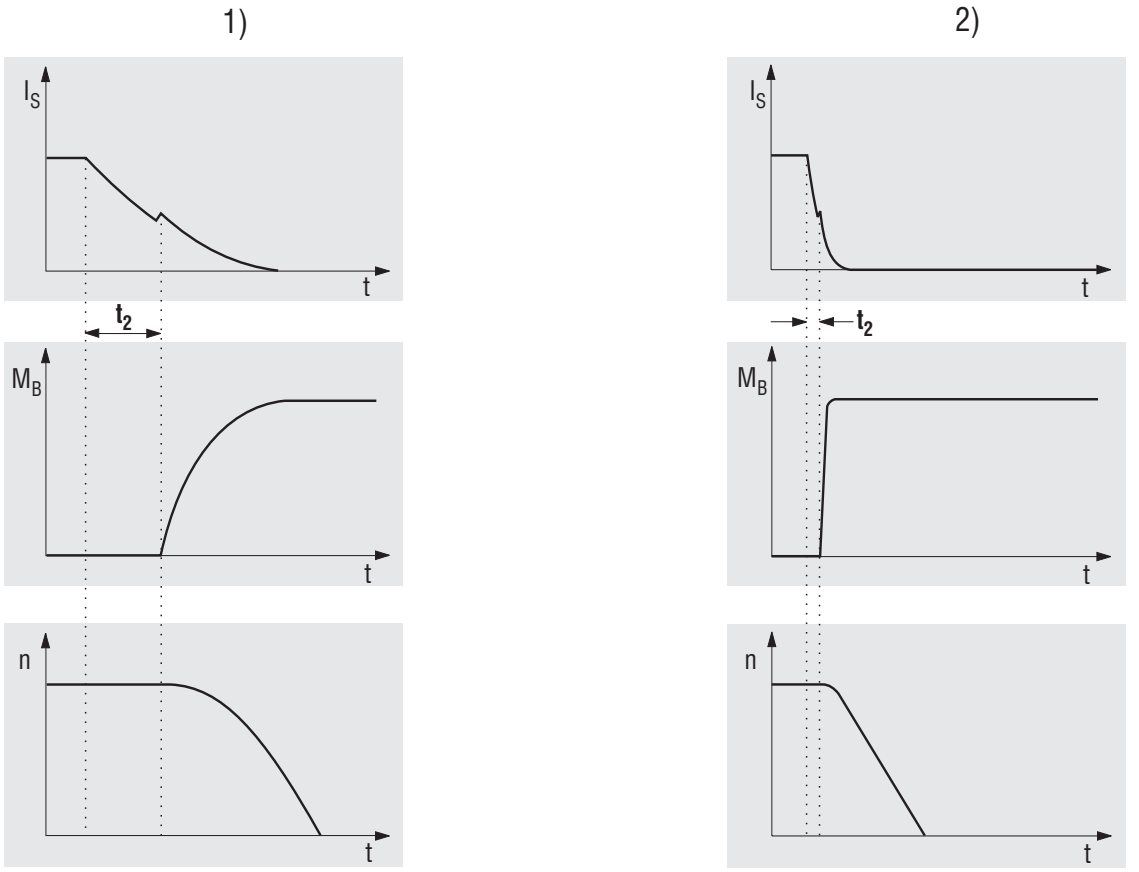


I_S	Coil current	1) Switch-on procedure for operation with a rectifier without switching electronics	2) Switch-on procedure for operation with SEW rectifier with switching electronics, e.g. BGE (standard from size 112 upwards)
M_B	Braking torque		
n	Speed		
t_1	Brake response time		

Fig. 3: Shortening the motor startup time with the SEW brake system

The system switches over to the holding coil electronically as soon as the SEW brake has released. The braking magnet is now only sufficiently magnetized (with a small holding current) to ensure that the pressure plate is held in the startup position with adequate security and with minimum brake heating *(→ Fig. 2)*.

When switching off:
This means de-excitation occurs very rapidly when the coil is switched off, so the brake is applied with an extremely rapid reaction time, particularly with large brakes. This offers benefits to the user in the form of an especially short braking distance with a high repeat accuracy and high level of security, e.g. for applications involving drive units for vertical motion.



I_S	Coil current	1) Brake reaction to cut-off in the AC circuit	2) Brake reaction to cut-off in the DC and AC circuits
M_B	Braking torque		
n	Speed		
t_2	Normal brake reaction time		

Fig. 4: Shortening the braking distance by brake cut-off in the DC and AC circuits

The response time for application of the brake is also dependent on how rapidly the energy stored in the brake coil can be dissipated when the electrical power is switched off. A free-wheeling diode is used for dissipating the energy for a “cut-off in the AC circuit”. The current decays according to an e-function.

The current decays much more rapidly via the varistor when the DC circuit of the coil is interrupted at the same time, giving “cut-off in the DC and AC circuits”. The response time is significantly shorter *(→ Fig. 4, Fig. 5)*. Conventionally, “cut-off in the DC and AC circuits” is implemented using an additional contact on the brake contactor (suitable for DC switching).

→ *Sec.10*

Under certain circumstances, it is beneficial to use the electronic relays SR and UR *(→ Sec. 2.2.2.2)* for interrupting the DC circuit.

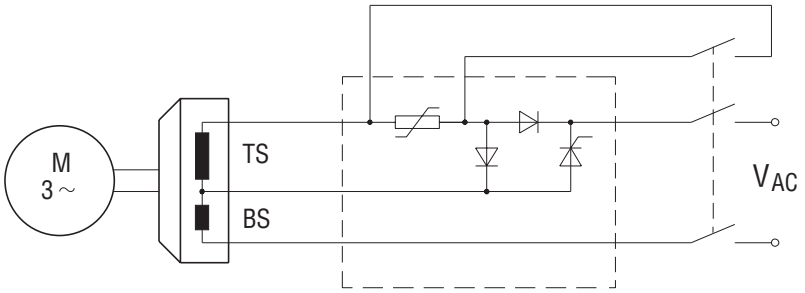


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Fig. 5: Principles of cut-off in the DC and AC circuits

Particularly quiet

Particularly quiet brake motors are demanded in many applications in the power range up to approx. 5.5 kW in order to reduce noise pollution. SEW satisfies these conditions as standard in all brake motors up to size 132S by means of appropriate design features, without affecting the particular dynamic properties of the brake system.

Particularly safe

The excitation power needed for the holding function may be too small in the event of a power failure or especially severe voltage dips. The brake is applied for reasons of safety. A monitoring system ensures that the accelerator coil is reactivated when the voltage returns, thereby releasing the brake.

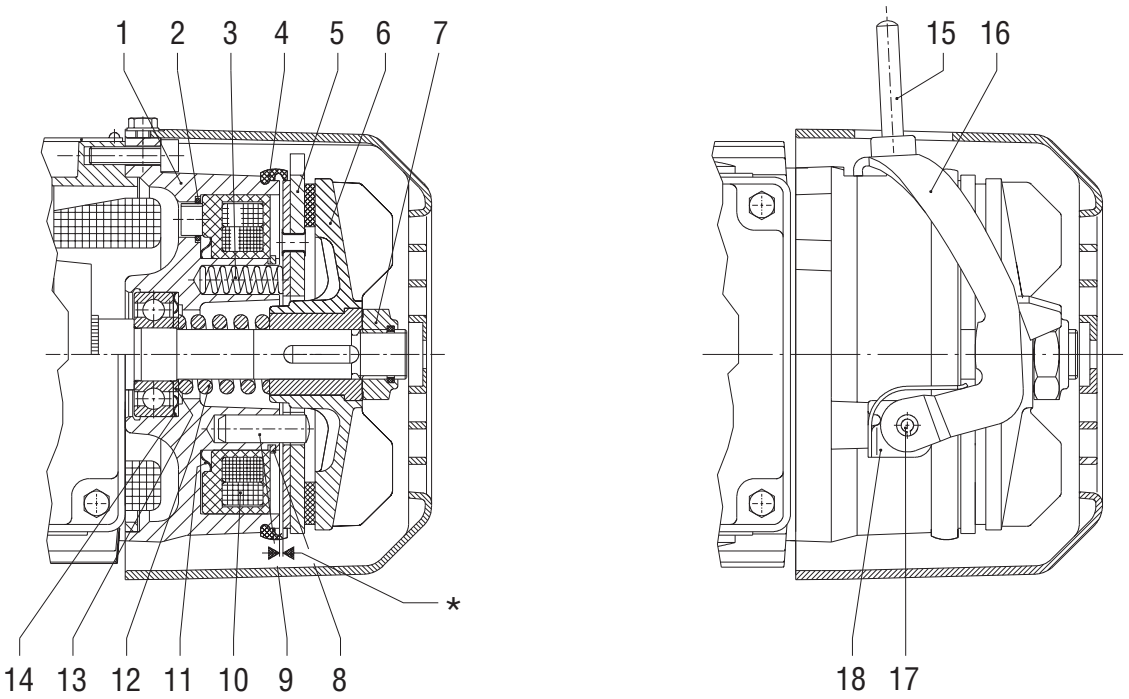
1.3.3 The SEW brake system in detail

1.3.3.1 B03 brake for DT 63..B03 brake motors

B03 is the disc brake for DT 63 motors *(Technical data → page 91, 92, 94, 97, 98)*. The following factors produce a compact construction:

- **The fan wheel (6) of the motor is also the friction ring pad carrier.**
- **The braking torque is only applied to the pressure plate (5) with one friction surface through the pressure of the brake spring (3).**
- **The brake coil (10) for releasing the brake is integrated in the brake bearing end shield (1).**
- **The brake bearing end shield is also the B-side motor end shield.**

The working air gap is set using a central hexagon head nut (7). *(Technical Data → page 98*)



1	Brake bearing end shield, complete	8	Circlip	15	Hand lever
2	O-ring	9	Parallel pin	16	Releasing lever, complete
3	Brake spring	10	Brake coil, complete	17	Dowel pin
4	Rubber sealing collar	11	Equalizing ring	18	Positioning spring
5	Pressure plate, complete	12	Counter spring	*	Working air gap
6	Brake fan, complete	13	Spacer		
7	Hexagon head nut	14	Equalizing ring		

Fig. 6: B03 brake for DT 63 motors

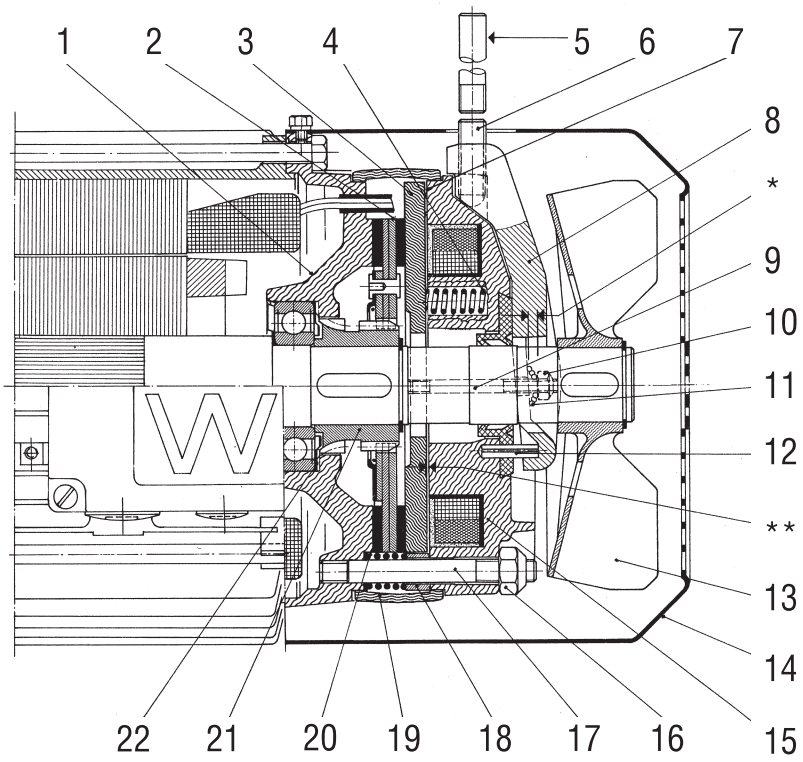
1.3.3.2 BM(G) brake

This brake is used in all DT 71..BMG – DV 225..BM AC brake motors, in G 71DBMG – GV 160MBM DC brake motors, extended housings with centrifugal couplings and in VARIBLOC® variable speed gear units *(Technical Data → page 91, 92, 93, 95, 97, 98)*.

The principal parts of the brake are:

- **Brake coil with tap (15)**
- **Moving pressure plate (3)**
- **Brake disc(s) (2) – also as double disc brake from motor size 180 to 225**
- **Brake springs (4) – configuration determines the braking torque**
  (Technical Data → page 92, 93)
- **Brake bearing end shield (1)**

The working air gap (**) is set using the 3 retaining screws (17) and the corresponding nuts (16). *(Technical Data → page 98)*



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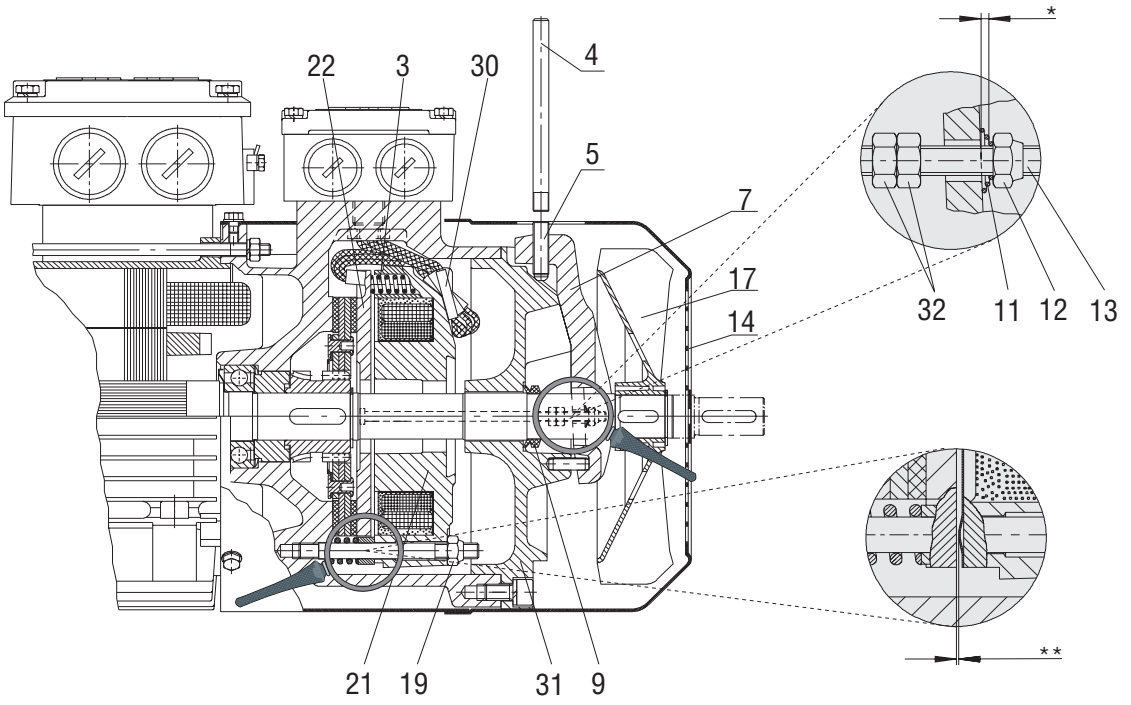
1	Brake bearing end shield	8	Releasing lever	18	Pressure ring
2	Brake disc, complete	9	Stud	19	Rubber sealing collar
3	Pressure plate	10	Adjusting screw	20	Counter spring
4	Brake spring	11	Conical coil spring	21	Carrier
5	Hand lever (with non-locking manual brake release HR)	12	Dowel pin	22	Equalizing ring
		13	Fan		
6	Grub screw (with locking manual brake release HF)	14	Fan guard	*	Floating clearance of manual brake release
		15	Brake coil body, complete		
7	Damping plate (only with BMG brake)	16	Hexagon head nut	**	Working air gap
		17	Retaining screw		

Fig. 7: BM(G) brake

1.3.3.3 BC brake for eDT..BC explosion protected AC motors

BC is a flameproof encapsulated brake with protection type EEx dII BT3. The brake basically comprises the same fundamental elements as the BMG and is integrated in eDT 71..BC – eDT 100..BC motors *(→ Sec. 6)*. The working air gap is adjusted in the same way as with the BMG *(Technical Data → page 98)*.



3	Brake springs	13	Tie bolt	30	Cable
4	Hand lever	14	Fan guard	31	Housing cover
5	Grub screw	17	Fan	32	Nuts
9	V-ring	19	Hexagon head nut	*	Floating clearance of manual brake release
11	Conical coil spring	21	Brake coil body		
12	Setting nut	22	Pressure plate	**	Working air gap

Fig. 8: BC brake for eDT..BC explosion protected AC motors

1.3.3.4 B brake for DY 71B – 112B servo motors

The B disc brake is principally used as a holding brake and is consequently designed for less wear. The properties of the B brake are the same as the BMG. The basic configuration is identical *(Technical data → page 99)*. The working air gap is not adjusted.

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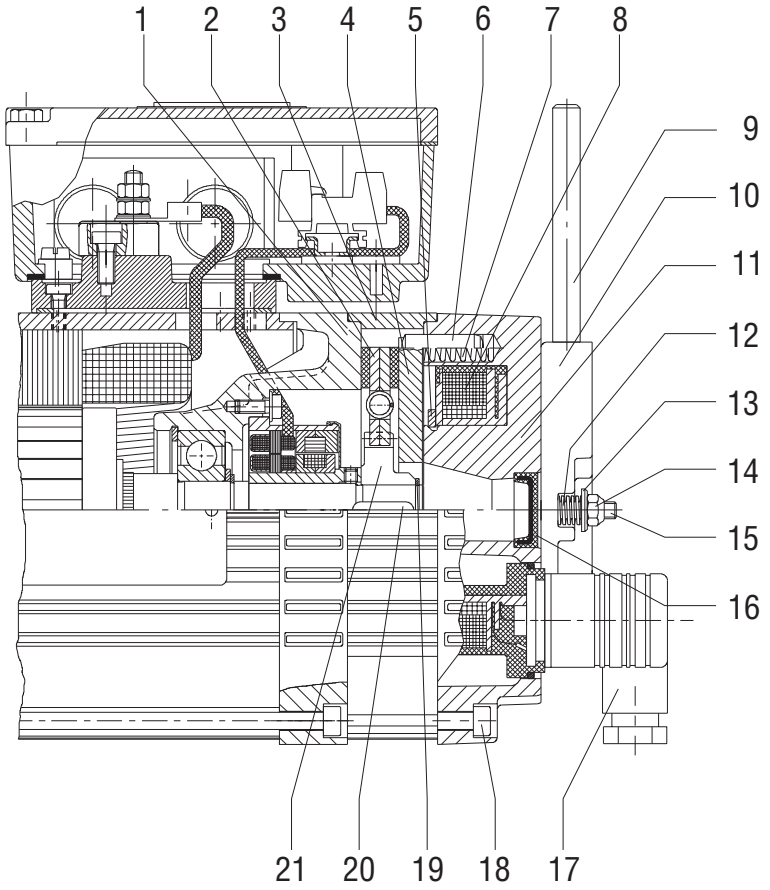

1 Brake bearing end shield
2 Brake disc, complete
3 Spacer bush
4 Pressure plate
5 Circlip
6 Parallel pin
7 Brake spring
8 Brake coil, complete
9 Hand lever
10 Releasing lever
11 Brake coil body
12 Dowel pin
13 Washer
14 Self locking counter nut
15 Stud
16 Closing cap
17 Right-angle connector
18 Hexagon socket head cap screw
19 Circlip
20 Key
21 Carrier

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Fig. 9: B brake for DY...B synchronous servo motors

1.3.4 Brake control systems

The brakes listed here have special brake control systems which are either installed on the motor (in the terminal box or with IS plug connection) or in the switch cabinet.

Block diagrams → *Sec. 9*, Technical Data / Dimensions → *Sec. 11*.

Brake control system	Function	Install. pos.	Voltage	I_{Hmax} (A)	Type	Part number	Color code	Special note	
BG	One-way rectifier	*Motor*	42 – 500V_{AC}	1.5	BG 1	825 590 3	Black	With terminal box: only DT63 With IS: only DT63-90	*46 - 49, 54, 59, 63, 68, 70 - 71, 75 - 76, 80 - 82, 86 - 87*
			150 – 500V_{AC}	1.5	BG 1.5	825 384 6	Black	With terminal box: DT71-100 With IS: DT100	
			42 – 150V_{AC}	3.0	BG 3	825 386 2	Brown		
BGE	One-way rectifier with electronic switching		150 – 500V_{AC}	1.5	BGE 1.5	825 385 4	Red	-	*46 - 49, 54, 59, 63, 68, 70 - 71, 75 - 76, 80 - 82, 86 - 87*
			42 – 150V_{AC}	3.0	BGE 3	825 387 0	Blue	-	
BSR	One-way rectifier + current relay for cut-off in the DC circuit		42 – 500V_{AC}	1.0	BG1 + SR 11	825 590 3 + 825 462 1		With terminal box: only DT63 With IS: only DT63-90	*50, 78, 84 - 85, 89 - 90*
			150 – 500V_{AC}	1.0	BGE 1.5 + SR 11	825 385 4 + 825 462 1		-	
				1.0	BGE 1.5 + SR 15	825 385 4 + 825 463 X		-	
			42 – 150V_{AC}	1.0	BGE 3 + SR11	825 387 0 + 825 462 1		-	
				1.0	BGE 3 + SR15	825 387 0 + 825 463 X		-	
BUR	One-way rectifier + voltage relay for DC circuit cut-off		42 – 150V_{AC}	1.0	BG 1 + UR 11	825 590 3 + 825 776 0		With terminal box: only DT63 With IS: only DT63-90	*55, 77, 83, 88*
			150 – 500V_{AC}	1.0	BG 1 + UR 15	825 590 3 + 825 773 6			
			150 – 500V_{AC}	1.0	BGE 1.5 + UR 15	825 385 4 + 825 773 6		-	
			42 – 150V_{AC}	1.0	BGE 3 + UR11	825 387 0 + 825 776 0		-	
BSG	Electronic switching		24V_{DC}	-	BSG	825 459 1	White	Recommended up to max. brake size BMG4 due to cross section of connecting lead	*53, 58, 62, 66, 74, 81, 82, 87*
BMS	One-way rectifier like BG	*Switch cabinet*	150 – 500V_{AC}	1.5	BMS 1.5	825 802 3	Black	Only up to motor size 100, not for Ex and servo	*51, 56, 60, 64, 67, 69, 72, 79*
			42 – 150V_{AC}	3.0	BMS 3	825 803 1	Brown		
BME	One-way rectifier with electronic switching like BGE		150 – 500V_{AC}	1.5	BME 1.5	825 722 1	Red	-	*51, 56, 60, 64, 67, 69, 72, 79*
			42 – 150V_{AC}	3.0	BME 3	825 723 X	Blue	-	
BMH	One-way rectifier with electronic switching and heating function		150 – 500V_{AC}	1.5	BMH 1.5	825 818 X	Green	-	*52, 57, 61, 65, 73, 80*
			42 – 150V_{AC}	3	BMH 3	825 819 8	Yellow	-	
BMP	One-way rectifier with electronic switching Integrated voltage relay for DC circuit cut-off		150 – 500V_{AC}	1.5	BMP 1.5	825 685 3	White	-	*51, 56, 60, 64, 72, 79*

Table 2: Survey of SEW brake control systems

1.4 Project planning notes

The size of both the brake motor itself and its electrical connection must be selected carefully to ensure the longest possible service life.

The following aspects must be taken into account:

- **Selection of the brake and the braking torque in accordance with the project planning data (selection of the motor)**
- **Determination of the brake voltage**
- **Selection of the brake control system and the circuit type**
- **Dimensioning and routing of the line**
- **Selection of the brake contactor**
- **Design details**

1.4.1 Selection of the brake and the braking torque in accordance with the project planning data (selection of the motor)

The mechanical components, brake type and braking torque are defined when the driving motor is specified. The type of drive or applications and the standards which have to be observed also exert an influence on the brake selection.

Selection criteria are:

- **AC squirrel-cage motor with one speed/pole-changing motor (limitations with 2-pole motors DV 160L to DV 180L)**
- **Speed-controlled AC squirrel-cage motor with frequency inverter**
- **DC motor**
- **Servo motor**
- **Number of braking operations during service and number of emergency braking operations**
- **Service brake or holding brake**
- **Level of braking torque (“soft braking”/“hard braking”)**
- **Hoist**
- **Minimum/maximum deceleration**

What is defined / determined during motor selection:

Basic definition	Link / supplement / remark
Motor type	**Brake type / brake control system**
Braking torque[1)]	**Brake springs**
Normal brake reaction time	Circuit type of brake control system (important for electrical design, wiring diagrams)
Braking time **Braking distance** **Braking deceleration rate** **Braking accuracy**	The required data can only be maintained if the aforementioned parameters meet the requirements
Braking work **Brake service life**	Adjustment time (important for service)

1) The braking torque is determined on the basis of the requirements of the application with regard to maximum deceleration and the maximum permitted distance or time

Table 3: Motor selection

Detailed information about selecting the size of the brake motor and calculating the brake data can be found in **Drive Engineering – Practical Implementation Vol. 1**. The configuration of the brake motor and the brake is automatically included when the SEW drive configuration program PRODRIVE is used.

Practical example:

A carriage with 2 driven wheels runs on rails (steel on steel friction contact) at a speed of 0.5 m/s.

Starting frequency: 75 trips unladen, 75 trips laden / hour, 40 % cdf

Unladen weight	1500 kg
Max. additional load	1500 kg
Wheel diameter	250 mm
Axle diameter	60 mm
Chain reduction i_V	1.588
Sprocket diameter	215 mm

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The static and dynamic power levels of the motor are calculated taking the resistance to motion, with the help of practical experience of the efficiency and table values for friction properties. The most favorable motor is determined by estimation followed by iterative calculations. The brake size is automatically defined by the motor.

In this case, the type selected is **DT 71D 2 BMG Z**, a 2-pole 0.55 kW brake motor with additional flywheel mass (flywheel fan).

The calculation of the required **braking torque** results in **2.5 Nm**. This value can be achieved by fitting suitable brake springs to the corresponding brake, BMG 05 *(Technical Data →page 92)*.

A **normal brake reaction time** of **0.005 s** is achieved by having a cut-off in the DC and AC circuits of the standard BG brake control system in the terminal box.

The **braking time** is calculated as **1 s** with the braking torque and resistance to motion. On the basis of the specified speed of the carriage, this results in a **braking deceleration rate** of **0.5 m/s^2**.

The aforementioned values produce a **braking distance** of **252.5 mm**.

The **braking accuracy** can be estimated with the empirically determined tolerance of ±12 % as **±30.3 mm**.

Calculating the **work done**, which is the kinetic energy converted into heat during the braking operation, gives a measure for the brake wear and thus also for the **brake service life**.

The **maximum value** for the **work done** is calculated as **368 J**.

The **mean value** for the **unladen and laden work done** is calculated as **306 J**.

The brake data table *(→ Sec. 11)* contains the value **120 x 10^6 J** for the **work done by the brake before adjustment**. This value enables the **brake service life until readjustment** to be calculated as **2600 h**. This is an important piece of data for preventative maintenance.

Check:

Each braking operation results in friction heat at the brake disc; if the permitted load limit is exceeded this leads to increased temperature and excessive wear on the brake lining.

The tables "Maximum permitted work done per start W_{max} depending on the starting frequency and the maximum speed" for an ambient temperature of 40 °C *(→ page 97)* are used for checking the calculated values.

In general, as in this case, the permitted starting frequency of the motor is restricted to lower values by the thermal loading on the winding.

The maximum permitted work done is 2500 J at 75 starts, which is higher than the calculated value for the maximum work done.

1.4.2 Determination of the brake voltage

The brake voltage should always be selected on the basis of the available AC supply voltage or motor operating voltage. This means the user is always guaranteed a less expensive installation for lower braking currents.

In the case of multi-voltage types in which the supply voltage has not been defined when the motor is purchased, it is necessary to select the smallest voltage in each case. This is in order to achieve feasible connection conditions in all cases when the brake control system is installed in the terminal box or with IS plug connection.

Low potentials are often unavoidable for reasons of safety. However, they demand a considerably greater investment in cables, switchgear, transformers as well as rectifiers and overvoltage protection (e.g. for direct 24 V_{DC} supply) than for a connection to the mains supply.

With the exception of BG and BMS, the maximum current flowing when the brake is released is 8.5 times the holding current. The voltage at the brake coil must not drop below 90 % of the rated voltage when this happens. The brake is re-applied at less than 70 % of rated voltage. The release procedure is repeated when the voltage rises again. If the voltage source is too weak and/or the line cross section inadequate, this can lead to overload and irreparable damage of the accelerator coil and the brake control system.

1.4.3 Selection of the brake control system and the circuit type

a) The brake control system is selected in accordance with the following criteria:

- **Function:** → *Sec. 2 – 7*
- **Location:** Terminal box/IS or switch cabinet *(→ Sec. 2 – 7)*
- **Voltage:** 42 – 500 V_{AC} is generally possible,
  Standard: 220 – 240 V_{AC} / 380 – 415 V_{AC} / 24 V_{DC}
  (Technical Data → page 95)

b) The type of circuit depends on:

- **Function:** → *Sec. 2 – 7*

1.4.4 Selection and routing of the line

a) Selection of the line

The criteria specified in Sec. 1.4.3 also apply for selecting the size of the brake connecting harness. The data sheets for the brakes *(Technical Data → page 95)* provide information about the possible supply voltages and the resultant operating currents.

Refer to *Table 4* for a quick source of information about selecting the size of line cross sections with regard to the acceleration currents for line lengths ≤ 50 m.

Brake type	Minimum cross section in mm^2 (AWG) of the brake connecting harnesses for line length ≤ 50 m and brake voltage (V_{AC})									
	42	49	56 24 V_{DC}	61	73	77	88	97	110	125 - 500
B03										
BMG05										
BMG1	**2.5** (12)						**1.5** (16)			
BMG2										
BMG4	**4** (10)									
BMG8	**6** (8)		**4** (10)	**2.5** (12)						
BM15		**10** (8)		**6** (8)		**4** (10)		**2.5** (12)		
BM 30 - 62	**16** (6)									

Values in brackets = AWG (American Wire Gauge)

Table 4: Minimum cross sections of brake connecting harnesses

Wire cross sections of max. 2.5 mm^2 can be connected to the terminals of the brake control systems. Intermediate terminals must be used in case of larger cross sections.

b) Routing instructions

Brake connecting harnesses must always be routed separately from other power cables with phased currents unless they are shielded.

Power cables with phased currents are in particular:

- Output cables from frequency and servo controllers, converters, soft start units and brake units
- Connecting harnesses to braking resistors

1.4.5 Selection of the brake contactor

In view of the high current loading and the DC voltage to be switched at inductive load, the switchgear for the brake voltage and the cut-off in the DC circuit either has to be special DC contactors or adapted AC contactors with contacts in the utilization category AC3 according to EN 60947-4-1.

It is very easy to select the brake contactor for mains operation:

A **power contactor** with a rated power of **2.2 kW or 4 kW in AC3 operation** is selected for the **standard voltages 230 V_{AC} or 400 V_{AC}**.

The contactor is configured for **DC3 operation** with **24 V_{DC}**.

1.4.6 Important design details

a) EMC (electromagnetic compatibility)

SEW AC brake motors comply with the relevant EMC generic standards when used in accordance with their designated use in continuous duty connected to mains power.

It is also necessary to take account of the corresponding instructions in the inverter documentation when they are operated with frequency inverters.

The EMC instructions in the servo controller or converter documentation must also be taken into account for the operation of SEW servo motors and DC motors with brakes.

The instructions on laying cables *(→Sec. 1.4.4)* must always be adhered to.

b) Type of circuit

The electrical design staff and, in particular, the installation and startup personnel must be given special information about the circuit type and the brake function intended with it.

Maintaining certain normal brake reaction times may be relevant for safety. The decision between cut-off in the AC circuit or cut-off in the DC and AC circuits must be passed on in a definitive and unambiguous fashion to the people undertaking the work. The normal brake reaction times t_{2l} in the data summary *(→ page 91)* **for cut-off in the AC circuit only apply if there is a separate voltage supply. The times are longer if the connection is to the terminal board/IS of the motor.**

BG and BGE are always supplied wired up for a cut-off in the AC circuit in their terminal box/IS. It is essential to move the blue wire on the brake coil from terminal 5 to terminal 4 if cut-off in the DC and AC circuits is required.

c) Adjustment time

The time until readjustment is determined on the basis of the expected brake wear. It is an important factor in setting up the maintenance schedule for the machine to be used by the customer's service personnel (machine documentation).

d) Measuring principles

The following points must be observed during service measurements on the brakes:

The values for DC voltage specified in the data sheets only apply if the brakes are supplied with DC voltage from an external source without an SEW brake control system.
Due to the fact that the freewheeling arm is arranged only over the coil section, the DC voltage which can be measured during operation with SEW brake control systems is 10 to 20 % lower than the normal one-way rectification with the freewheeling arm over the entire coil.

2 DT/DV…BM(G) AC brake motors

Refer to the following for more information and detailed technical data:

- **Geared Motors catalog (with prices)**
- **Pole-Changing Geared Motors catalog (with prices)**

The B03 brake *(→ Fig. 6)* is only used for the smallest size DT 63. All other brake motors from DT 71.. to DV 225.. use the principle of the BMG / BM brake *(→ Fig. 7)*.
SEW DT 63..B03 to DV 225..BM brake motors are characterized in that the brake is integrated in the motor. This means they are extremely compact.

Various brake control systems for installation in the terminal box, with plug connection or in the switch cabinet *(→ Sec. 1.3.4)* permit the optimum solution to be found for all applications and conditions.

The standard type is supplied unless particular requirements are made.

2.1 Standard type of brake control system

A brake motor is determined to be the standard type if it is supplied with a terminal box and, with one exception, with built-in brake control systems. The standard type is completely ready to fit.

Like the motor connection voltage, the brake voltage is also specified by the customer in most cases. If no such information is given for the brake voltage, the phase voltage is automatically selected for single-speed motors and the mains voltage for pole-changing motors. Table 5 shows the standard types of AC brake motor.

Type of brake motor	Standard type of brake control system for	
	AC connection	24 V_{DC} connection
DT 63..B03 – DT 100..BMG	BG	Without control unit
DV 112..BMG – DV 225..BM	BGE	BSG

Table 5: Standard type of brake control system

→ 46 - 49, 53, 54, 58, 59, 62, 75 - 76, 81 - 82, 86 - 87

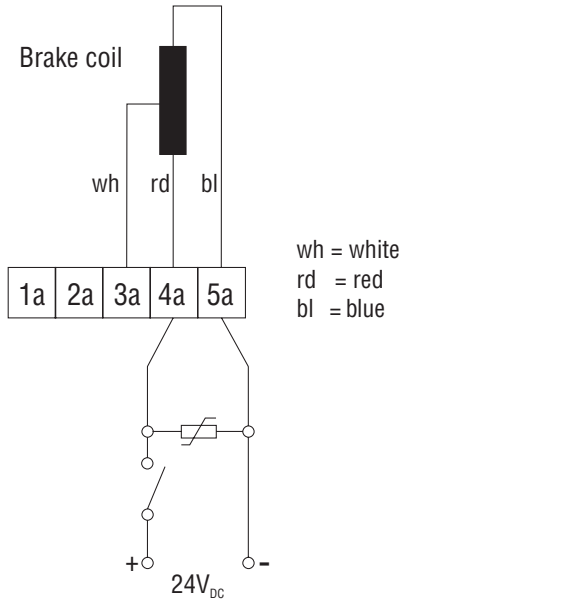
Either a cut-off in the AC circuit (BG, BGE) or a cut-off in the DC and AC circuits (BG, BGE, BSG) are possible with the standard types.

The brake voltage for the brake can either be supplied separately (in particular with pole-changing motors) or taken directly from the motor terminal board or plug connection (with single-speed motors).

The response times t_{2I} for cut-off in the AC circuit *(Technical Data → page 91)* apply to the separate power supply. With the terminal board connection, switching the motor off with remanent energization leads to a further delay before the brake is applied.

The specified brake control systems possess a powerful overvoltage protection for the brake coil and switch contact.

No brake control system is supplied with the standard type for 24 V_{DC} voltage supply of DT 63..B03 to DT 100..BMG motors. The customer must install suitable overvoltage protection *(→ Fig. 10).*



Varistor type	Manufacturer
SIOV-S10 K300 10M 250 VB VZB 300	Siemens Conradty Thomson

Fig. 10: 24 V_{DC} connection with overvoltage protection of the brakes for motor sizes 63 – 100

2.2 Brake motors for special requirements

The modular SEW concept for brake motors permits a wide range of variation in equipping with electronic and mechanical options. The options include special voltages, mechanical manual brake release, special types of protection, special plug connections and special brake control systems *(→ Geared Motors catalog)*.

2.2.1 Brake control system for high starting frequency

High starting frequency combined with a not insignificant mass moment of inertia represents a frequent requirement for brake motors.

As well as the basic thermal suitability of the motor, the brake needs to have a response time t_1 which is short enough to ensure that it is already released when the motor starts, with consideration for the mass moment of inertia to be accelerated. The temperature and wear balance of the SEW brake permits a high starting frequency without having the usual startup phase with the brake still closed.

DV 112..BMG to DV 225…BM motors are equipped for a high starting frequency as standard.

Type of brake motor	High starting frequency	
	Brake control system for AC connection	Brake control system for 24 V_{DC} connection
DT 63..B03	BME (BMH, BMP) in the switch cabinet	BSG in the switch cabinet
DT 71..BMG to DV 225..BM	BGE (BSR, BUR) in the terminal box / IS or BME (BMH, BMP) in the switch cabinet	BSG in the terminal box / IS or in the switch cabinet

Table 6: Types of DT 63..B03 to DV 225..BM brake motors for high starting frequency

→ 46 - 62,67 -70, 76 - 90

Table 6 shows that as well as BGE (BME) and BSG, the BSR, BUR, BMH and BMP brake control systems possess properties for shortening the response time in addition to their other functions.

2.2.2 Brake motors for high stopping accuracy

High stopping accuracy is a requirement for positioning systems.
Due to their mechanical principle, the degree of wear on the linings and local physical peripheral conditions, brake motors are subject to an empirically determined braking distance variation of ±12 %. The shorter the braking distance, the less of an error the "natural" variation exerts on the total distance *(→ Fig. 4)*.

Cut-off in the DC and AC circuits makes it possible to shorten the normal brake reaction time t_{2II} considerably *(→ Technical Data, page 91).*

→ 46 - 49, 51 - 52, 54 - 57, 59 - 61, 63, 69 - 70, 79 - 80, 86 - 87

2.2.2.1 Cut-off in the DC and AC circuits with mechanical contact

Sections 1.3.2 and 2.1 have already referred to the possibility of achieving this solution by conventional means with an extra contact.

2.2.2.2 Cut-off in the DC and AC circuits with electronic relay in the terminal box / IS

The BSR and BUR brake control systems offer particularly elegant possibilities involving an electronic, wear-free contact at the same time as minimum wiring work *(→ Table 2)*. Both control systems are made up of BGE (BG with size 63 and IS1) and either the SR current relay or the UR voltage relay.

BSR is only suited to motors with a fixed speed.
BUR can be used universally if it has a separate supply voltage feed.

When ordering the brake motor, it is sufficient to specify BSR or BUR in conjunction with the motor or brake voltage. The SEW order processing system will assign the exact relay.

Refer to Table 7 and Table 8 for relay retrofitting options suited to the motor and the voltage. The electronic relays can switch up to 1 A coil current and thereby limit the choice to BSR and BUR.

BSR principle

With BSR, the BGE (or BG) brake control system gets its voltage supply directly from the motor terminal board of a single-speed motor, and so it does not need a special connecting harness.

When the motor is switched off, the motor current is interrupted practically instantaneously and it is used for a cut-off in the DC circuit of the brake coil via the SR current relay. This results in the especially rapid application of the brake despite the remanence voltage at the motor terminal board and in the brake control system *(→ Sec. 9.4)*.

→ 50, 78, 84 - 85
89 - 90

Unless the customer specifies otherwise, the brake voltage is automatically defined on the basis of the motor phase voltage (e.g. motor 230 V Δ / 400 V Y, brake 230 V). As an option, the brake coil can also be configured for the line-to-line voltage (max. 500 V, e.g. motor 230 V Δ / 400 V Y, brake 400 V).

BSR selection

Table 7 takes account of the motor current and the brake current in the allocation of the SR relay.

BUR principle

With BUR, the BGE (or BG) brake control system has a separate voltage supply because there is no constant voltage at the motor terminal board (pole-changing motors, motors on the frequency inverter). After the cut-off in the AC circuit, the UR voltage relay triggers the cut-off in the DC circuit of the brake coil almost instantaneously and the brake is applied especially rapidly *(→ Sec. 9.5)*.

Unless the customer specifies otherwise, the brake voltage is always selected on the basis of the motor phase voltage. Optionally, it is also possible to define other brake voltages in accordance with Table 8.

→ 55, 77, 83, 88

BUR selection

Table 8 takes account of the brake voltage and the brake current in the allocation of the UR relay.

Motor type:	BSR (BGE/BG1 + SR..) for motor voltage (V_{AC}) in Y connection																				
	40 - 58	59 - 66	67 - 73	74 - 82	83 - 92	93 - 104	105 - 106	117 - 131	132 - 147	148 - 164	165 - 185	186 - 207	208 - 233	234 - 261	262 - 293	294 - 329	330 - 369	370 - 414	415 - 464	465 - 522	523 - 690
DT 63..B03[1]	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 71D..BMG[2]		SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 80N..BMG[2]			SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 80K..BMG[2]			SR15	SR15	SR15	SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 90S..BMG[2]					SR15	SR15	SR15	SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 90L..BMG[2]					SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 100LS..BMG						SR15	SR15	SR15	SR15	SR15	SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DT 100L..BMG							SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR11	SR11	SR11	SR11	SR11	SR11	SR11	SR11
DV 112M..BMG								SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR11	SR11	SR11	SR11	SR11
DV 132S..BMG								SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR11	SR11
DV 132M..BM											SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15
DV 132ML..BM											SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15
DV 160M..BM											SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15
DV 160L..BM													SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15
DV 180M..BM														SR15	SR15	SR15	SR15	SR15	SR15	SR15	SR15
DV 180L..BM																SR15	SR15	SR15	SR15	SR15	SR15
DV 200LS..BM																			SR15	SR15	SR15
DV 200L..BM																			SR15	SR15	SR15

SR11 SR15 Not possible

Table 7: Assignment of current relays SR11 and 15 to motor and motor voltage

Motor type:	BUR (BGE/BG1 + UR..) for brake voltage (V_{AC})														
	23 - 25	40 - 46	47 - 52	53 - 58	59 - 66	67 - 73	74 - 82	83 - 92	93 - 104	105 - 116	117 - 131	132 - 147	148 - 164	165 - 185	186 - 500
DT 63..B03[1]							UR11	UR11	UR11	UR11	UR11	UR11	UR15	UR15	UR15
DT 71/80..BMG[2]							UR11	UR11	UR11	UR11	UR11	UR11	UR15	UR15	UR15
DT 90/100..BMG[2]										UR11	UR11	UR11	UR15	UR15	UR15
DV 112M..BMG													UR15	UR15	UR15
DV 132S..BMG													UR15	UR15	UR15
DV 132M..BM															UR15
DV 132ML..BM															UR15
DV 160M..BM															UR15
DV 160L..BM															UR15
DV 180M/L..BM															UR15
DV 200/225..BM															UR15

UR11 UR15 Not possible

Table 8: Assignment of voltage relays UR11 and 15 to motor and voltage

1) BSR/BUR = BG1 + SR../UR..
2) With IS plug connection: BSR/BUR = BG1 + SR../UR..

2.2.3 Brake control system for elevated ambient temperature or restricted ventilation

As well as basic considerations, elevated ambient temperature, inadequate supply of cooling air and/or thermal classification H represent reasons for installing the brake control system in the switch cabinet.
Only brake control systems with electronic switching are used in order to ensure reliable switching at elevated winding temperatures in the brake.

→ *51, 53, 56, 58, 60, 62, 79, 80,*

The use of BGE, BME or BSG is prescribed instead of BG, BMS or 24 V_{DC} direct connection for the special case represented by "electronic brake release when motor at standstill" for motors of sizes 63 – 100, unless control systems with extra functions are already being used.

Type of brake motor	Increased thermal loading	
	Brake control system for AC connection (in the switch cabinet)	Brake control system for 24 V_{DC} connection (in the switch cabinet)
DT 63..B03	BME, BMP	BSG
DT 71..BMG – DV225..BM		

Table 9: Special versions of DT 63..B03 to DV 225..BM brake motors for increased thermal loading with brake control systems in the switch cabinet

2.2.4 Brake control system for low and fluctuating ambient temperatures

Brake motors for low and fluctuating ambient temperatures, e.g. set up outdoors, are exposed to the dangers of condensation and icing. Functional impairments due to corrosion and ice can be counteracted by the use of the BMH brake control system with the extra function of "anti-condensation heating".

The "heating" function is activated externally. As soon as the brake has been applied and the heating function switched on during lengthy breaks, both coil sections of the SEW brake system are supplied with reduced voltage in an inverse-parallel connection by a thyristor operating at a reduced control-factor setting. On the one hand, this practically eliminates the induction effect (brake does not release). On the other hand, it gives rise to heating in the coil system, increasing the temperature by approx. 50 K in relation to the ambient temperature.

→ *52, 57, 61, 80,*

BMH is available for all motor sizes and is exclusively mounted in the switch cabinet.

2.2.5 Brake control system in the switch cabinet

SEW brake control systems are also available for switch cabinet installation. The following aspects favor switch cabinet installation of brake control systems:

- **Unfavorable environmental conditions at the motor (e.g. motor with thermal classification H, elevated ambient temperature > 40 °C, low ambient temperatures etc.)**
- **Connections with cut-off in the DC circuit by switch contact are less complicated in the switch cabinet**
- **Easier access to the brake control system for service purposes**

→ 51 - 53, 56 - 58, 60 - 61, 67,69, 79 - 80

When the brake control system is installed in the switch cabinet, always note that 3 lines must be routed between the brake coil and the control system. There is an auxiliary terminal strip with 5 terminals available for connecting in the terminal box. Two of these are for the motor winding monitoring.

Table 10 shows an overview of all brake control systems for switch cabinet installation. Except for BSG, all the others are accommodated in standard housings for clipping onto top hat rails.

Type of brake motor	Brake control system in the switch cabinet	
	for AC connection	for 24 V_{DC} connection
DT 63..B03	BMS, BME, BMH, BMP	BSG
DT 71 – 100..BMG		
DV 112..BMG – DV 225..BM	BME, BMH, BMP	

Table 10: Types of DT 63..B03 to DV 225..BM brake motors with brake control system in the switch cabinet

2.2.6 Multi-motor operation of brake motors

Brakes must be switched at the same time in multi-motor operation. In addition, the brakes must all be applied together when several motors are operating on a common load and a malfunction occurs in one brake.

Common switching can be achieved by parallel AC circuit supply to any particular group of brakes connected to one brake control system.

The parallel AC circuit supply is configured in such a way that both voltage half-waves are utilized alternately.

→ 67 - 68

When several brakes are connected in parallel to the same brake rectifier, the total of all the brake currents must not exceed the rated current of the brake control system.

At the same time, connecting a limited number of brakes of the same type in series in the AC circuit permits joint control and joint application of the brake, for example if a brake coil is interrupted.

Please note that the brake voltage must be reduced in accordance with the number of brakes connected in parallel.

→ 69 - 70

Basically, all brakes have to be cut-off in the AC circuit in the event of a fault.

2.2.7 IS plug connection and brake control system

The IS plug connection for DT 63 to DV 132S motors contains 4 contacts (8, 9, 10, 11) by means of which it is possible to make a connection from the switch cabinet to the brake. The brake control system is either installed in the plug connection or in the switch cabinet depending on the requirements.

→ 75 - 80

Type of brake motor	Brake motor with IS		Connection
	Brake control system in IS	Brake control system in the switch cabinet	
DT 63..B03 IS – **DT 90..BMG IS**	BG1, BSR[1], BUR[1]	BMS, BME, BMH, BMP	AC
	-	BSG	24 V_{DC}
DT 100..BMG IS – **DV 132S..BMG IS**	BG[2], BGE, BSR, BUR	BMS[2], BME, BMH, BMP	AC
	BSG	BSG	24 V_{DC}

1) BSR and BUR with BG1
2) Only with DT 100

Table 11: Types of brake motor with IS plug connection

2.2.8 AS plug connection and brake control system

AS plug connections for DT 71 to DV 132S motors contain 2 contacts for connecting the brake control system to the supply voltage. Cut-off in the DC and AC circuits is only possible with BSR and BUR.
Apart from the possibility of a direct 24 V_{DC} supply to brakes on motor sizes DT 71 to DT 100, there are five versions available with the brake control system in the terminal box.

→ 81 - 85

Type of brake motor	Brake motor with AS Brake control system in the terminal box	
	AC connection	Connection to 24 V_{DC}
DT 71..BMG AS – **DT 100..BMG AS**	BG[1], BGE[1], BSR, BUR	BSG[2]
DV 112..BMG AS – **DV 132S..BMG AS**	BGE[1], BSR, BUR	BSG

1) Only for cut-off in the AC circuit
2) Optionally, can also be directly connected to 24 V_{DC}

Table 12: Types of brake motor with AS plug connection

2.2.9 AM plug connection and brake control system

→ S. 86 - 90

Up to four contacts can be used for connecting the brake in the AM plug connection for DT 71 to DV 132S motors.
This means all brake control systems for terminal box and switch cabinet installation can be used without restrictions with both cut-off in the AC circuit and cut-off in the DC and AC circuits.

Table 13 shows an overview.

Type of brake motor	Brake motor with AM		Connection
	Brake control system in the terminal box	Brake control system in the switch cabinet	
DT 71..BMG AM –	BG[1)], BGE, BSR, BUR	BMS[1)], BME, BMH, BMP	AC
DV 132S..BMG AM	BSG	BSG	24 V_{DC}

1) Only with DT 71 – DT 100

Table 13: Types of brake motor with AM plug connection

3 DT/DV…BM(G) AC brake motors with frequency inverter

Refer to the following for more information and detailed technical data:

- **Geared Motors catalog (with prices)**
- **MOVITRAC® 0500 catalog**
- **MOVITRAC 31C® catalog**
- **MOVIDRIVE® catalog**
- **Drive Engineering – Practical Implementation, Vol. 5**

IMPORTANT

The voltage supply to the brake must always be routed separately. The variable supply voltage of the motor means the voltage must not be taken from the motor terminal board.

Under normal circumstances in the frequency inverter mode of the motor, the mechanical brake only displays the characteristics of a holding brake for holding a position which has been reached and of a security brake for an emergency (emergency stop). Consequently, its size is determined by a defined number of emergency stop braking operations of the drive at full load from maximum speed *(→ Sec. 1.4)*.

It is also always the case that the brake command is issued to the frequency inverter simultaneously with the stop command and without any delay. It is beneficial and recommended for this command to be generated by the frequency inverter itself. Internal interlocks in the frequency inverter ensure the precise moment is selected. This allows the load to be safely accepted by the mechanical brake, thereby avoiding, for example, any "sag" during hoist operation.

→ *55, 63 - 66*

Table 14 shows a survey of all brake control systems which are possible in conjunction with frequency inverter supply to the motor.

Type of brake motor	Installation in the terminal box or IS	Switch cabinet installation	Connection to
DT 63..B03	BG1, BUR[1)]	BMS, BME, BMP, BMH	AC
	Without control unit	BSG	24 V_{DC}
DT 71..BMG – DT 100..BMG	BG1[2)], BG, BGE, BUR[1)]	BMS, BME, BMP, BMH	AC
	BSG	BSG	24 V_{DC}
DV 112..BMG – DV 225..BM	BGE, BUR	BME, BMP, BMH	AC
	BSG	BSG	24 V_{DC}

1) BUR consists of BG1 and UR with brake B03 and operation of motor sizes 63 – 90 with IS plug connection.
2) BG1 is only installed when IS plug connections are used on motor sizes 71 – 90.

Table 14: Brake control systems in frequency inverter mode

4 Servo motors with DY 71..B – DY 112..B brakes

Refer to the following for more information and detailed technical data:

- **Geared Servo Motors catalog (with prices)**
- **MOVIDYN® catalog**
- **MOVIDRIVE® catalog**
- **Drive Engineering – Practical Implementation, Vol. 7**

B brakes *(→ Fig. 9)* of DY 71 –112..B servo motors are supplied with voltage from the switch cabinet exclusively via a separate plug connection.

The B-side integration of the brake into the motor housing ensures a particularly compact design. Servo motors can also be supplied with the "manual brake release" option.

The various brake control systems and the opportunity of connecting to 110, 230, 400 V_{AC} and also to 24 V_{DC} mean that this characteristic emergency stop and holding brake can also be used in all applications involving highly dynamic qualities *(→ Technical Data, page 99).*

The brake command in servo drives is generated in the MOVIDYN® or MOVIDRIVE® servo controller and used for switching the brake with a suitable brake contactor.

With this brake too, the size is determined by the required number of possible emergency braking operations at full load from maximum speed *(→ Sec. 1.4).*

Depending on the motor type, B brakes can alternatively be supplied with two possible braking torques M_{B1} and M_{B2}. The higher braking torque M_{B2} (2 – 3 x M_0) is selected in the case of hoist operation for reasons of safety.

Table 15 shows the various brake control systems.

Servo motor with brake type	Brake control system in the switch cabinet	Connection to
DY 71..B – DY 112..B	BME, BMP	AC
	BSG	24 V_{DC}

Table 15: Brake control systems for servo drives

5 DC motors with G/GV… BM(G) brake

Refer to the following for more information and detailed technical data:

- **DC Geared Motors catalog (with prices)**

→ 71 - 74

BM(G) brakes also form an integral part of DC motors.
The brake control systems are either installed in the terminal box or in the switch cabinet. The sample circuits correspond to those of brake motors with frequency inverter supply.

The brake command is preferably generated in the supply converter in order to guarantee an exact moment for load take-over by the mechanical brake.

In contrast to AC brake motors with the same shaft height, standard DC motors with BM(G) are supplied with lower braking torques *(→ Technical Data, page 91).*

The mechanical brake in the DC motors is purely intended as a holding and emergency brake. Its size is selected for a specific number of emergency braking operations at full load from maximum speed.

Table 16 shows a survey of the possible brake control systems for standard DC motors.

Size 71 – 100 DC motors are equipped with BG brake rectifiers whilst larger motors are fitted with BGE in the terminal box as standard. With a 24 V_{DC} supply voltage, the standard configuration for size 71 – 100 motors is without BSG in the terminal box whereas for larger motors, it is with BSG in the terminal box *(→ Table 1).*

DC motor with brake type	Terminal box installation	Switch cabinet installation	Connection to
GF 71DBMG – GV 132SBMG	BG[1], BGE, BUR	BMS[1], BME, BMP, BMH	AC
	BSG[2]	BSG	24 V_{DC}
GV 132MBM – GV 160MBM	BGE, BUR	BME, BMP, BMH	AC
	BSG	BSG	24 V_{DC}

1) BG and BMS are only used for sizes 71 – 100; BG is standard for these motors.
2) BSG is available as an option for sizes 71 – 100. The standard delivery is without BSG.

Table 16: Brake control systems of standard DC motors

6 eDT 71D4 BC05/H./TF – eDT 100L4 BC2/H./TF explosion- protected AC brake motors

Refer to the following for more information and detailed technical data:

- **Geared Motors catalog (with prices)**
- **Explosion Protected AC Motors, Increased Safety Protection Type catalog**

eDT...BC.. explosion- protected AC brake motors with increased safety protection type operate with an integrated, explosion-proof brake. This combination has been certified by the Acceptance Institute of the Physikalisch-Technische Bundesanstalt (PTB) Braunschweig (the Germany Federal Office of Engineering Physics at Brunswick) and operates, in accordance with the BMG brake principle, with the technical data shown in Table 17.

Explosion protected brake motor type	Braking torques (Nm)	Braking work[1] W (10^6 J)	Response time t_1 (10^{-3} s)	Reaction time[2] t_{2II} (10^{-3} s)	Reaction time[3] t_{2I} (10^{-3} s)	Coil power P_B (W)
eDT 71 – 80..BC	7.5/6/5/4/2.5/ 1.6/1.2	120	20	8	40	29
eDT 90 – 100..BC	30/24/20/16/10/ 6.6/5	260	35	15	80	41

1) Work done by the brake before adjustment
2) Reaction time for cut-off in the DC and AC circuits
3) Reaction time for cut-off in the AC circuit

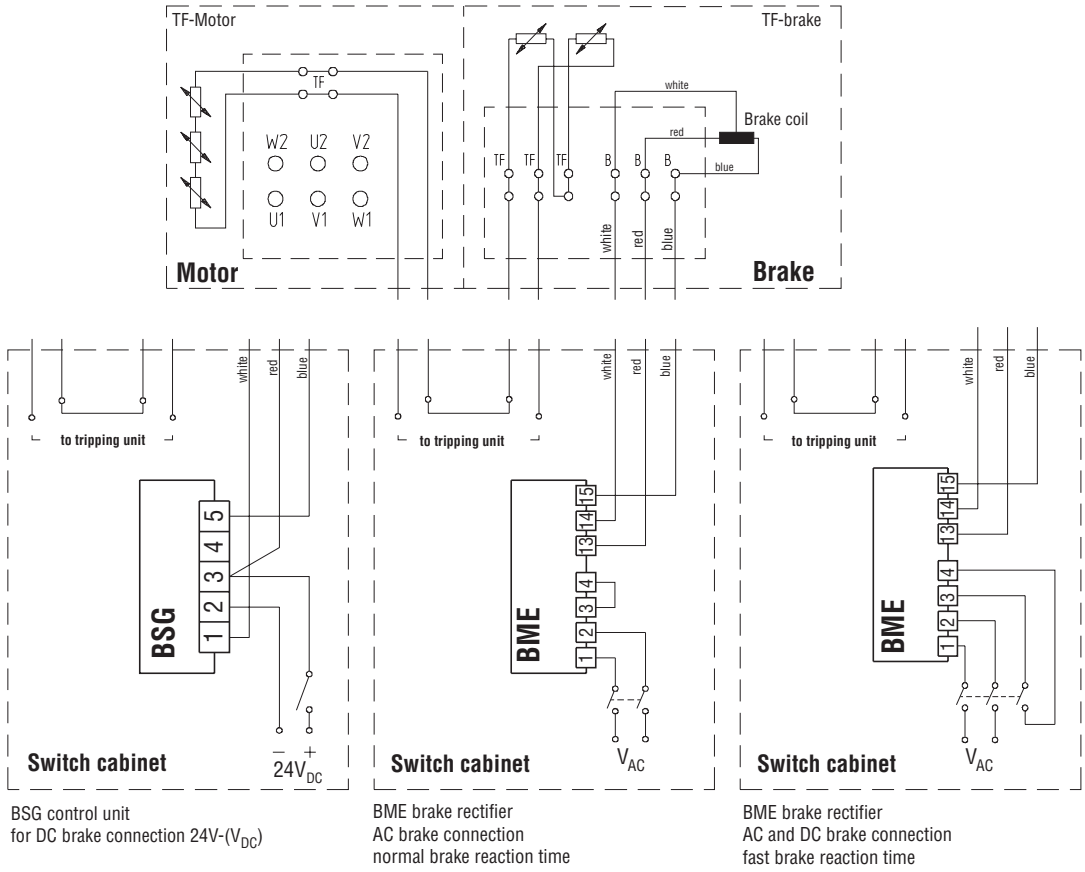
Table 17: Technical data of BC brakes with explosion- protected brake motors

The brake control systems shown in Table 18 are all approved (only for switch cabinet installation) if wired up in accordance with Fig. 11. It is also essential to have thermal monitoring of the motor and the brake by means of positive temperature coefficient (PTC) thermistors with an approved trip switch bearing the PTB certification 3.53 – PTC A.

External measures must be taken to ensure that the brake command is issued at the same time as the motor is switched off.

Explosion protected brake motor type	Brake control system in the switch cabinet	Connection to
eDT 71 – 100..BC	BME	AC
	BSG	24 V_{DC}

Table 18: Approved brake control systems for explosion protected AC brake motors



BSG control unit
for DC brake connection 24V-(V_{DC})

BME brake rectifier
AC brake connection
normal brake reaction time

BME brake rectifier
AC and DC brake connection
fast brake reaction time

See motor nameplate for required AC voltage Brake V~...

Switch contacts of utilization category AC3 as per EN 60947

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Fig. 11: Connection diagram for explosion-protected AC brake motors

7 Brakes in VARIBLOC® variable speed gear units

Refer to the following for more information and detailed technical data:

- **Variable Speed Geared Motors catalog (with prices)**

In view of the V-belt connection between the motor and the gear unit, the brake mounted on the motor as a holding and security brake is not permitted for many applications.

Consequently, there is a version for VARIBLOC® VU/VZ 01 – 41 with a brake on the driven variable pulley. The corresponding brake control systems are installed in a special terminal box on the variable speed gear unit·

→ 49, 53

VARIBLOC® variable speed gear unit type	Motor power range (kW)	Brake type	Maximum braking torque (Nm)	Brake control system (standard)	
				AC	24 V_{DC}
VU/VZ 01 BMG/HF	0.25 – 0.75	BMG05	5	BG	-
VU/VZ 11 BMG/HF	0.37 – 1.5	BMG1	10	BG	-
VU/VZ 21 BMG/HF	0.37 – 3.0	BMG2	20	BG	-
VU/VZ 31 BMG/HF	1.5 – 5.5	BMG4	40	BGE	BSG
VU/VZ 41 BMG/HF	3.0 – 11.0	BMG8	75	BGE	BSG

Table 19: Survey of data, VARIBLOC® variable speed gear units with brake

Table 19 provides information about the basic data on VARIBLOC® variable speed gear units with a mounted brake and lockable manual brake release as a standard feature.

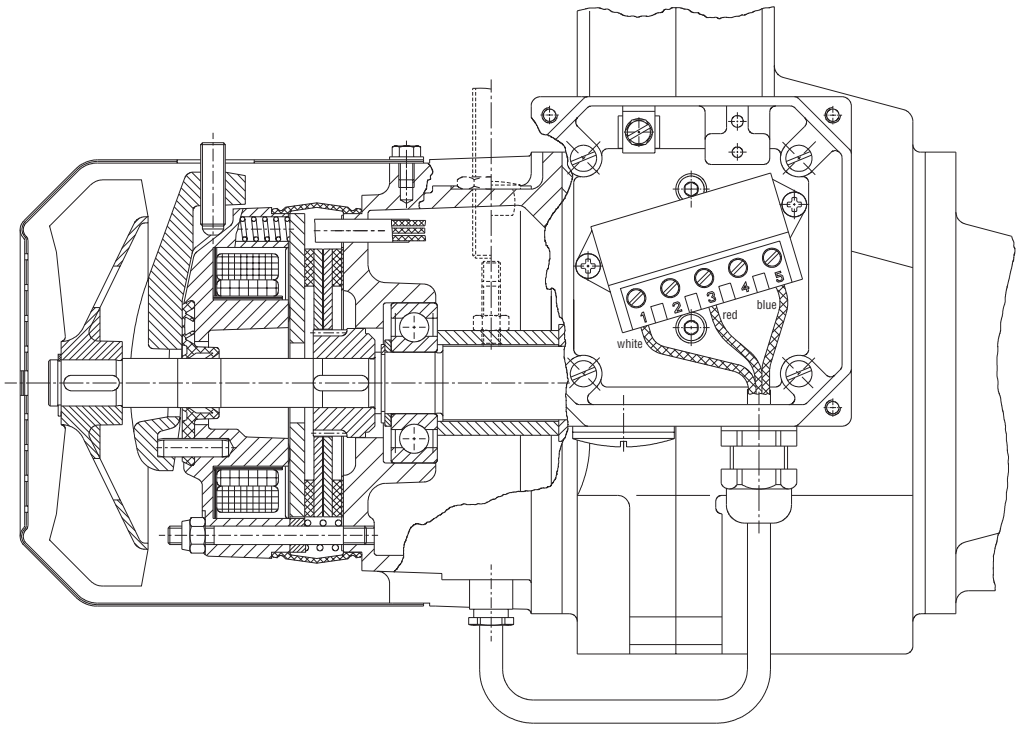

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Fig. 12: Brake in VARIBLOC® variable speed gear units

8 Brakes in extended housings with centrifugal coupling

Refer to the following for more information and detailed technical data:

- **Centrifugal and Torque Limiting Coupling catalog**

Extended housings with SEW centrifugal couplings are also equipped with brakes in the event of special requirements for stopping the machine rapidly and safely whilst avoiding any reverse motion of the drive shaft when the motor is at a standstill. The brake control systems are installed in a special terminal box on the extended housing.

The brake on the motor is adequate for torque limiting couplings.

→ 49, 53

Extended housing with brake + centrifugal coupling type	Brake type	Maximum braking torque (Nm)	Brake control system (standard)	
			AC	24 V_{DC}
LT/LM 60 BMG	BMG4	30	BG	-
LT/LM 70 BMG	BMG4			
LT/LM 80 BMG	BMG8	55	BGE	BSG
LT/LM 90 BM	BM15	125		
LT/LM 100 BM				
LT/LM 105 BM				
LT/LM 130 BM				
LT/LM 135 BM				

Table 20: Survey of data on extended housings with centrifugal coupling and brake

Table 20 provides information about the basic data on extended housings with variable speed gear units and brakes as a standard feature.

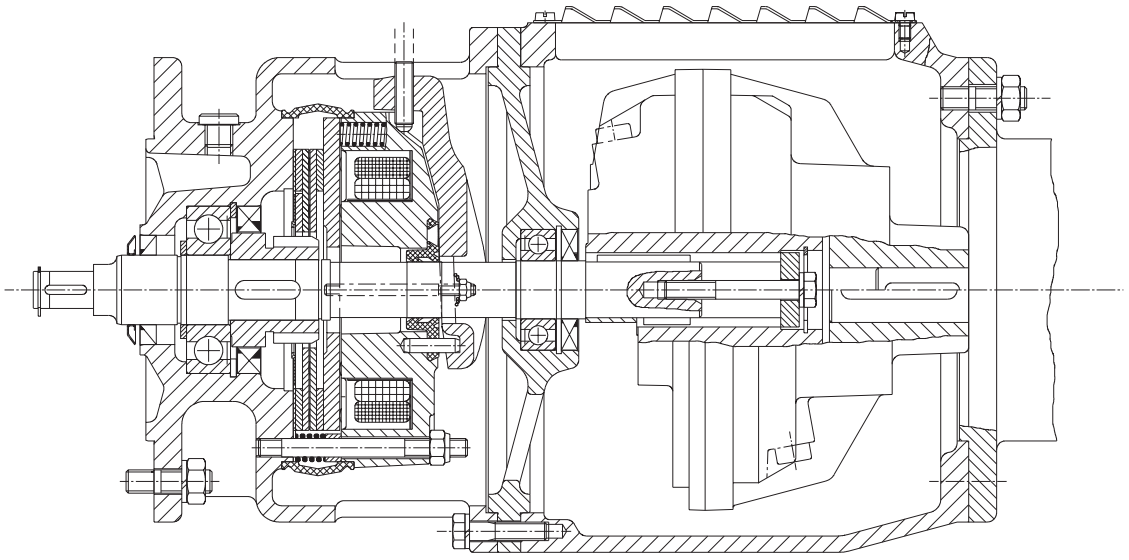

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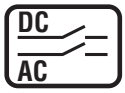
Fig. 13: Brake in extended housing with centrifugal coupling

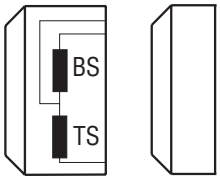
9 Block diagrams of brake control systems

9.1 Key

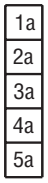
Cut-off in the AC circuit (normal application of the brake)



Cut-off in the DC and AC circuits
(rapid application of the brake)



Brake
BS = Accelerator coil
TS = Coil section



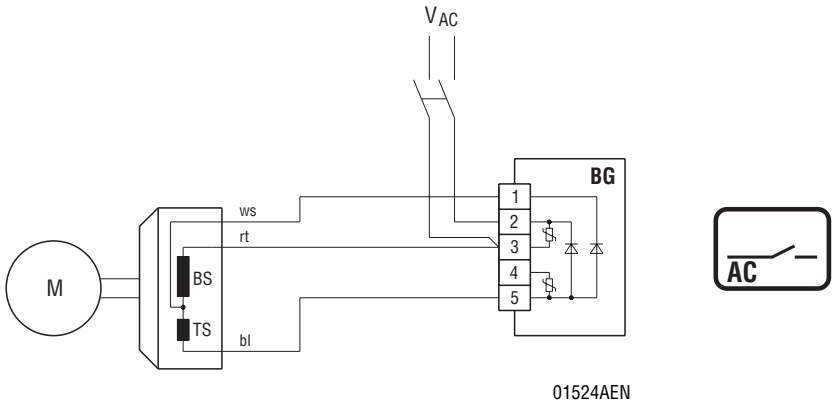
Auxiliary terminal strip in the terminal box

Motor with delta connection

Motor with star connection

ws	White
rt	Red
bl	Blue
br	Brown
sw	Black

9.2 BG, BMS



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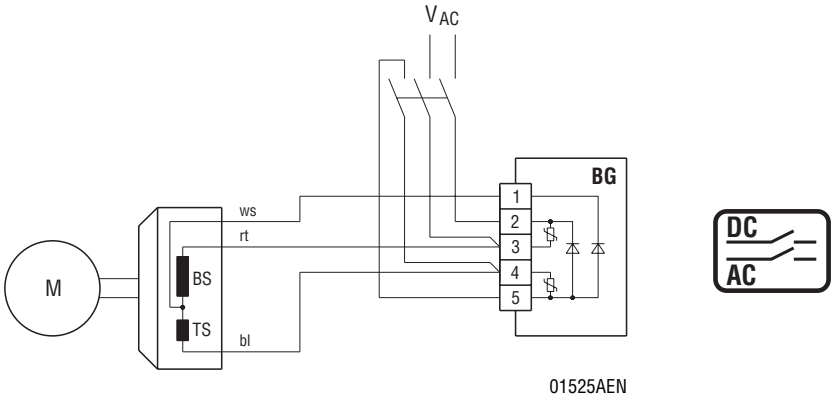

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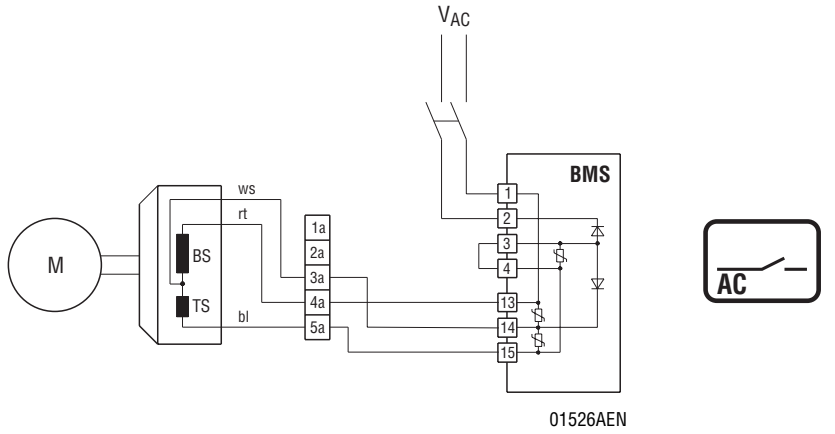

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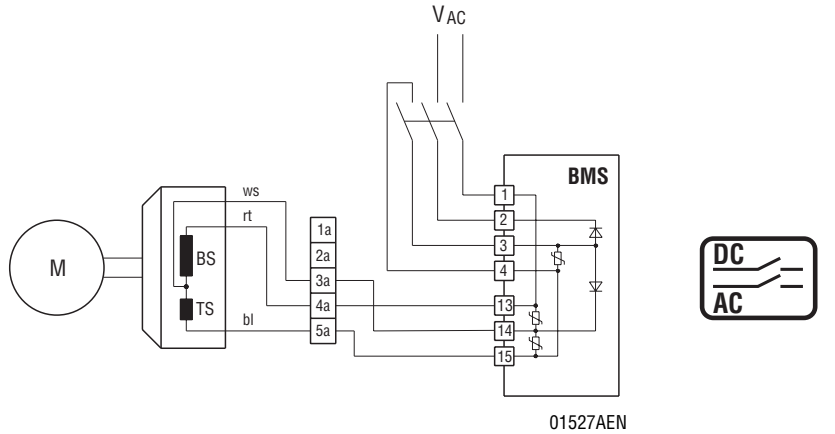

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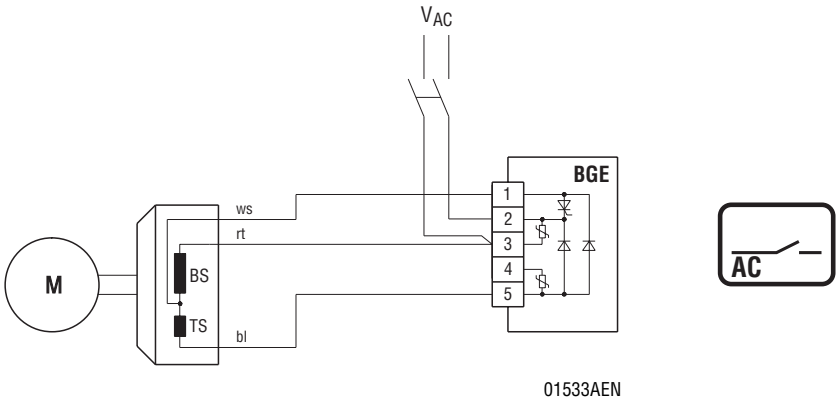
9.3 BGE, BME



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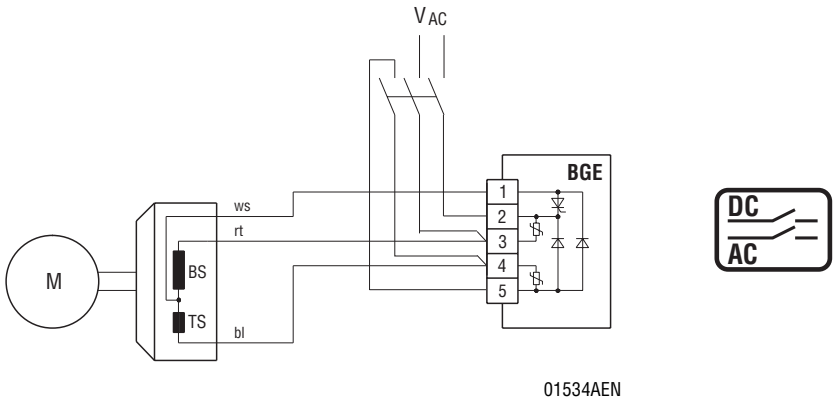

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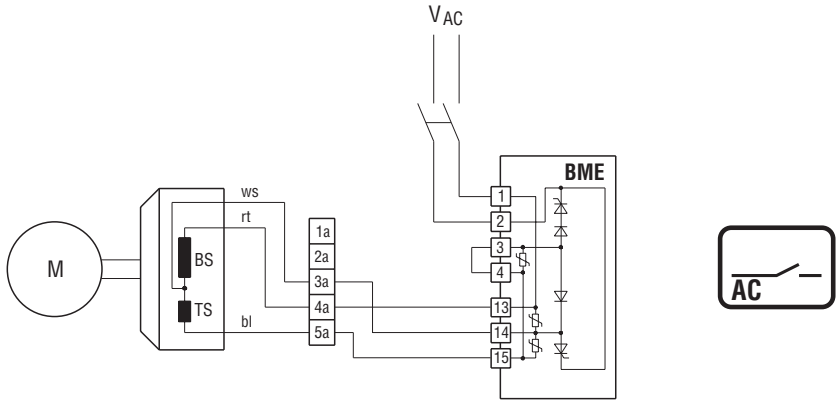
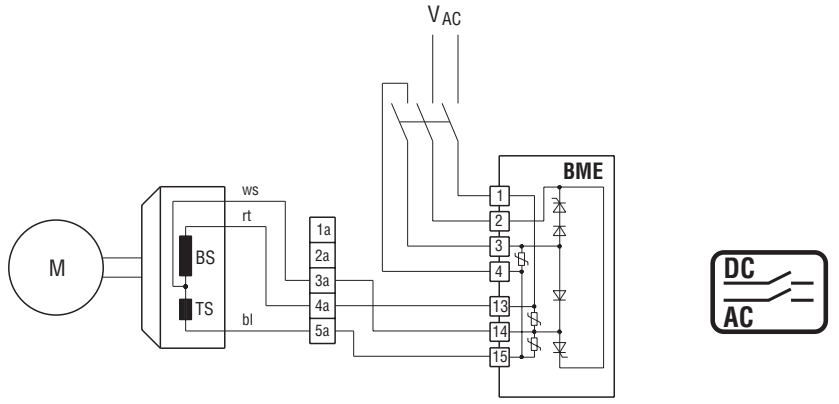


01535AEN



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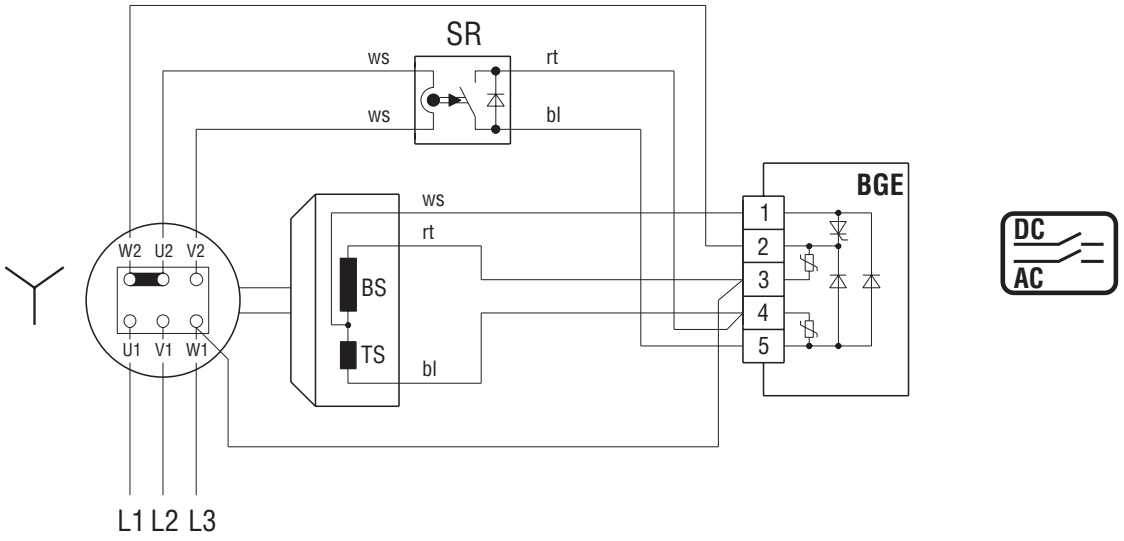
9.4 BSR



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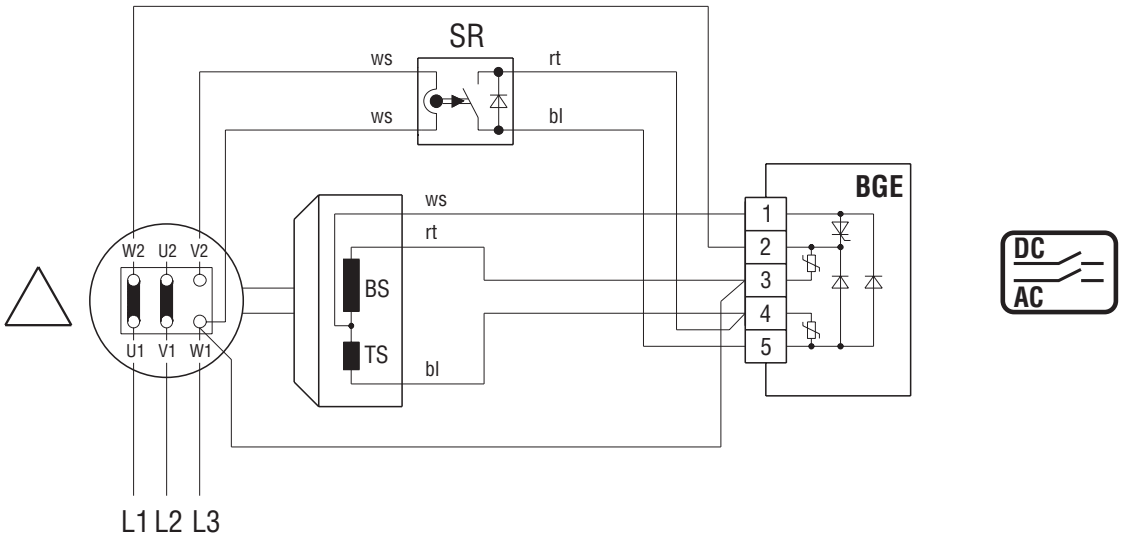

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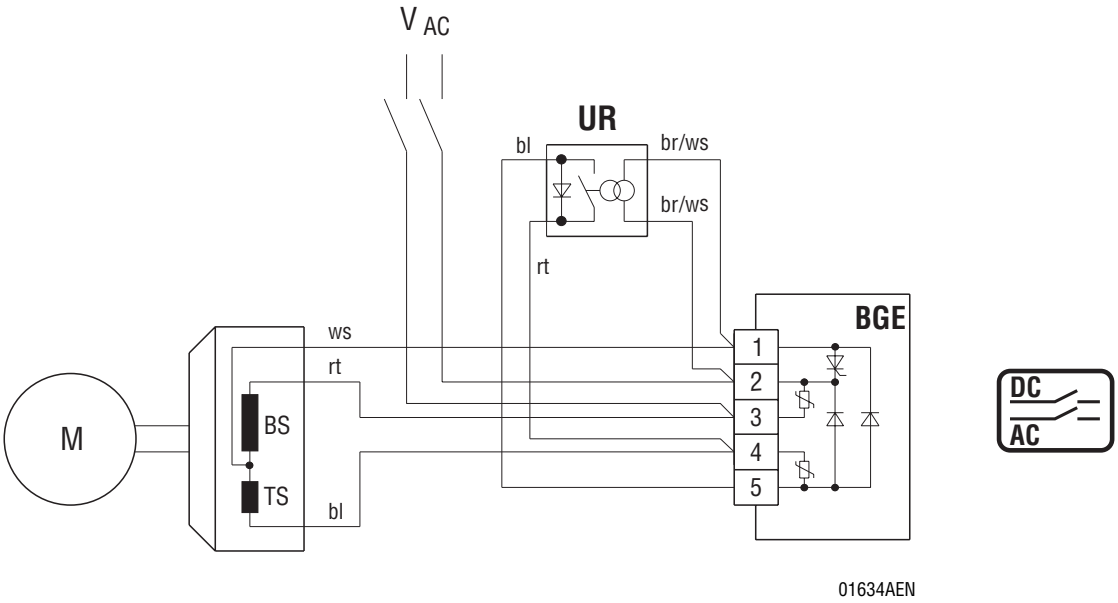
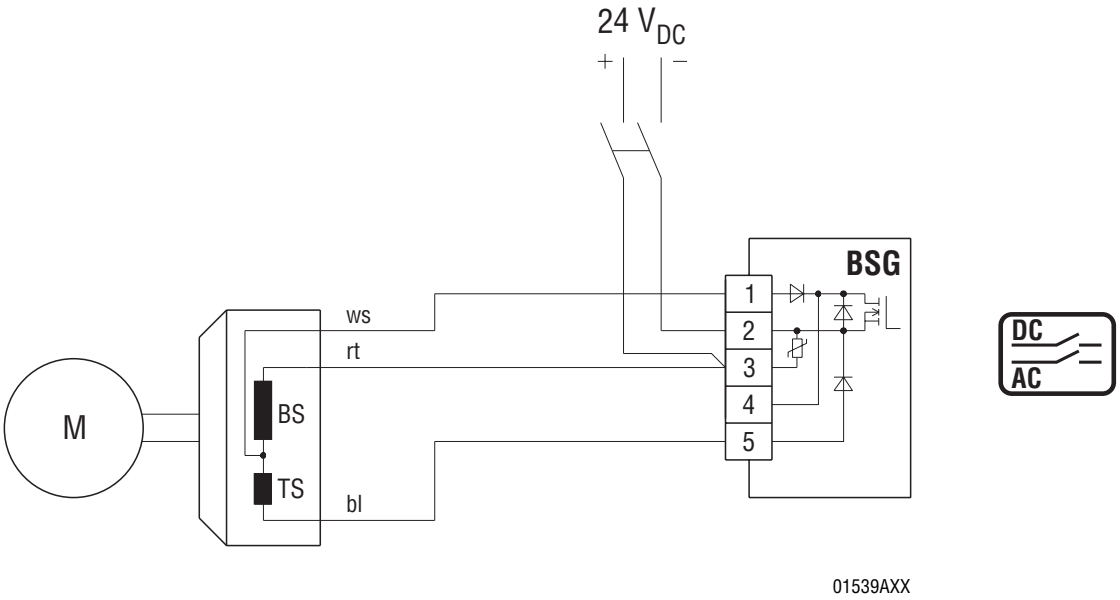
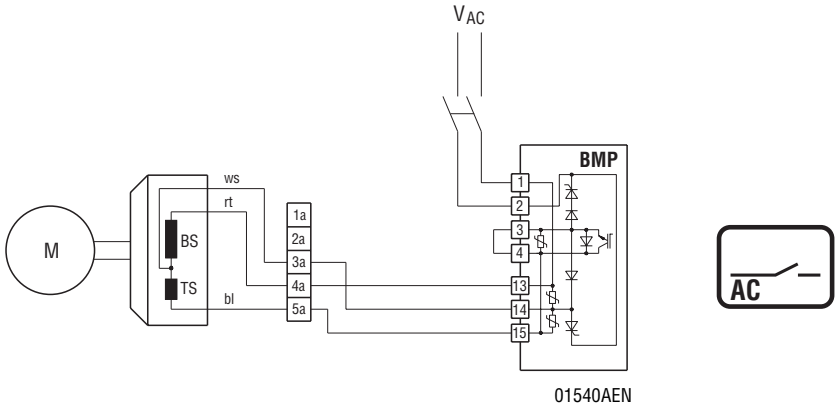
9.5 BUR



9.6 BSG



9.7 BMP, BMH



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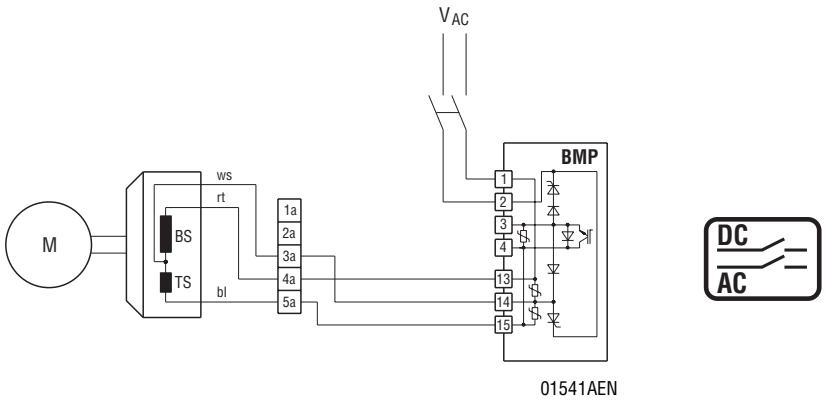

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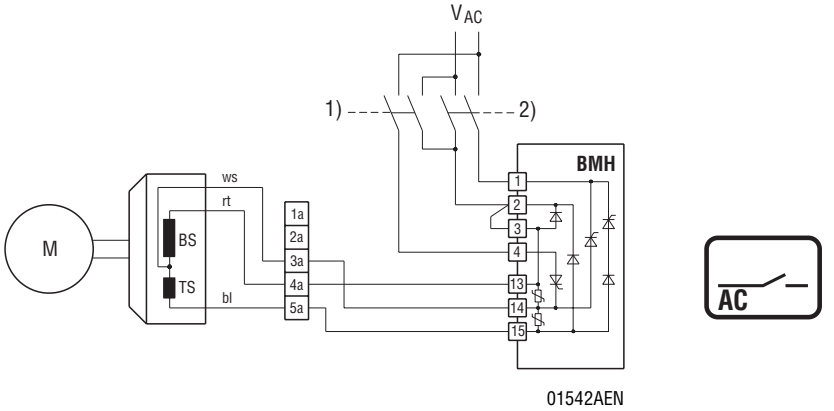
1) Heating
2) Ventilation



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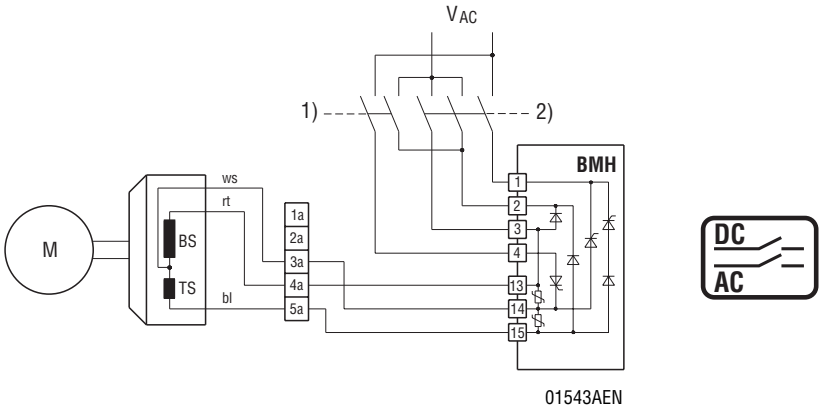
1) Heating
2) Ventilation



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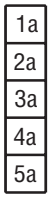
10 Sample circuits

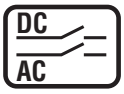
10.1 Key

- **Apply voltage (see rating plate) to release the brake, contacts operate in parallel with the motor contactor.**
- **Contact rating of the brake contactors AC 3 according to EN 60947-4-1**

Cut-off in the AC circuit
(normal application of the brake)

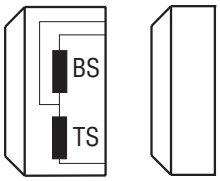


Auxiliary terminal strip
in the terminal box

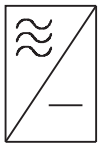


Cut-off in the DC and AC circuits
(rapid application of the brake)

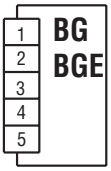
Frequency inverter



Brake
BS = Accelerator coil
TS = Coil section

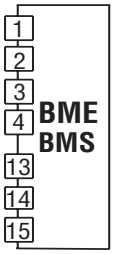


Converter



Brake control system type BG,
BGE for installation in the
motor terminal box

Motor in
delta connection



Brake control system type BME,
BMS for installation in the
switch cabinet

Motor in
star connection

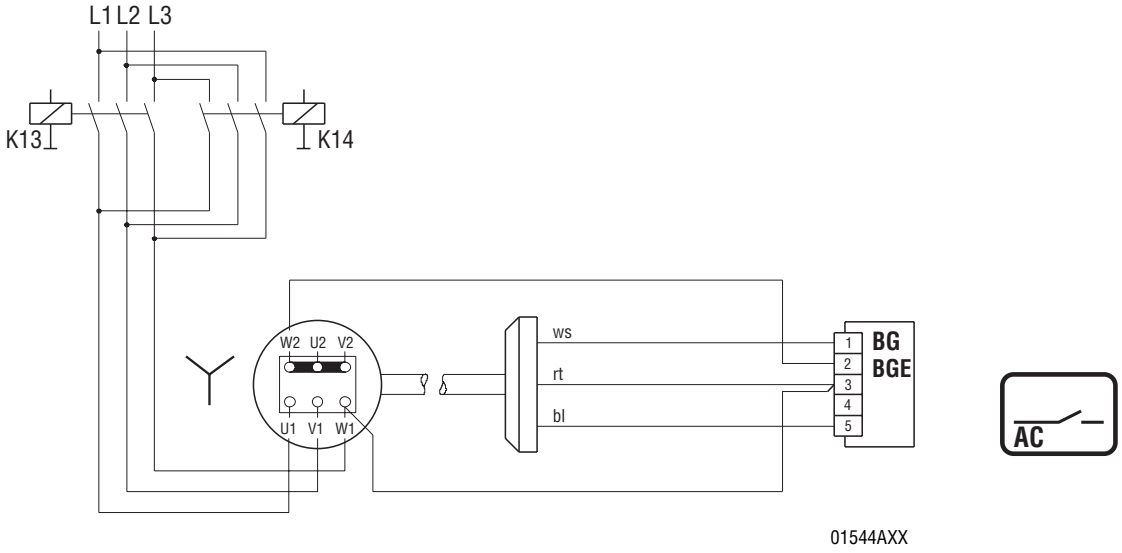
ws	White
rt	Red
bl	Blue
br	Brown
sw	Black

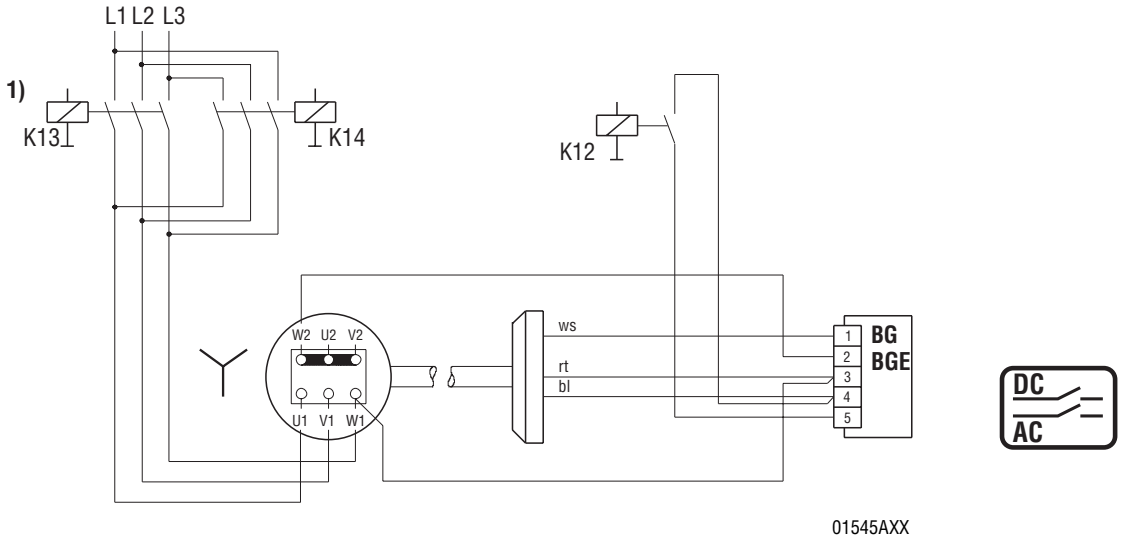
10.2 AC squirrel-cage motors with one speed

BG, BGE in the terminal box, supply from motor terminal board

Brake voltage = Δ voltage

Example: supply system 400 V, motor 230 VΔ /400 VY, brake 230 V_{AC}



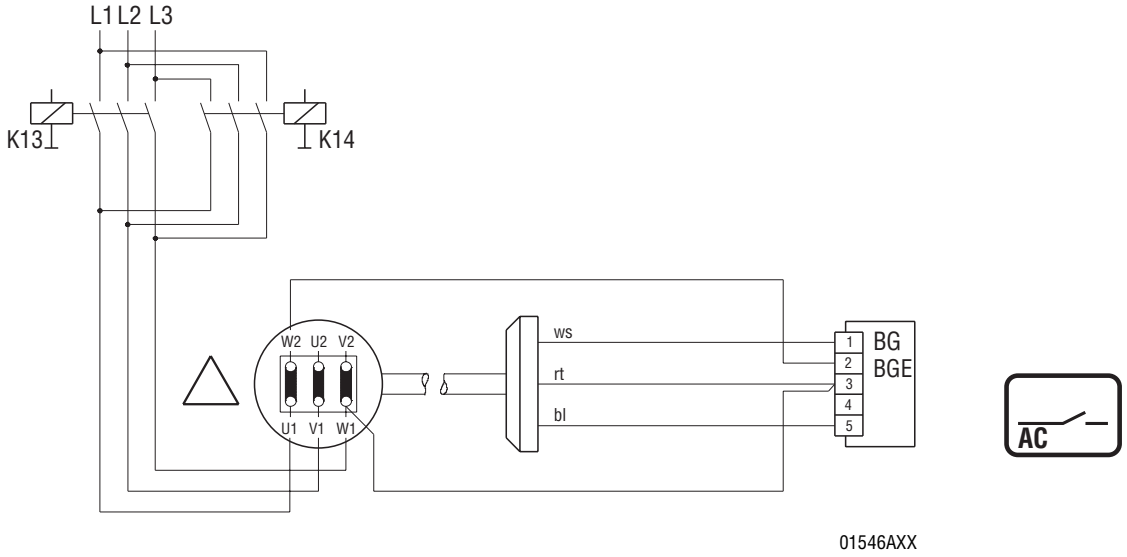


1) K12 is connected at the same time (direction of rotation) as K13 or K14.

BG, BGE in the terminal box, supply from motor terminal board

Brake voltage = Δ voltage

Example: supply system 400 V, motor 400 VΔ /690 VY, brake 400 V_{AC}



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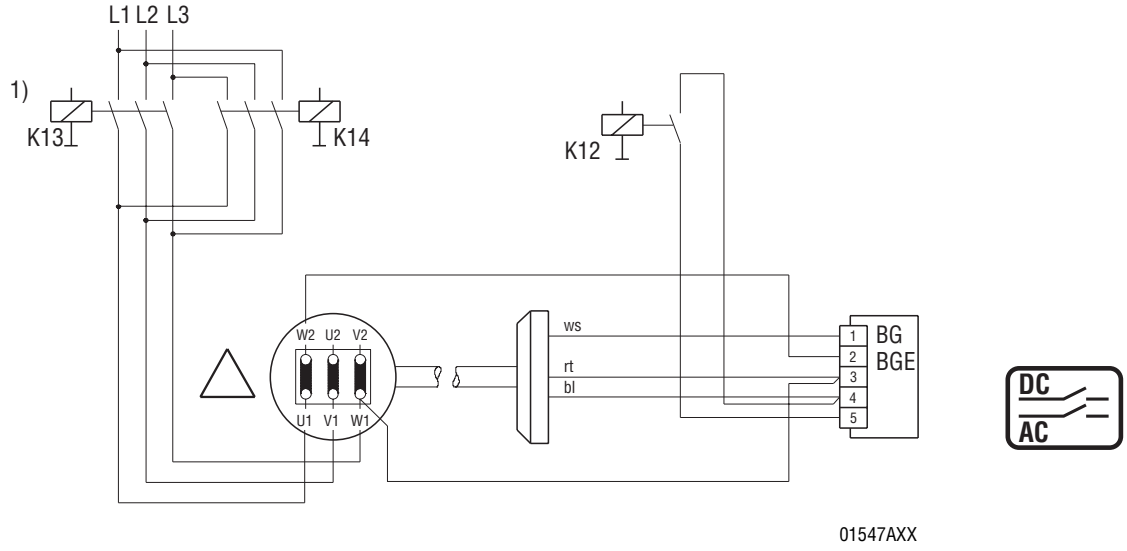

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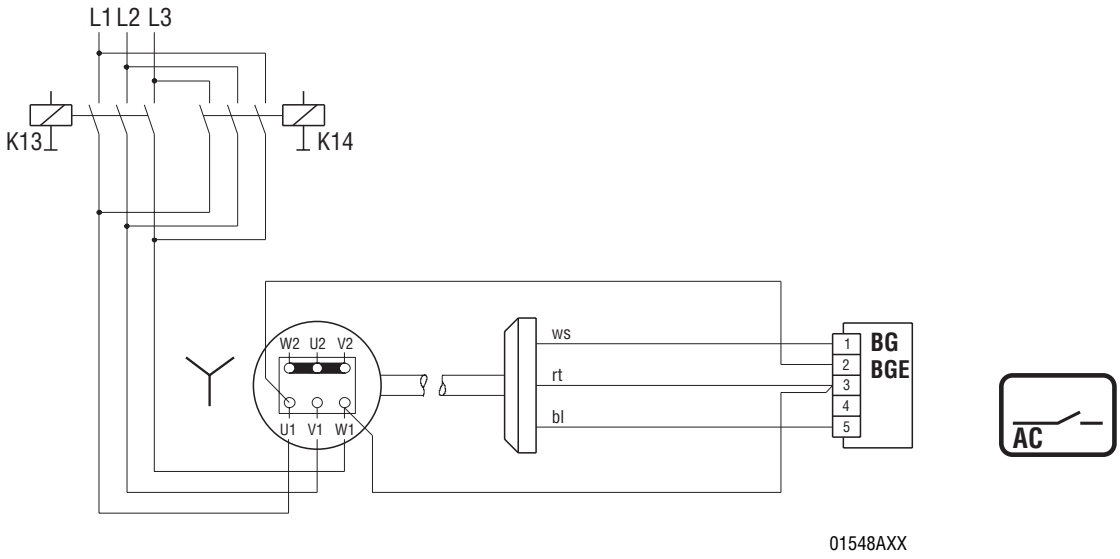
1) K12 is connected at the same time (direction of rotation) as K13 or K14.

BG, BGE in the terminal box, supply from motor terminal board

Brake voltage = ⋎ voltage

Example: supply system 400 V, motor 230 V ∆ /400 V ⋎, brake 400 V_{AC}



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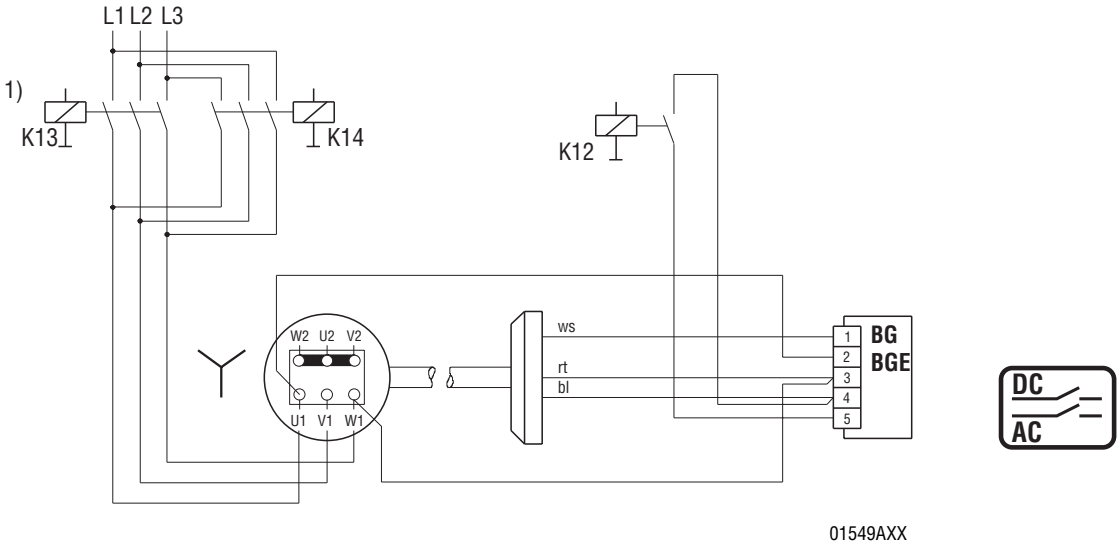

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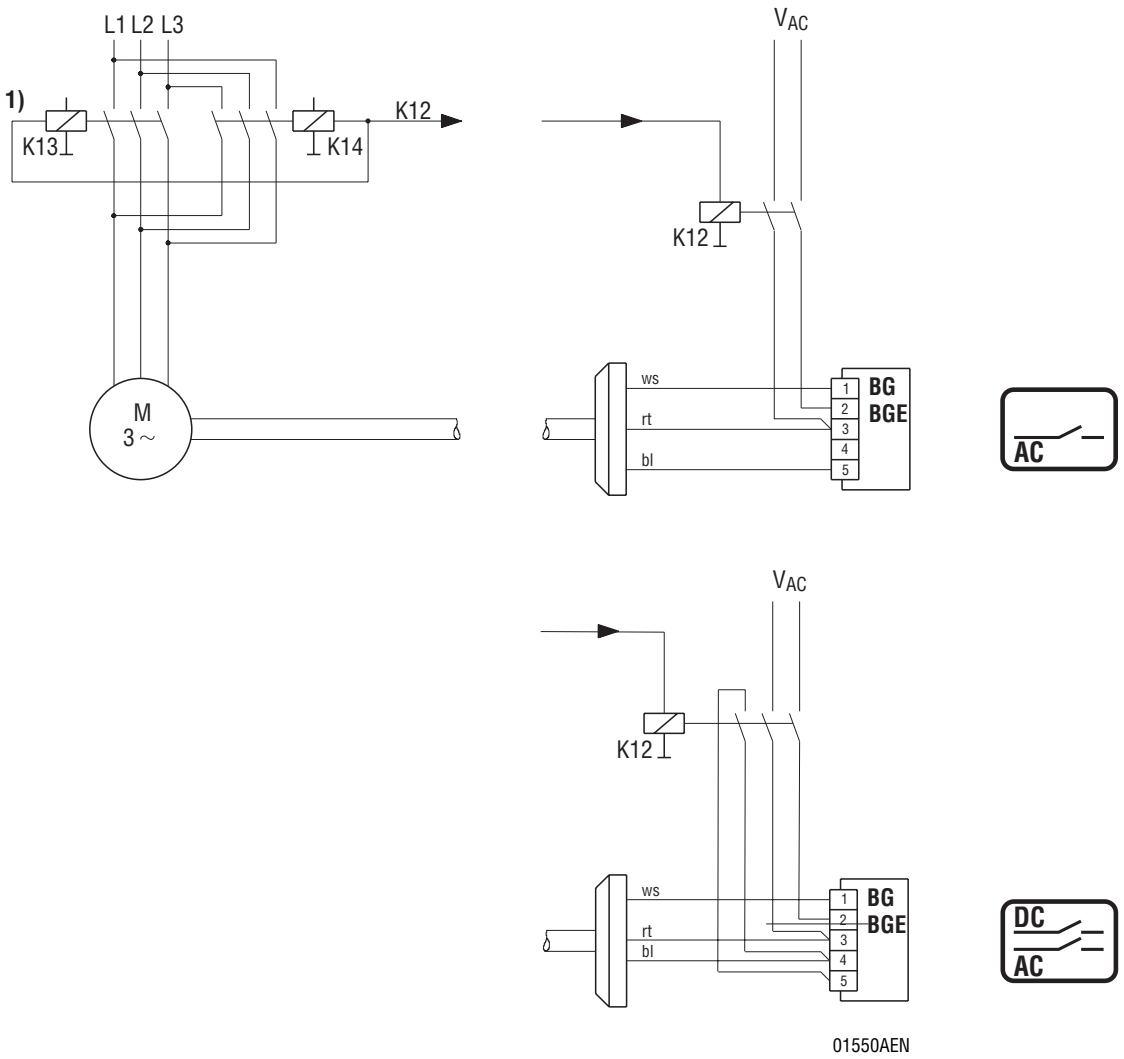
1) K12 is connected at the same time (direction of rotation) as K13 or K14.

BG, BGE in the terminal box, external supply

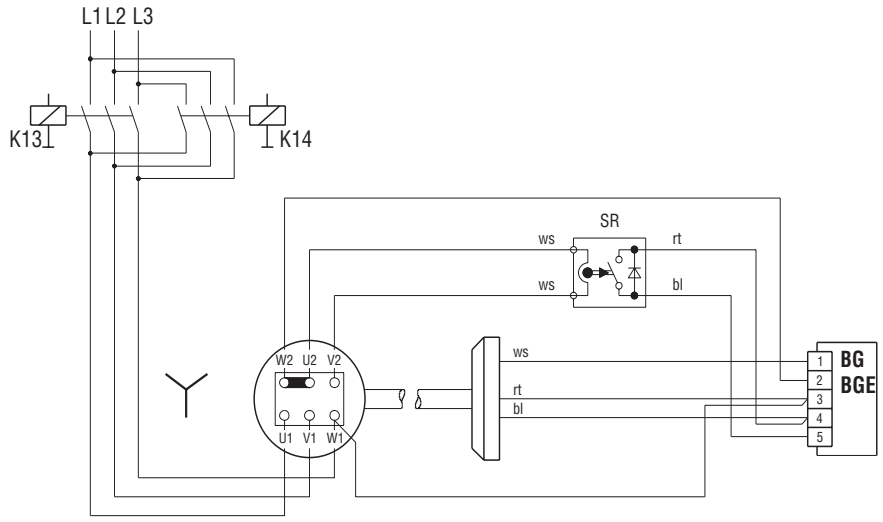


1) K12 is connected at the same time (direction of rotation) as K13 or K14.

BSR in the terminal box

Brake voltage = Δ voltage

Example: supply system 400 V, motor 230 VΔ / 400 VY, brake 230 V_{AC}



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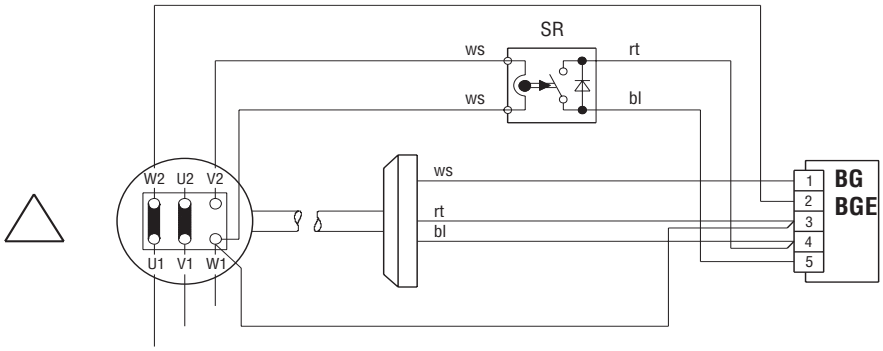
Example: supply system 400 V, motor 400 VΔ /690 VY, brake 400 V_{AC}



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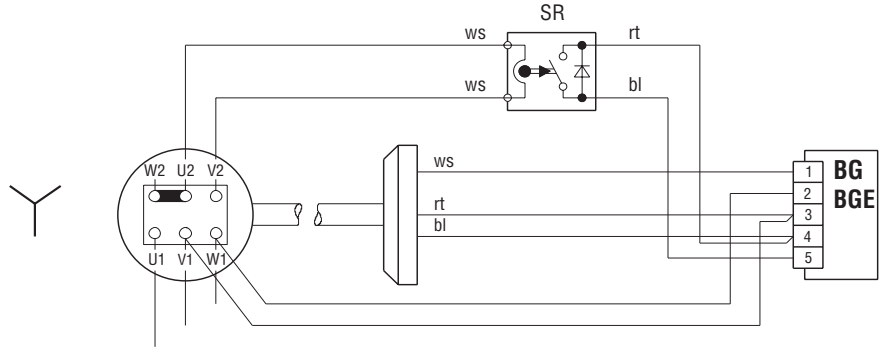
Brake voltage = Y voltage

Example: supply system 400 V, motor 230 VΔ / 400 VY, brake 400 V_{AC}



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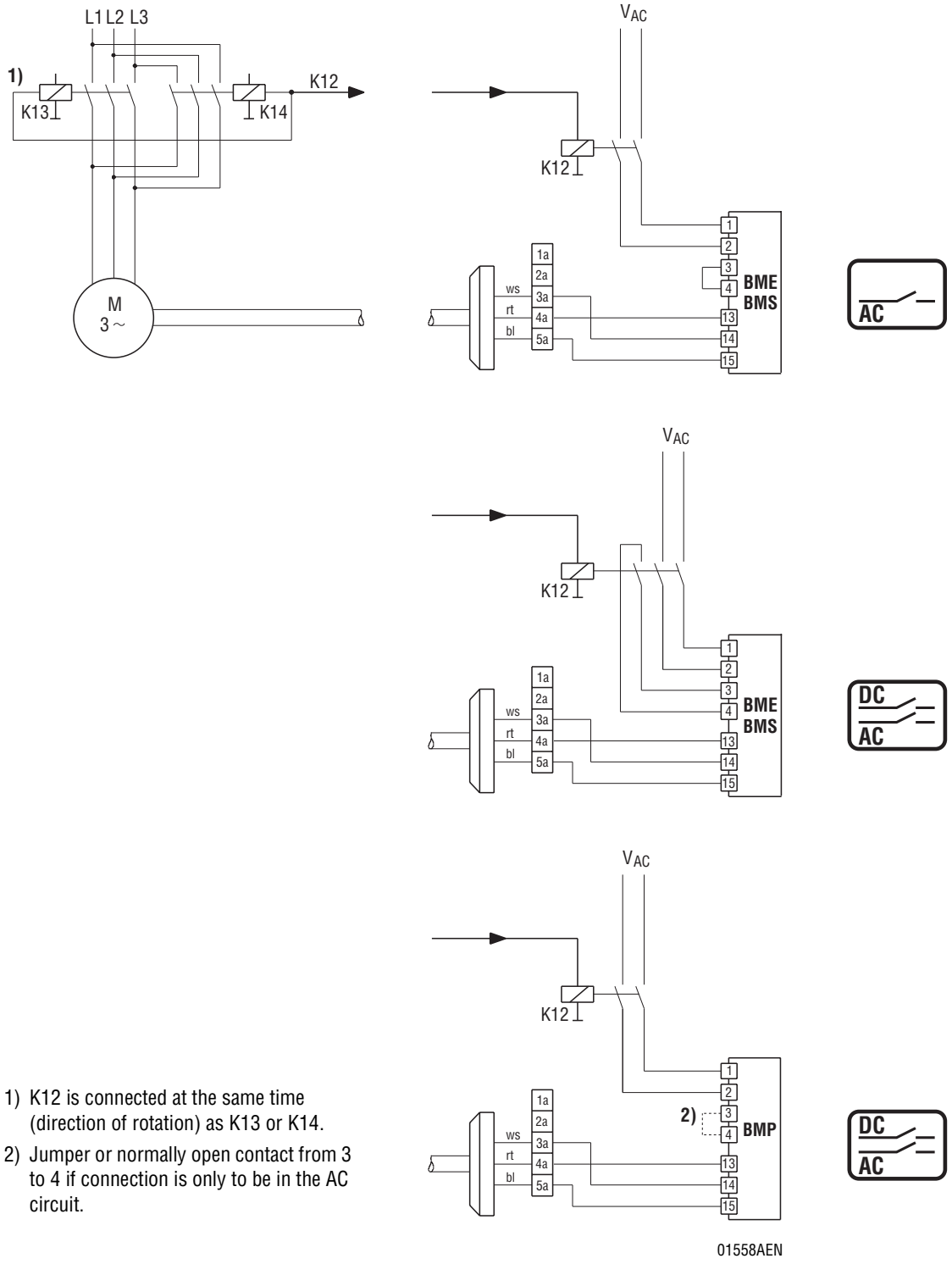
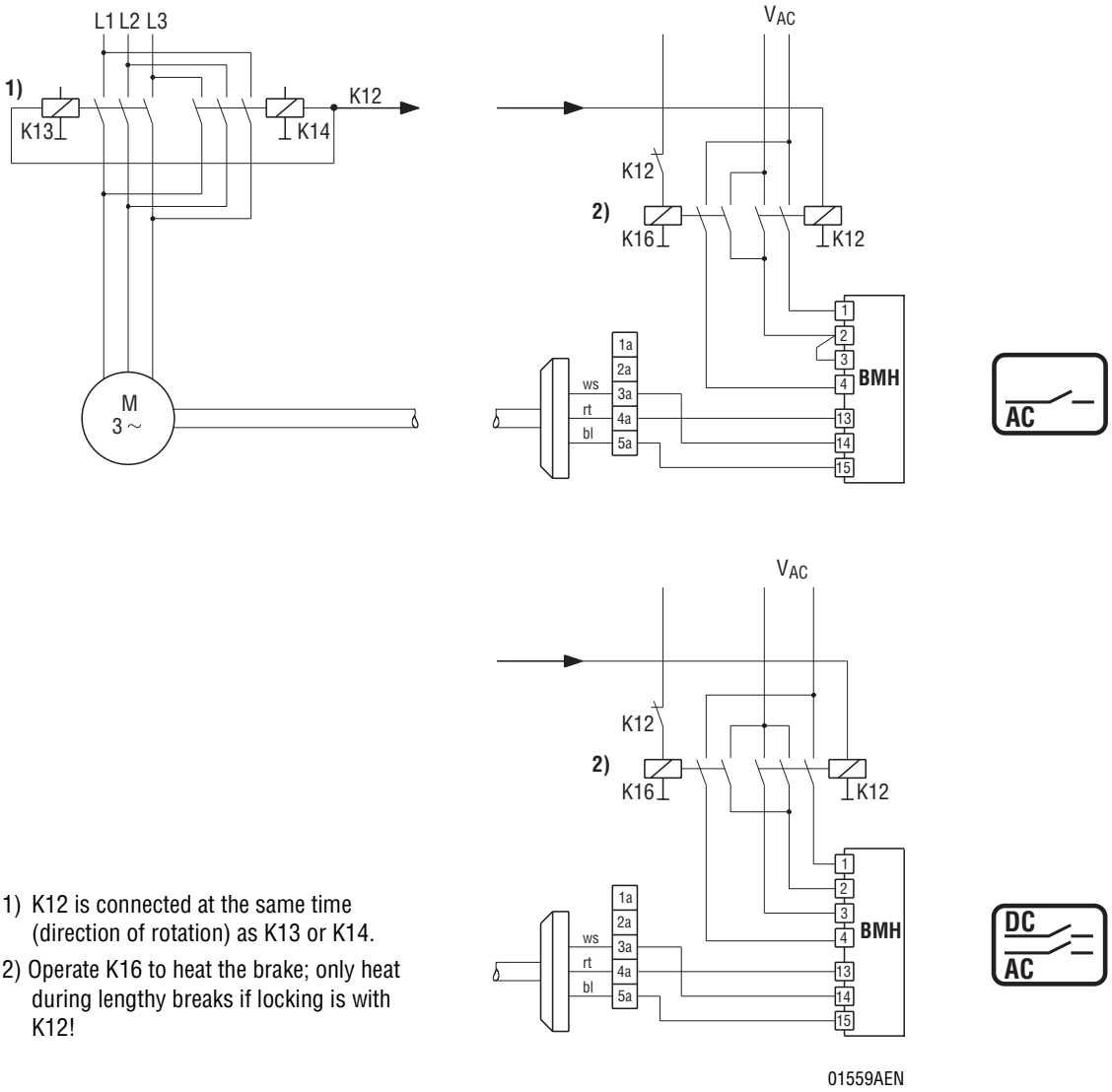
BMS, BME, BMP in the switch cabinet



1) K12 is connected at the same time (direction of rotation) as K13 or K14.
2) Jumper or normally open contact from 3 to 4 if connection is only to be in the AC circuit.

BMH in the switch cabinet



1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Operate K16 to heat the brake; only heat during lengthy breaks if locking is with K12!

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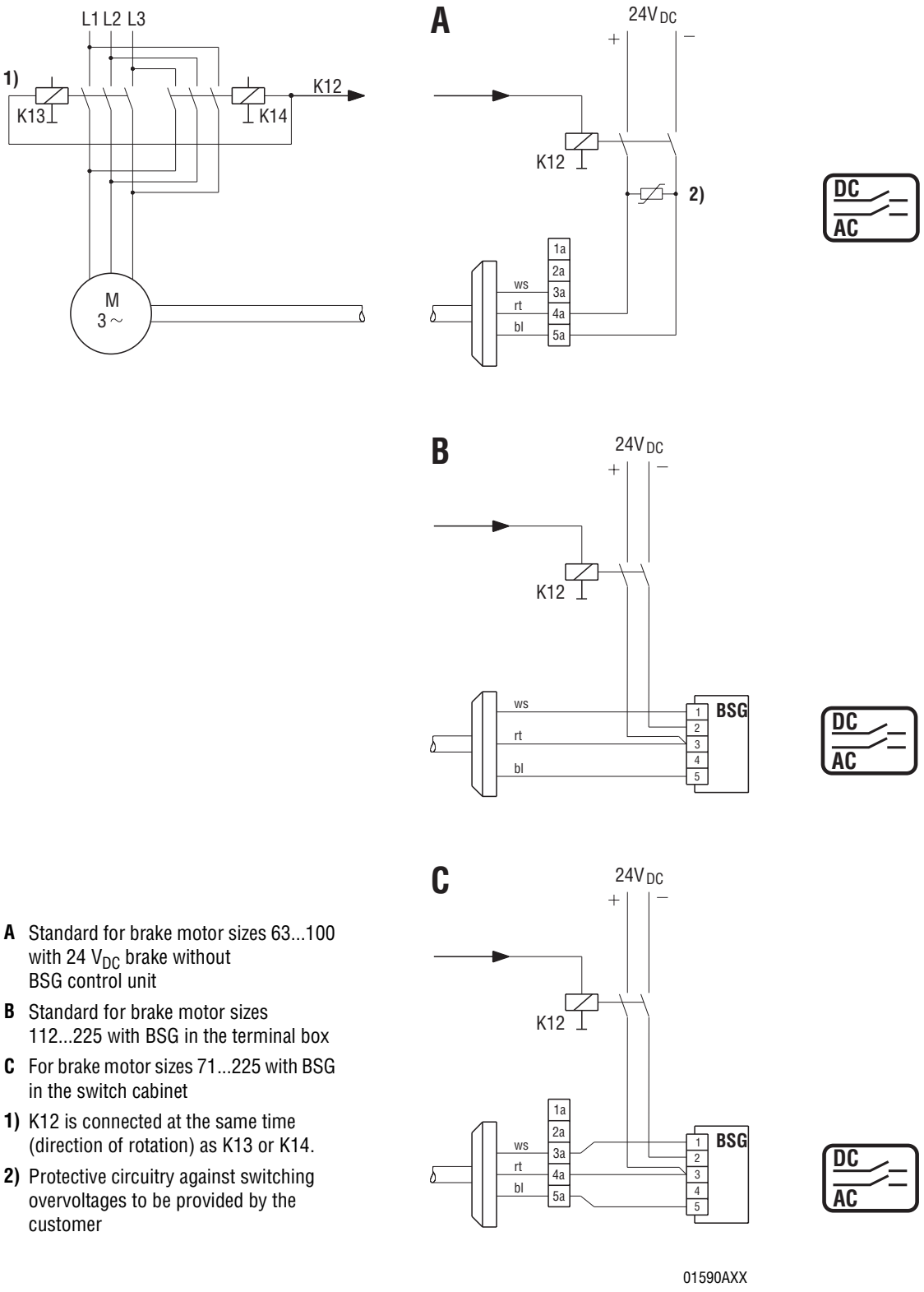
Brake control system 24 V_{DC}



A Standard for brake motor sizes 63...100 with 24 V_{DC} brake without BSG control unit

B Standard for brake motor sizes 112...225 with BSG in the terminal box

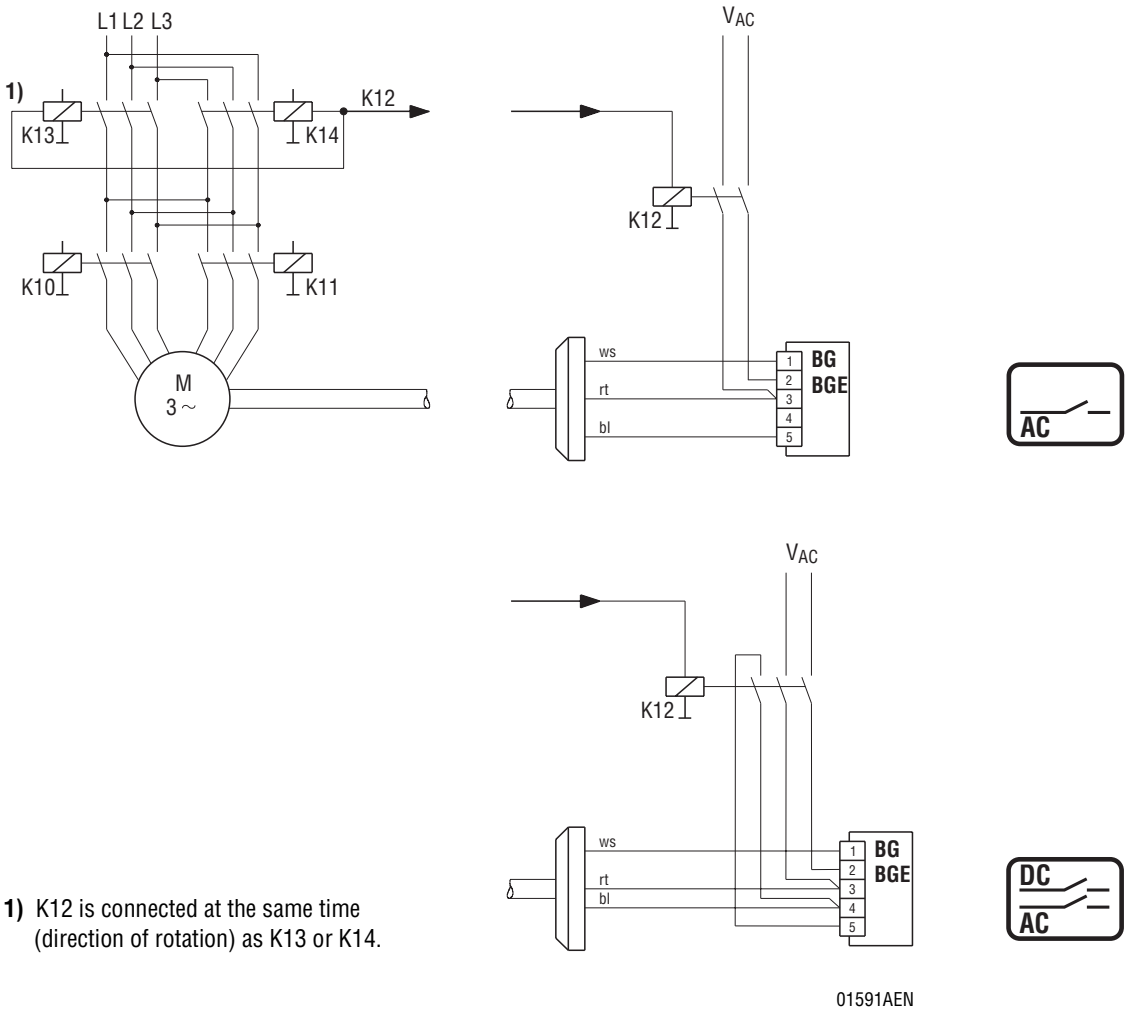
C For brake motor sizes 71...225 with BSG in the switch cabinet

1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Protective circuitry against switching overvoltages to be provided by the customer

10.3 Pole-changing motors

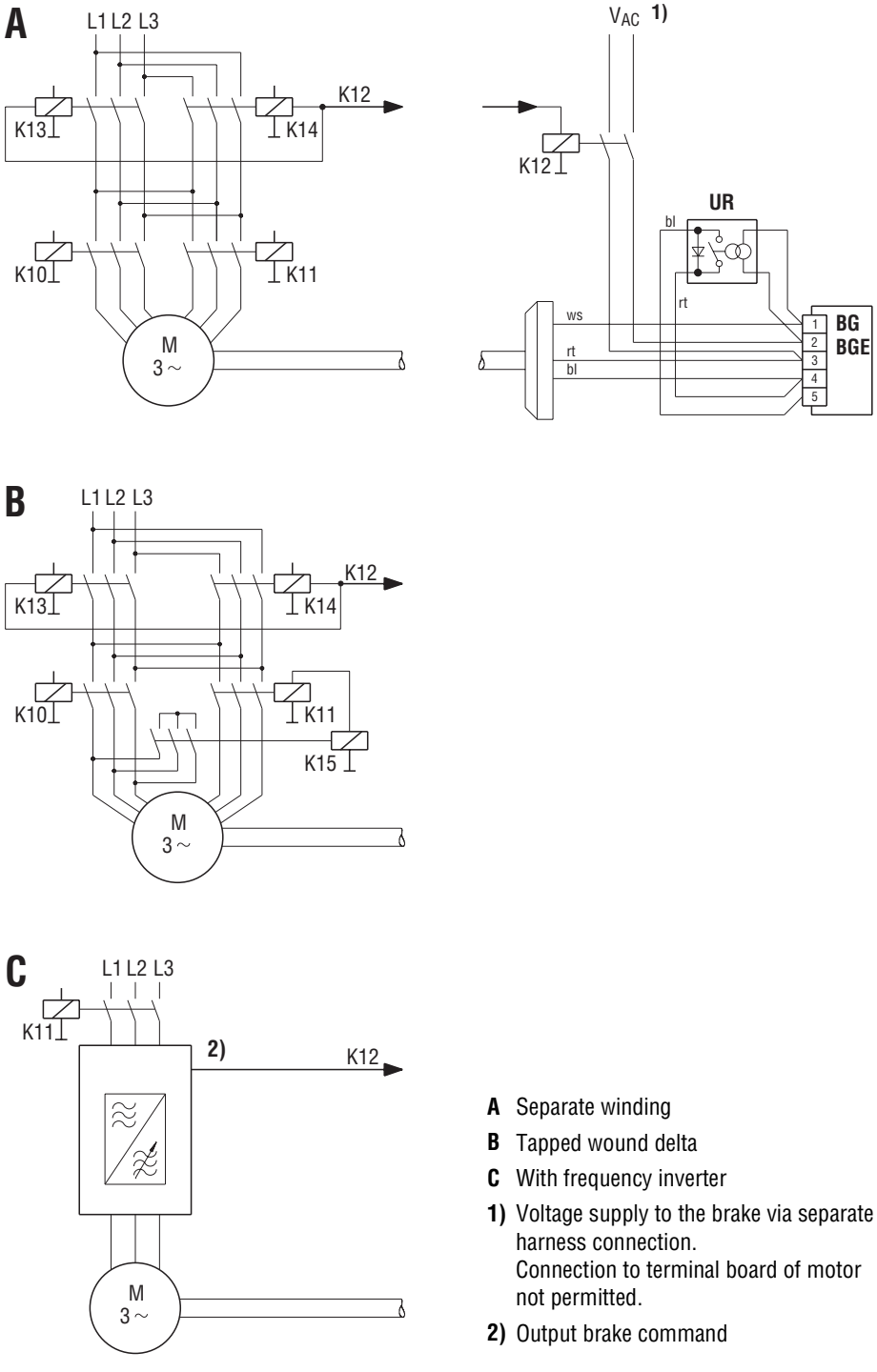
BG, BGE in the terminal box, pole-changing motor (separate winding)



1) K12 is connected at the same time (direction of rotation) as K13 or K14.

01591AEN

BUR with pole-changing and speed-controlled AC squirrel cage motors



A Separate winding

B Tapped wound delta

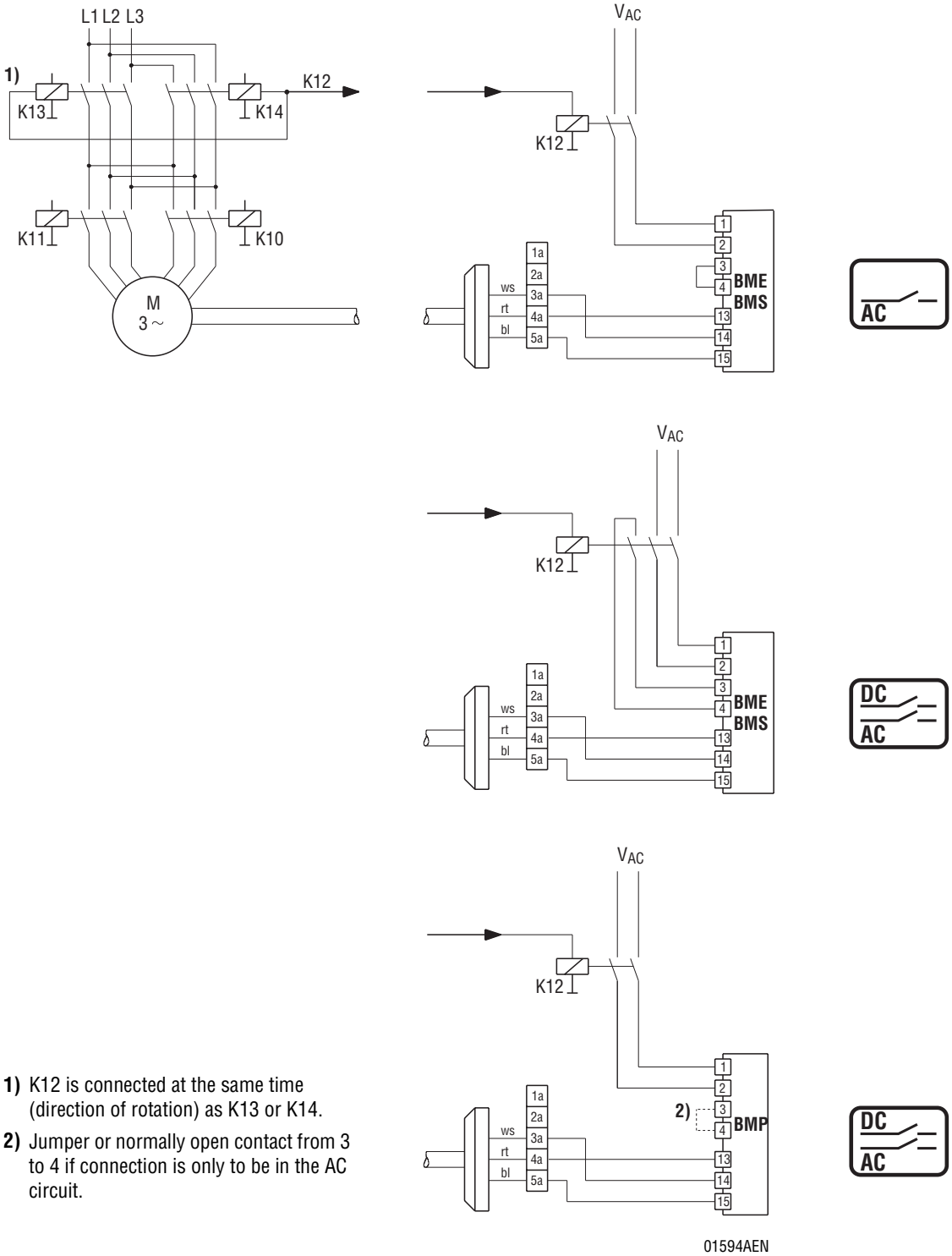
C With frequency inverter

1) Voltage supply to the brake via separate harness connection.
Connection to terminal board of motor not permitted.

2) Output brake command

01592AEN

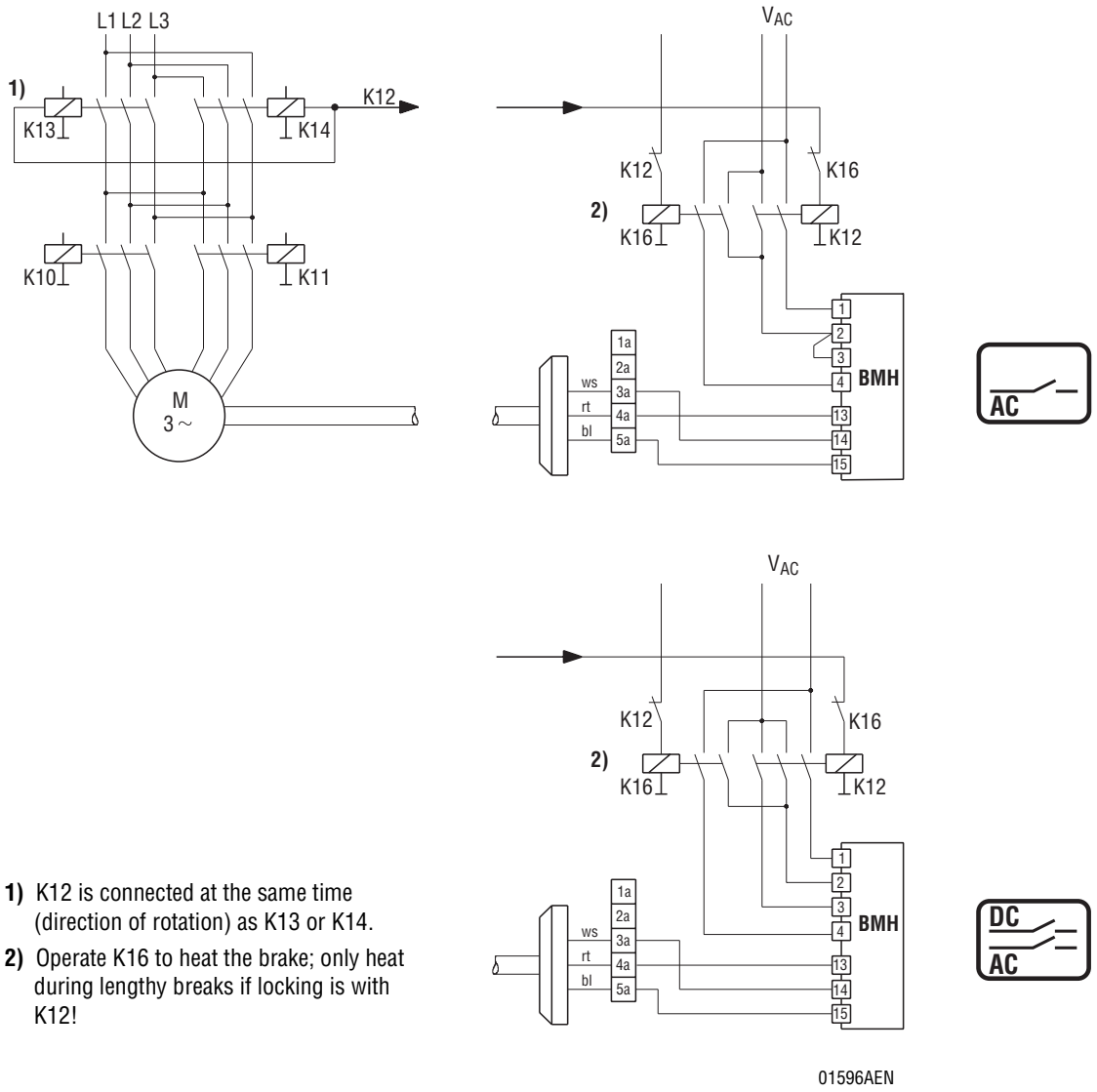
BMS, BME, BMP in the switch cabinet, pole-changing motor (separate winding)



1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Jumper or normally open contact from 3 to 4 if connection is only to be in the AC circuit.

BMH in the switch cabinet, pole-changing motor (separate winding)

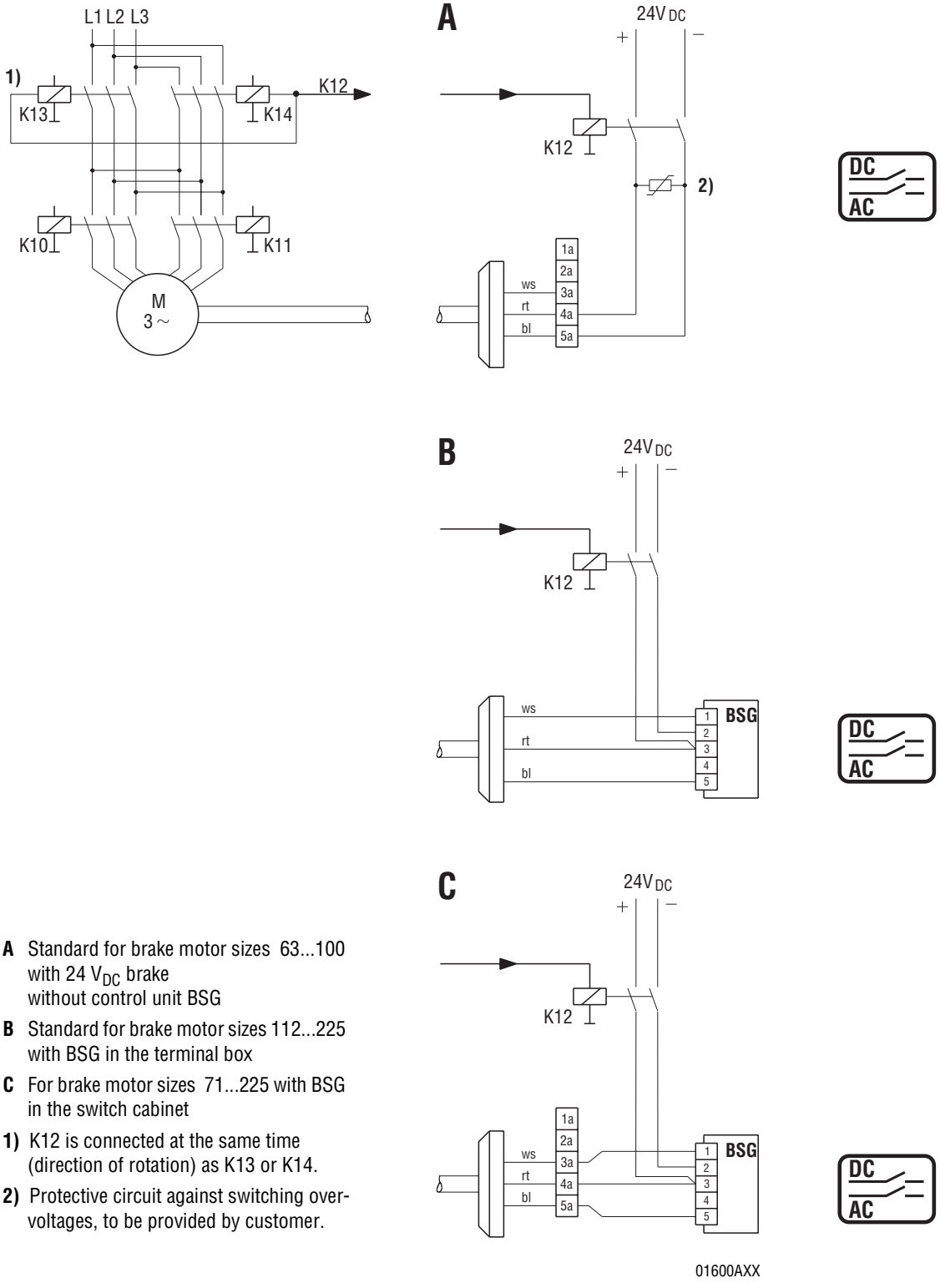


01596AEN

1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Operate K16 to heat the brake; only heat during lengthy breaks if locking is with K12!

Brake control system 24 V_{DC}, pole-changing motor (separate winding)



A Standard for brake motor sizes 63...100 with 24 V_{DC} brake without control unit BSG

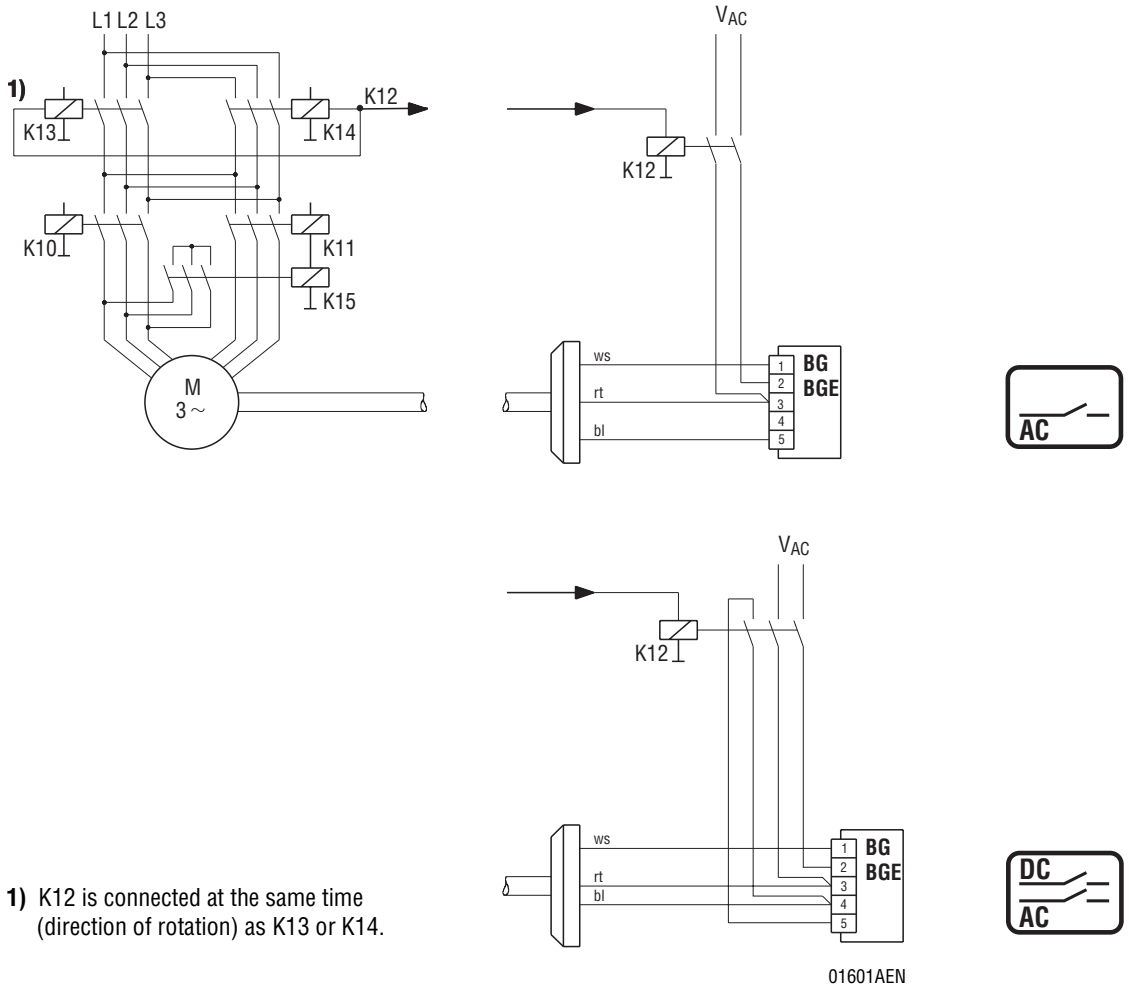
B Standard for brake motor sizes 112...225 with BSG in the terminal box

C For brake motor sizes 71...225 with BSG in the switch cabinet

1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Protective circuit against switching overvoltages, to be provided by customer.

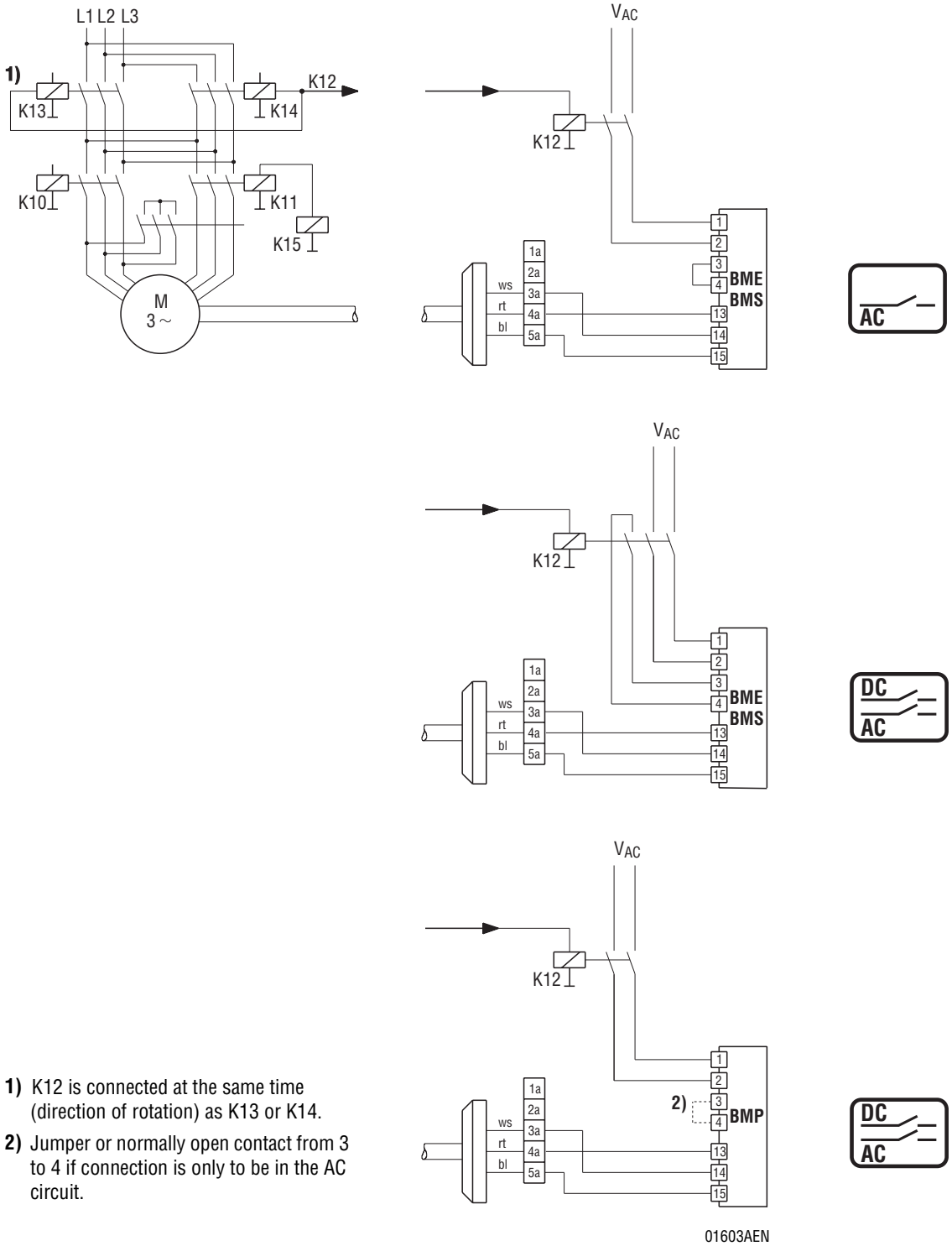
BG, BGE in the terminal box, pole-changing motor (tapped wound)



1) K12 is connected at the same time (direction of rotation) as K13 or K14.

01601AEN

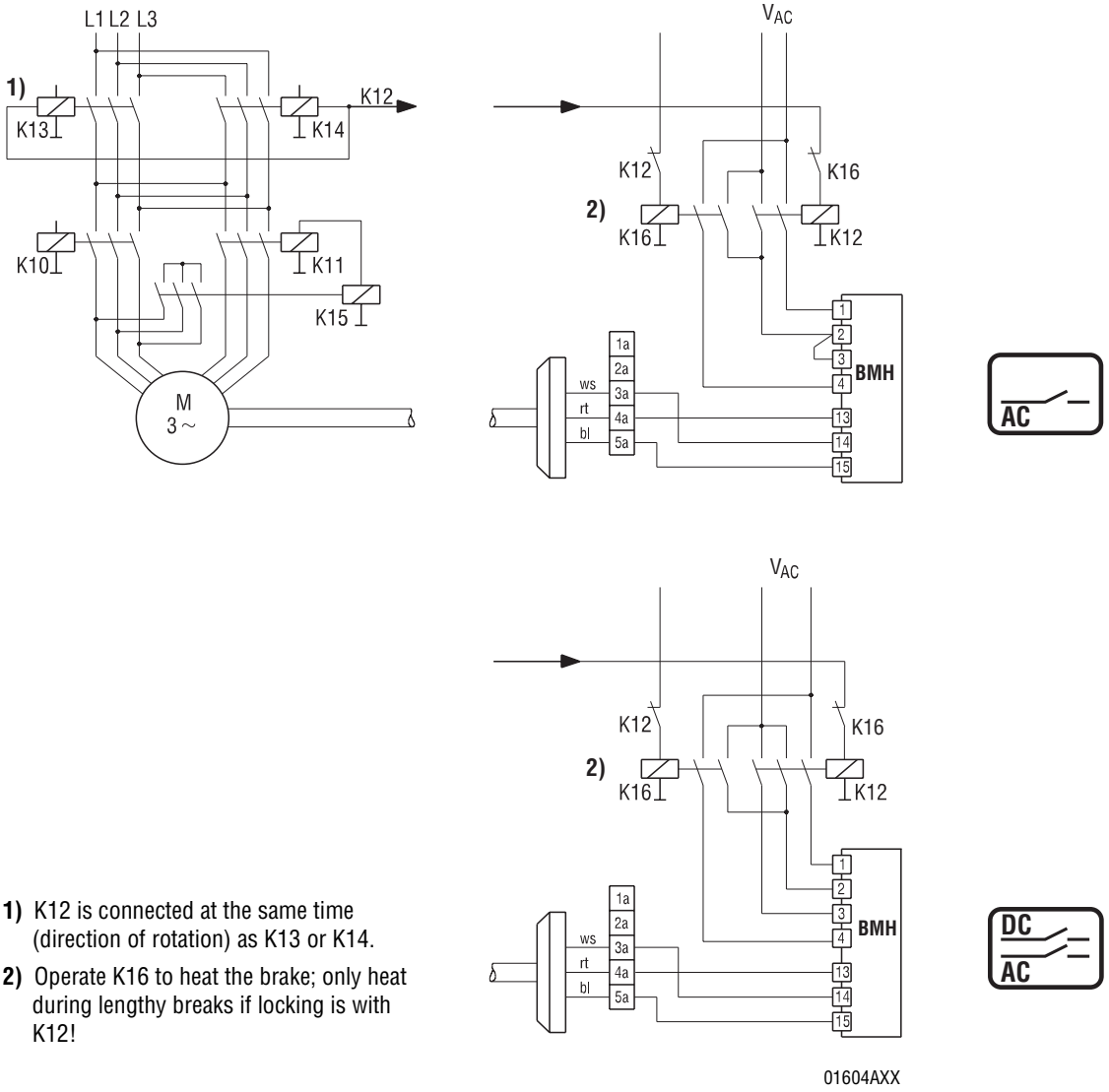
BMS, BME, BMP in the switch cabinet, pole-changing motor (tapped wound)



1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Jumper or normally open contact from 3 to 4 if connection is only to be in the AC circuit.

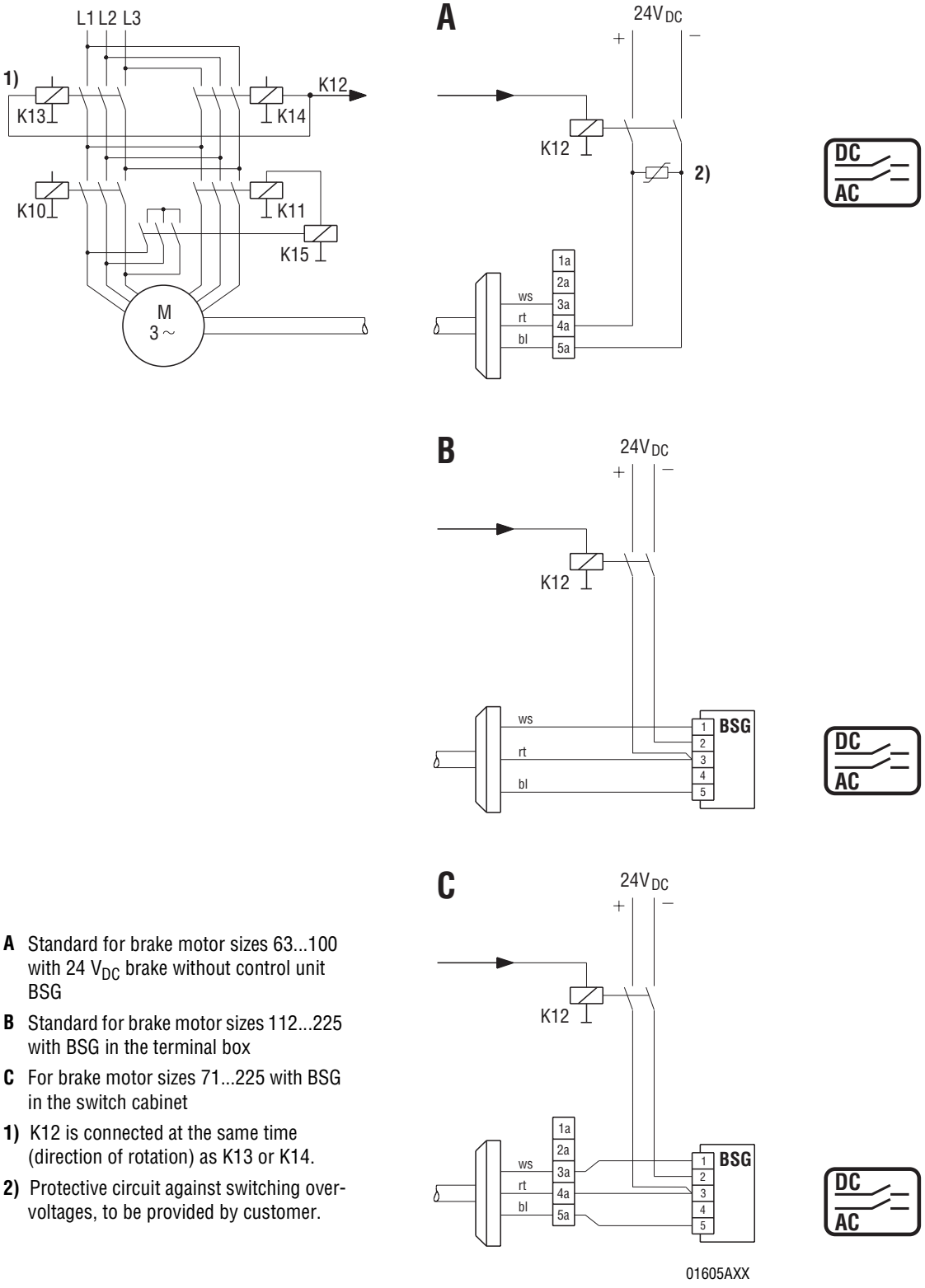
BMH in the switch cabinet, pole-changing motor (tapped wound)



1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Operate K16 to heat the brake; only heat during lengthy breaks if locking is with K12!

Brake control system $24V_{DC}$, pole-changing motor (tapped wound)



A Standard for brake motor sizes 63...100 with 24 V_{DC} brake without control unit BSG

B Standard for brake motor sizes 112...225 with BSG in the terminal box

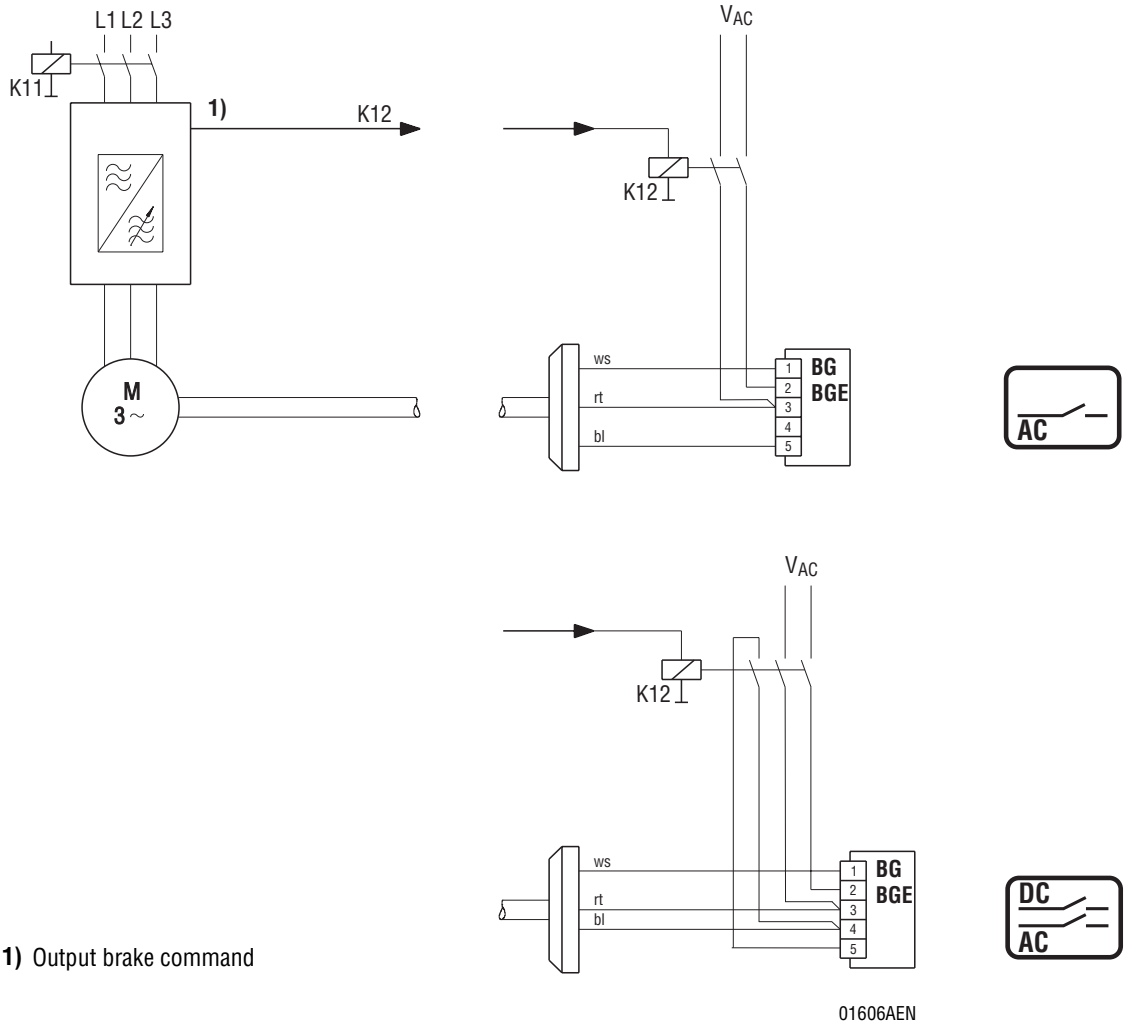
C For brake motor sizes 71...225 with BSG in the switch cabinet

1) K12 is connected at the same time (direction of rotation) as K13 or K14.

2) Protective circuit against switching over-voltages, to be provided by customer.

10.4 AC squirrel-cage motors with frequency inverter

BG, BGE in the terminal box, AC squirrel-cage motor with frequency inverter



1) Output brake command

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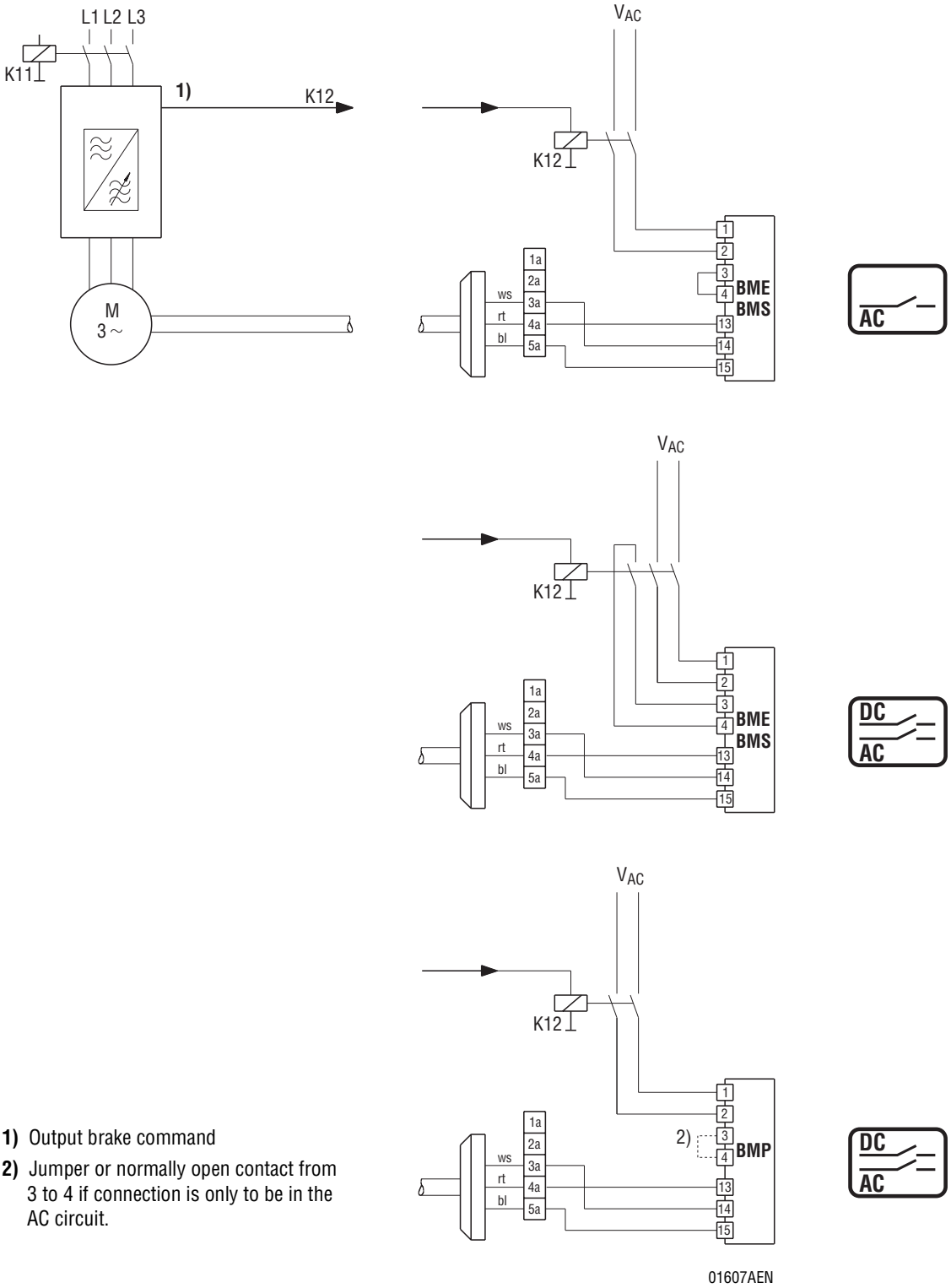
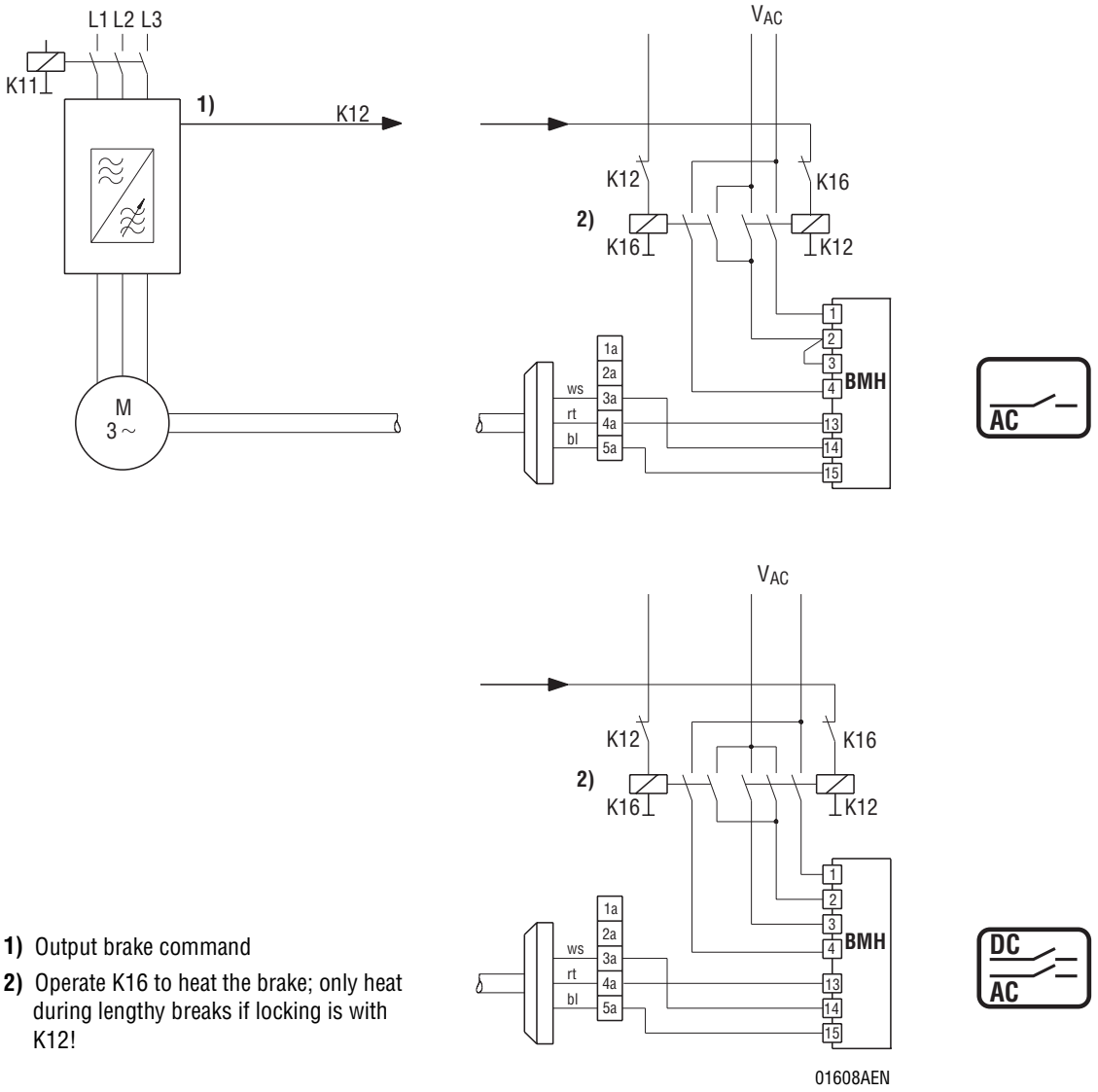
BMS, BME, BMP in the switch cabinet, AC squirrel-cage motor with frequency inverter



1) Output brake command

2) Jumper or normally open contact from 3 to 4 if connection is only to be in the AC circuit.

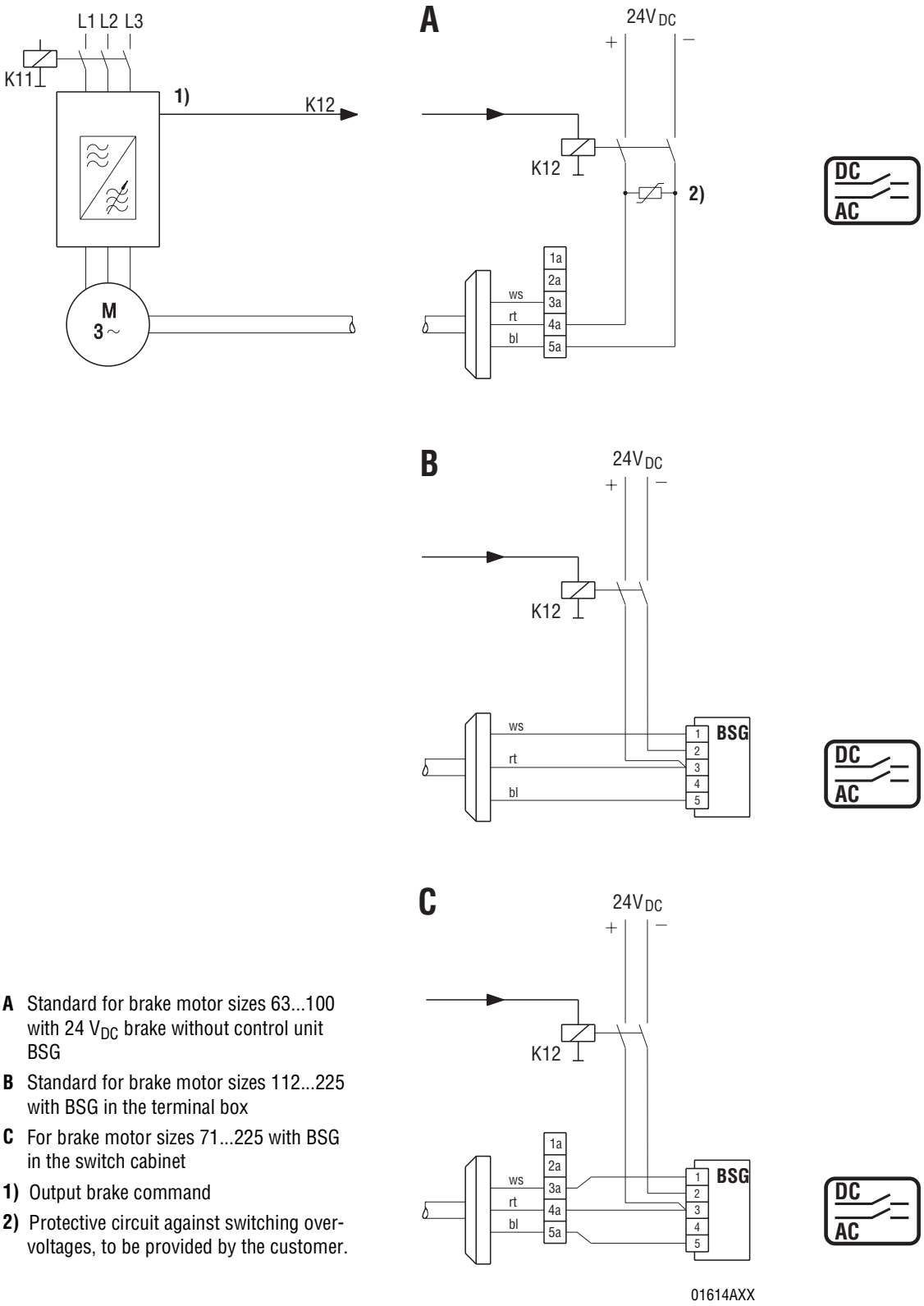
BMH in the switch cabinet, AC squirrel cage motor with frequency inverter



1) Output brake command

2) Operate K16 to heat the brake; only heat during lengthy breaks if locking is with K12!

Brake control system 24 V_{DC}, AC squirrel-cage motor with frequency inverter



A Standard for brake motor sizes 63...100 with 24 V_{DC} brake without control unit BSG

B Standard for brake motor sizes 112...225 with BSG in the terminal box

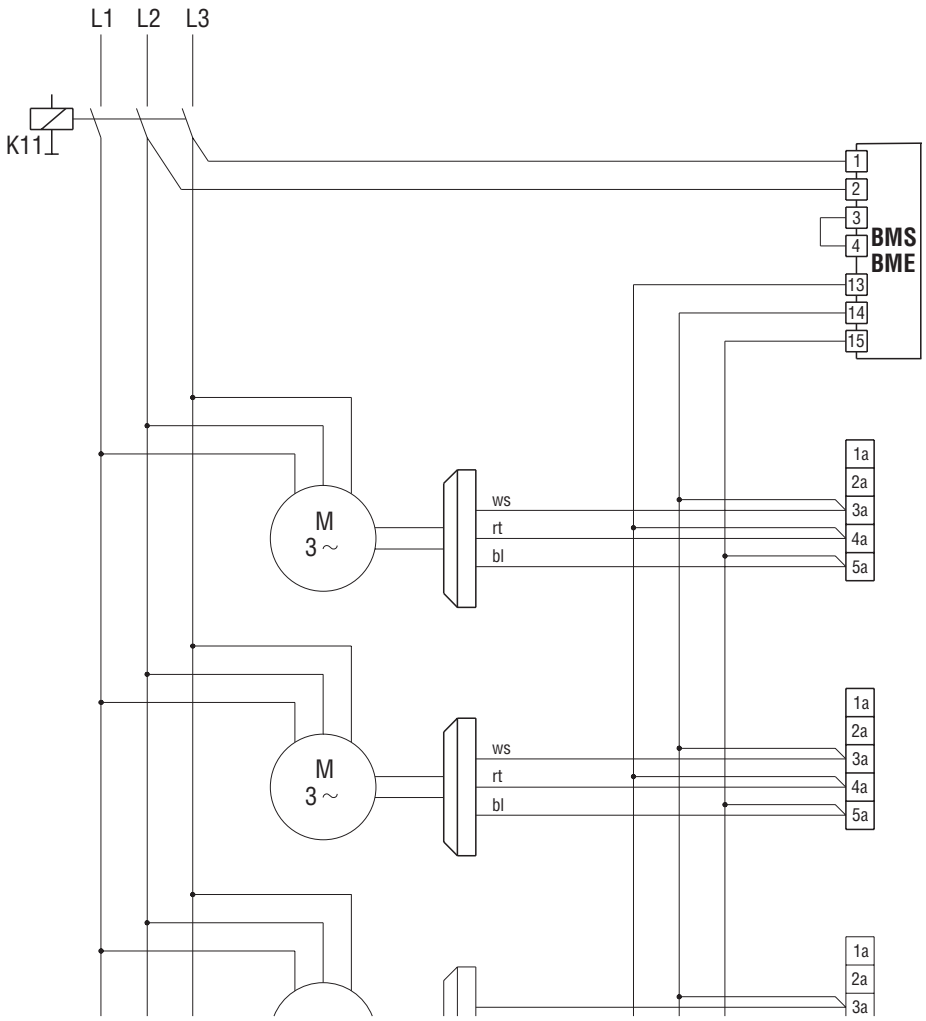
C For brake motor sizes 71...225 with BSG in the switch cabinet

1) Output brake command

2) Protective circuit against switching overvoltages, to be provided by the customer.

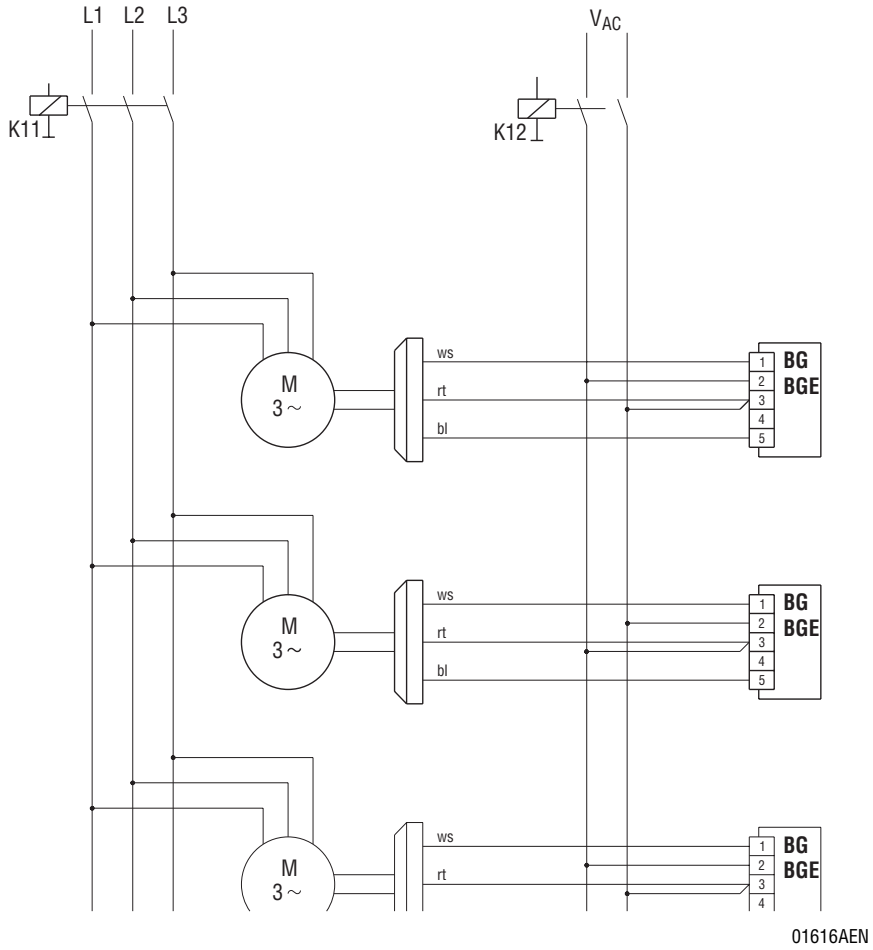
10.5 Multi-motor operation

Parallel connection of several brakes to BMS, BME in the switch cabinet

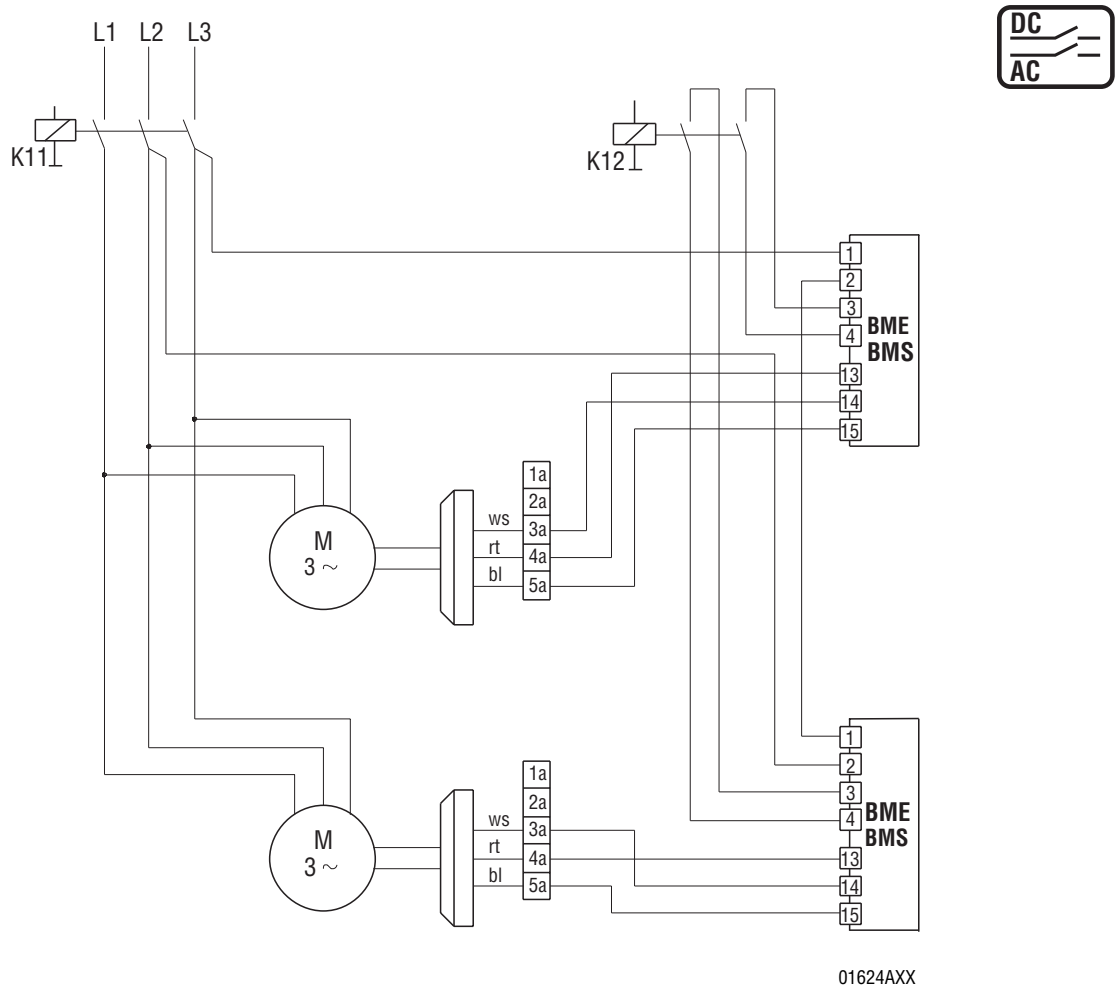


The total of the brake currents must not exceed the maximum permitted current of the brake control unit.
IB = Acceleration current

Inverse-parallel connection of several BG, BGE in the terminal box to jointly switched supply voltage

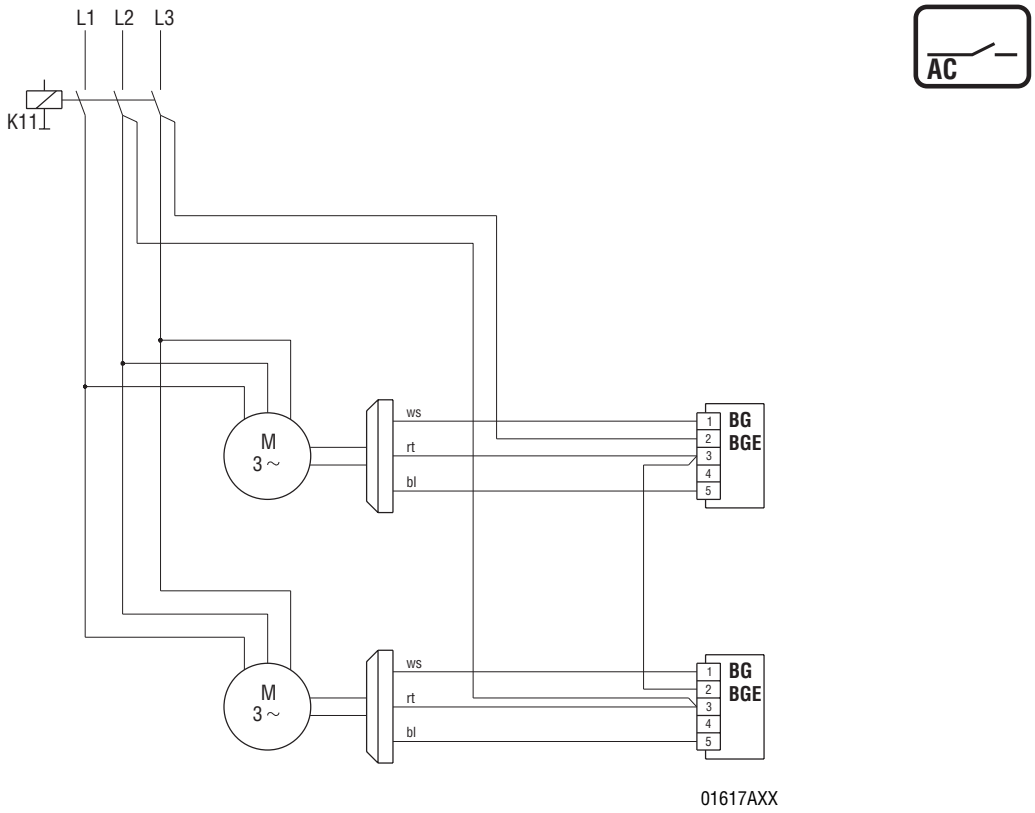


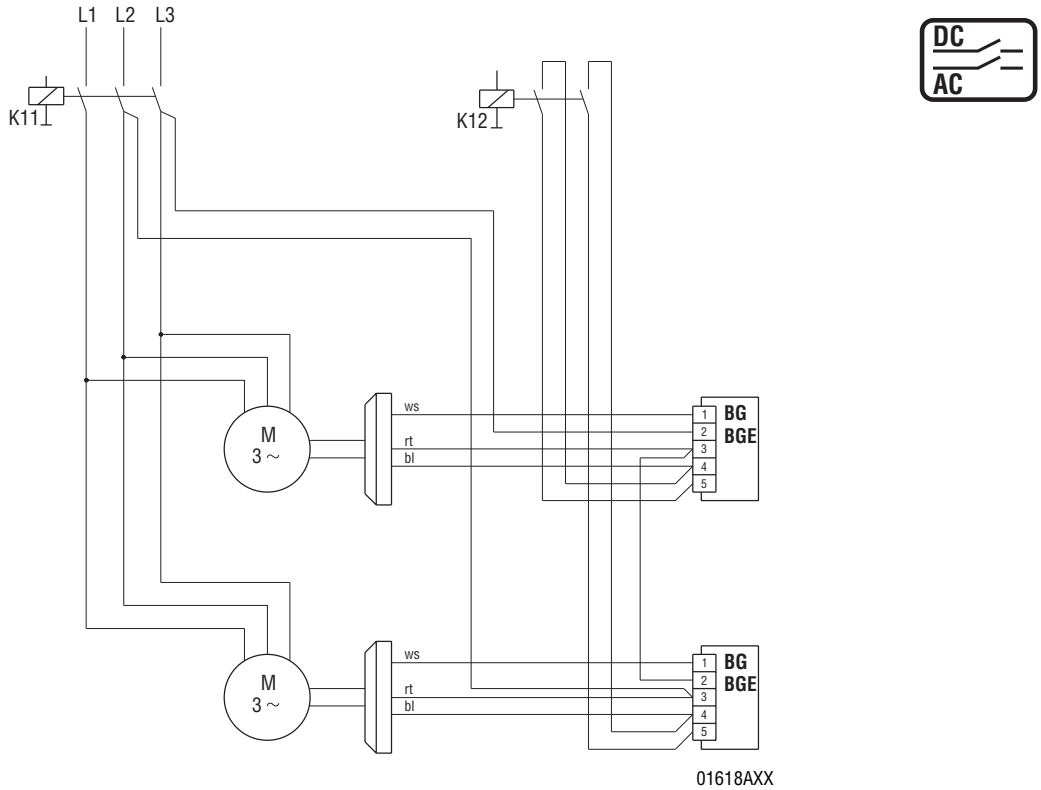
AC circuit series connection of several BMS, BME in the switch cabinet



K11, K12 operate in parallel

AC circuit series connection of several BG, BGE in the terminal box

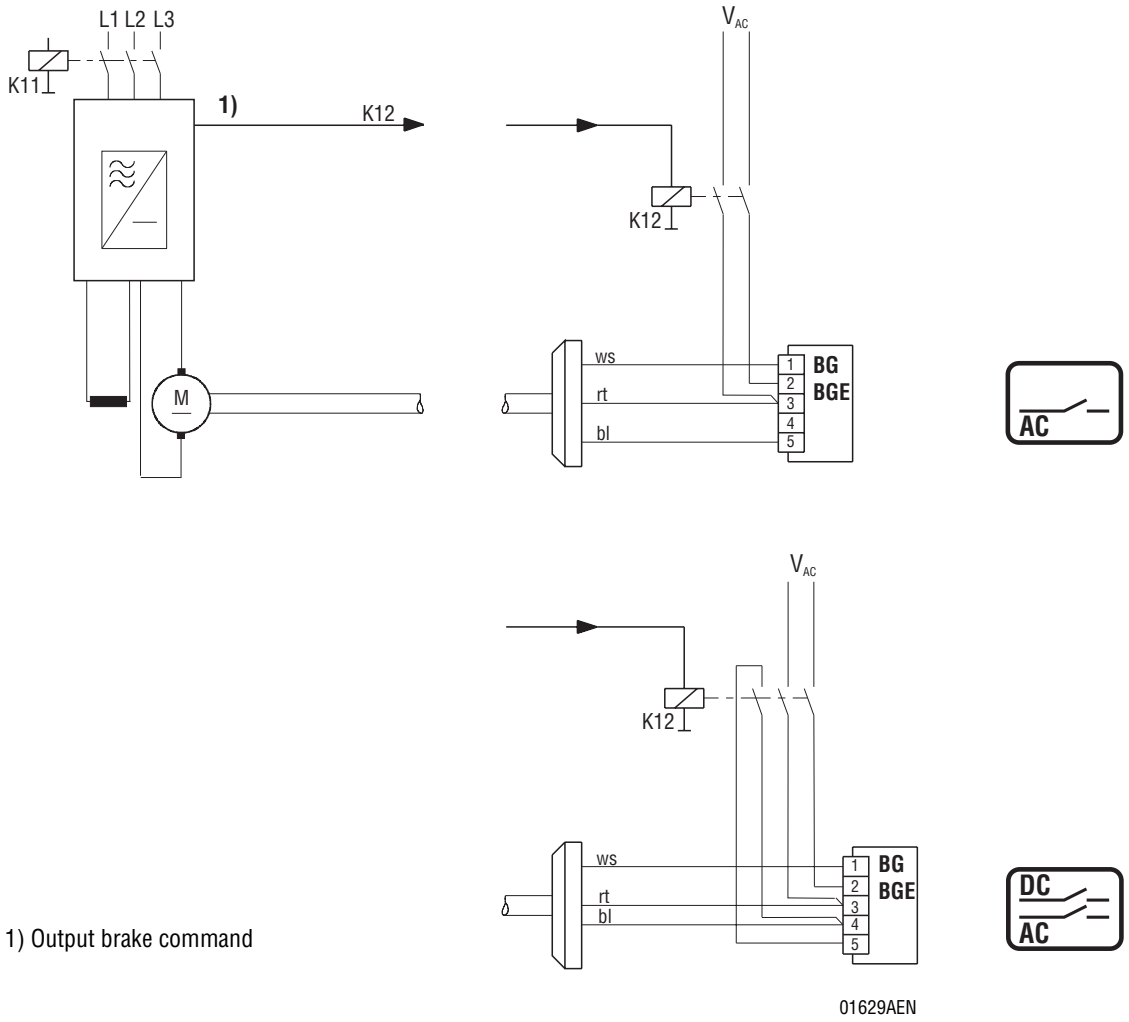




K11, K12 operate in parallel, switching contacts correspond to AC3

10.6 DC motor with converter

BG, BGE in the terminal box, DC motor with converter



1) Output brake command

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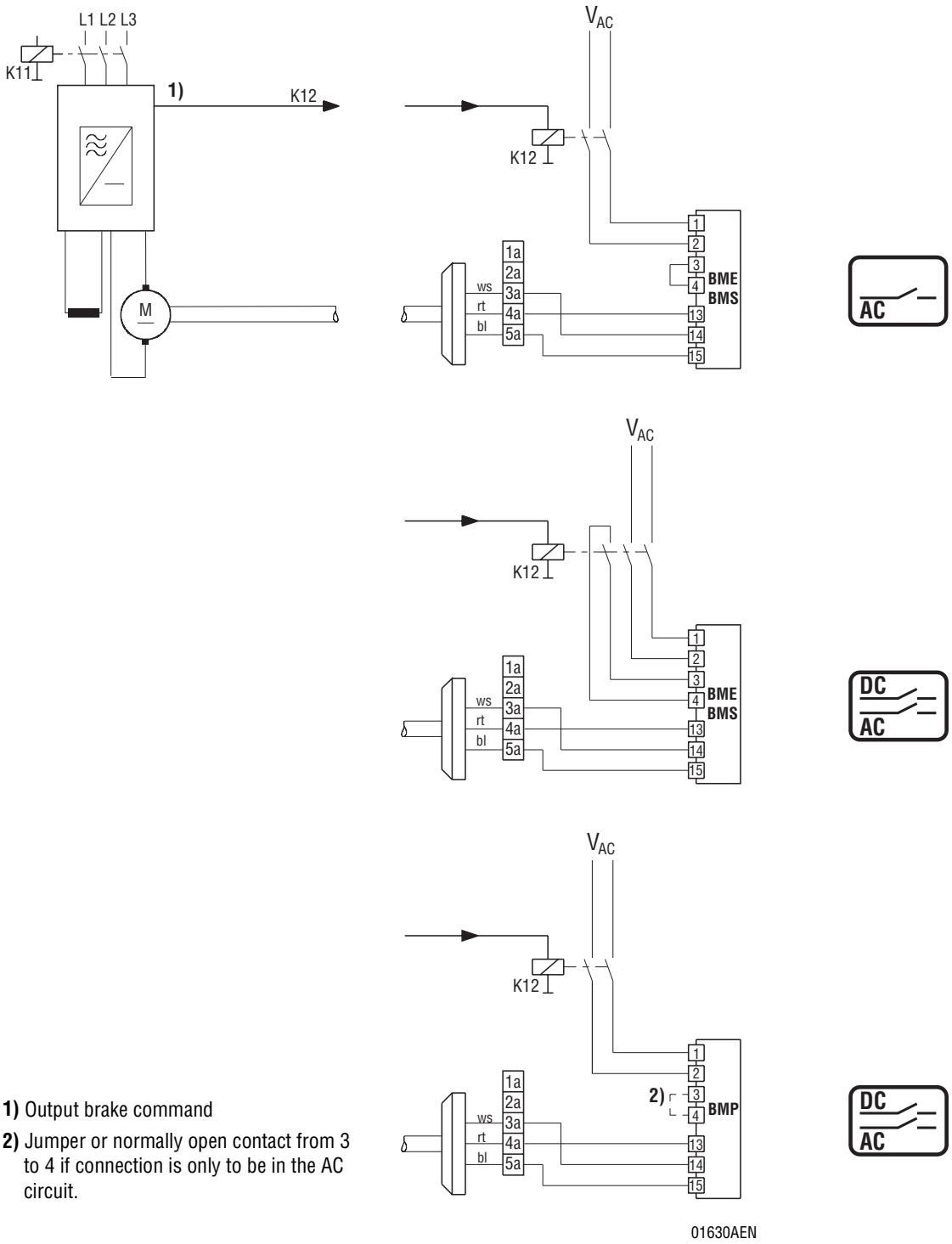
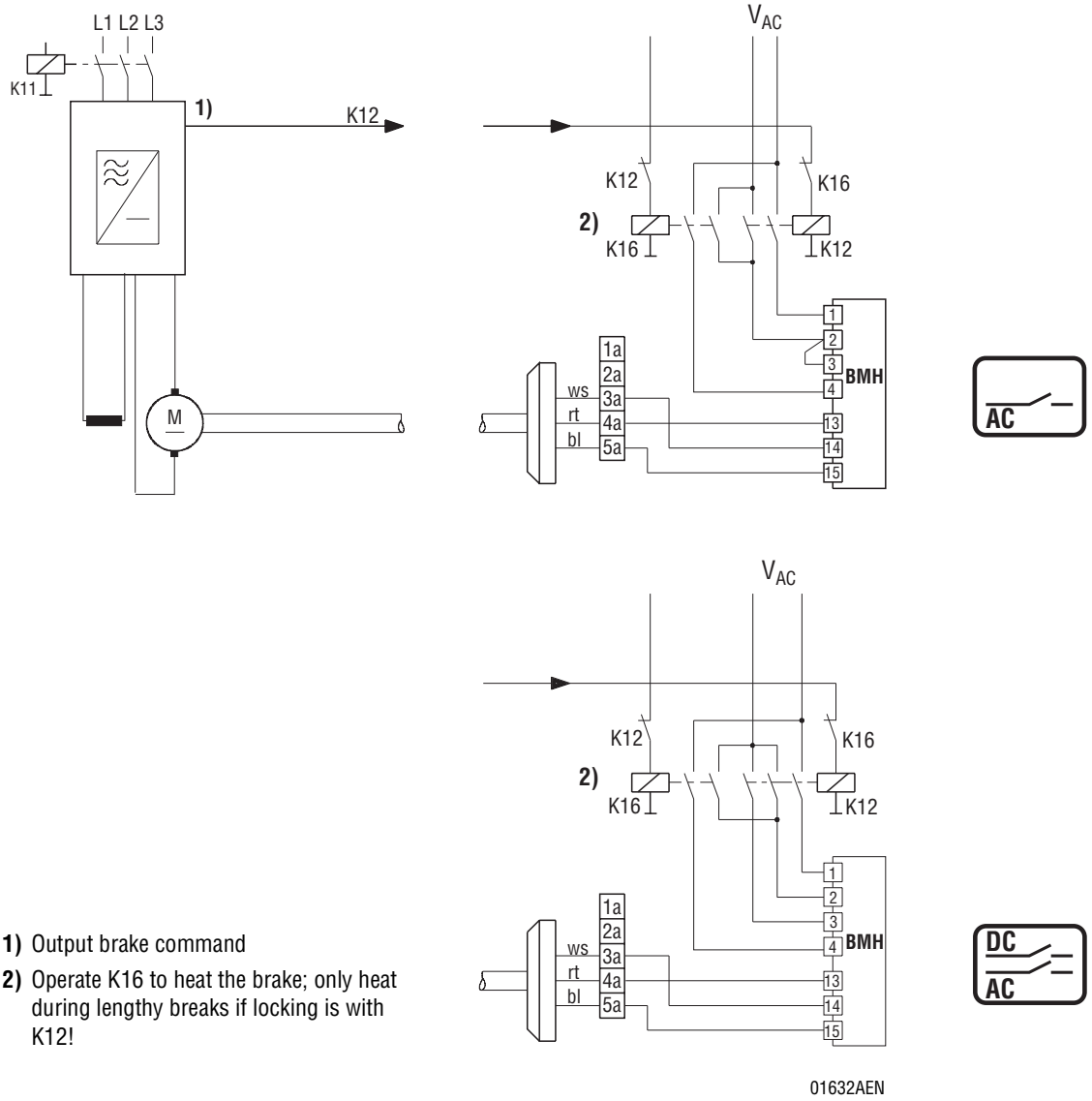
BMS, BME, BMP in the switch cabinet, DC motor with converter



1) Output brake command

2) Jumper or normally open contact from 3 to 4 if connection is only to be in the AC circuit.

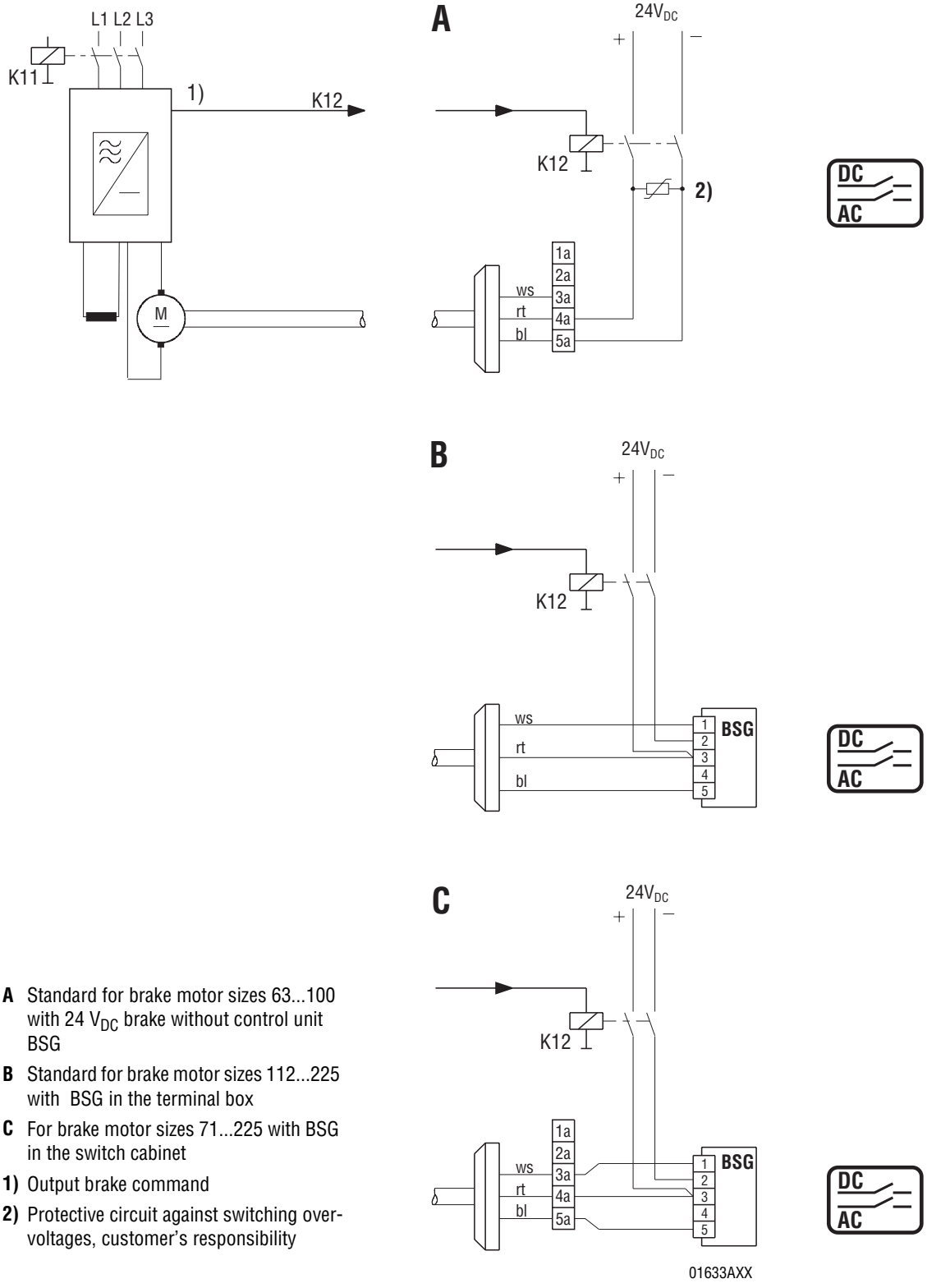
BMH in the switch cabinet, DC motor with converter



1) Output brake command

2) Operate K16 to heat the brake; only heat during lengthy breaks if locking is with K12!

Brake control system 24 V_{DC}, DC motor with converter



A Standard for brake motor sizes 63...100 with 24 V_{DC} brake without control unit BSG

B Standard for brake motor sizes 112...225 with BSG in the terminal box

C For brake motor sizes 71...225 with BSG in the switch cabinet

1) Output brake command

2) Protective circuit against switching overvoltages, customer's responsibility

Drehstrombremsmotor mit Steckverbinder IS Bremsenansteuerung

AC Squirrel-Cage Motors with IS Integrated Connector Brake Control

Moteurs-frein triphasés avec connecteur IS Commande de frein

SEW

Schaltbild
Circuit diagram
Schéma de branchement

09 761 197

AT 103

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen. Kontakte arbeiten parallel mit Motorschütz

Kontaktbelastbarkeit der Bremsschütze: AC3 nach EN 60947-4-1

- Steckverbinder Oberteil (kundenseitig zu verschalten)
- Steckverbinder Unterteil (werkseitig verschaltet)
- Wechselstromseitige Abschaltung (normales Einfallen der Bremse)
- Gleich- und wechselstromseitige Abschaltung (schnelles Einfallen der Bremse)

Observe Operating Instructions

To release apply brake voltage (see nameplate). Contactors wired parallel with motor contacts.

Contact rating of brake contacts: AC3 as per EN 60947-4-1

- Is upper section (user wired)
- Is lower section (factory wired)
- Cut-off in the AC circuit (normal brake reaction)
- Cut-off in the DC and AC circuits (fast brake reaction)

Respecter les consignes de la notice d'utilisation

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Les contacts travaillent en parallèle avec le contacteur moteur

Capacité de charge des contacteurs de frein: AC3 selon EN 60947-4-1

- Partie supérieure du connecteur (à câbler par le client)
- Partie inférieure du connecteur (câblée en usine)
- Coupure du frein côté courant alternatif (freinage normal)
- Coupure du frein côté courant alternatif et côté courant continu (freinage rapide)

Bremsenansteuerung BGE, BG

Spannungsversorgung vom Motor
nicht für polumschaltbare und geregelte Motoren.

Bremsspannung gleich Δ -Spannung
Beispiel: Motor 230 V Δ / 400 V Y
Bremse 230 V AC

BGE, BG Brake Control

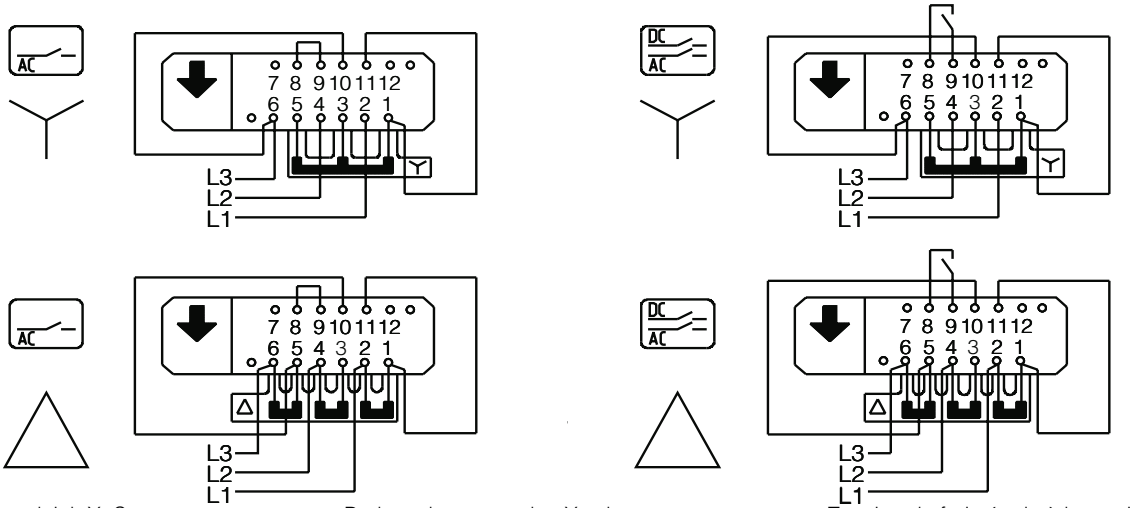
Voltage Supply from Motor
Not for multi-speed or controlled motors

Brake voltage equal to Δ voltage
Example: Motor 230 V Δ / 400 V Y
Brake 230 V AC

Commande de frein BGE, BG

Alimentation du moteur
Sauf moteurs régulés par électronique ou à pôles commutables

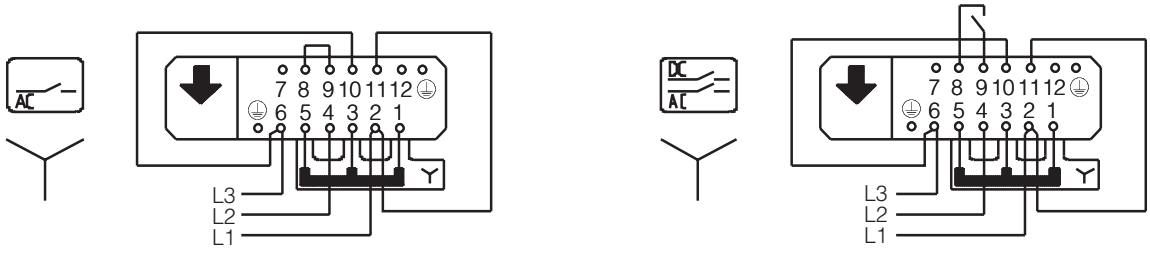
Tension du frein égale à la tension Δ
Exemple: Moteur 230 V Δ / 400 V Y
Frein: 230 V AC



Bremsspannung gleich Y -Spannung
Beispiel: Motor 230 V Δ / 400 V Y
Bremse 400 V AC

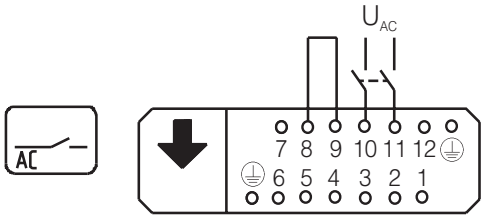
Brake voltage equal to Y voltage
Example: Motor 230 V Δ / 400 V Y
Brake 400 V AC

Tension du frein égale à la tension Y
Exemple: Moteur 230 V Δ / 400 V Y
Frein: 400 V AC



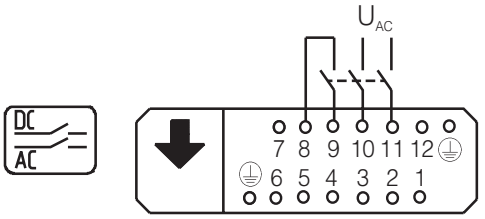
Bremsenansteuerung BGE, BG

Externe Spannungsversorgung



BGE, BG Brake Control

External supply voltage

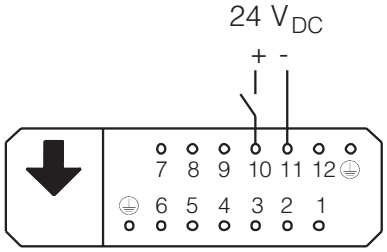


Commande de frein BGE, BG

Alimentation externe

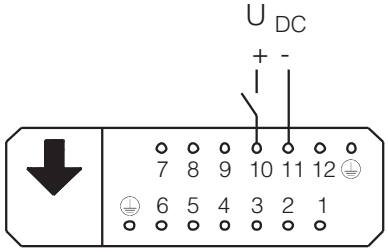
Bremsenansteuerung BSG
BSG Brake Control
Commande de frein BSG

nicht für Motor Baugröße 63
not for motor size 63
sauf moteur taille 63

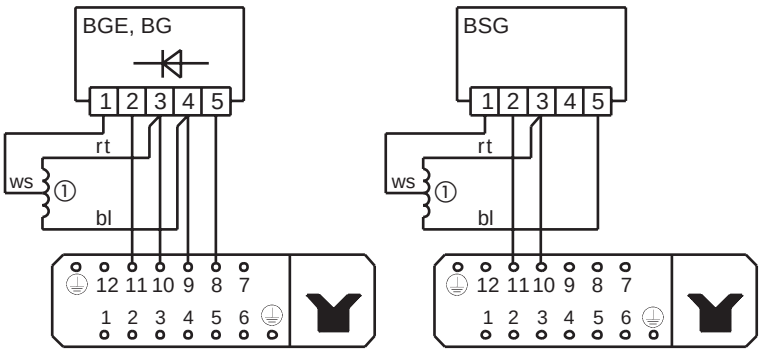


Direkte Gleichspannungsversorgung
Direct DC supply voltage
Alimentation en tension continue directe

nicht für Motoren ab Baugröße 112
not for motors size 112 or larger
Sauf moteurs à partir de la taille 112

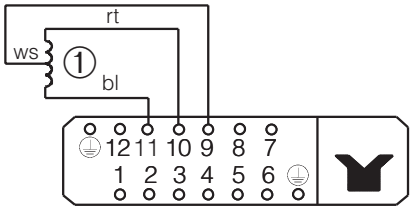


Bremsenansteuerung BGE, BG, BSG
BGE, BG, BSG Brake Control
Commande de frein BGE, BG, BSG



① Bremsspule
① Brake coil
① Bobine de frein

Direkte Gleichspannungsversorgung
Direct DC supply voltage
Alimentation en tension continue directe



ws = weiß / white / blanc
rt = rot / red / rouge
bl = blau / blue / bleu

Drehstrombremsmotor mit Steckverbinder IS Bremsenansteuerung BUR/BSR

AC Squirrel-Cage Motor with IS Integrated Connector BUR/BSR Brake Control

Moteurs-frein triphasés avec connecteur IS Commande de frein BUR/BSR

SEW

Schaltbild
Circuit diagram
Schéma de branchement

09 764 097

AT 105

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen. Kontakte arbeiten parallel mit Motorschütz

Kontaktbelastbarkeit der Bremsschütze: AC3 nach EN 60947-4-1

- Steckverbinder Oberteil (kundenseitig zu verschalten)
- Steckverbinder Unterteil (werkseitig verschaltet)

Observe Operating Instructions

To release apply brake voltage (see name plate). Contactors wired parallel with motor contacts.

Contact rating of brake contacts: AC3 as per EN 60947-4-1

- Is upper section (user wired)
- Is lower section (factory wired)

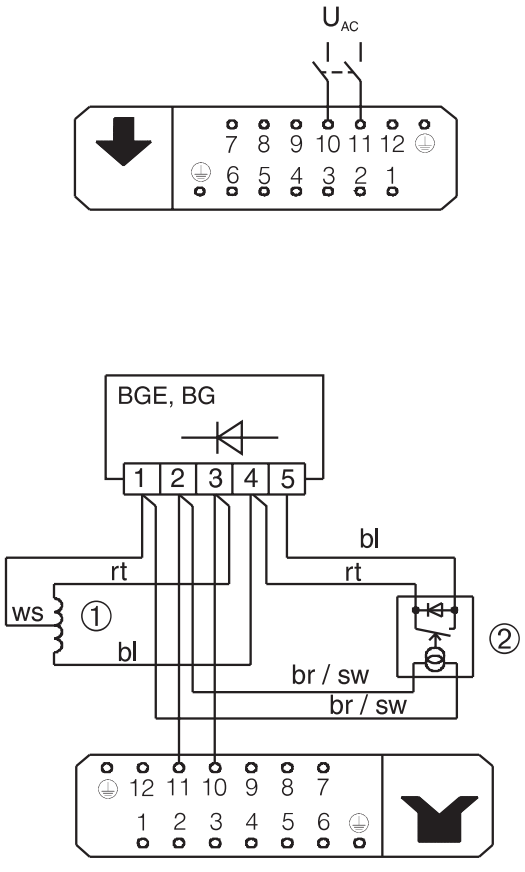
Respecter les consignes de la notice d'utilisation

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Les contacts travaillent en parallèle avec le contacteur moteur

Capacité de charge des contacteurs de frein: AC3 selon EN 60947-4-1

- Partie supérieure du connecteur (à câbler par le client)
- Partie inférieure du connecteur (câblée en usine)

Bremsenansteuerung BUR / BUR Brake Control / Commande de frein BUR



① Bremsspule
① Brake coil
① Bobine de frein

② Spannungsrelais
② Voltage relay
② Relais de tension

ws= weiß / white / blanc
rt= rot / red / rouge
bl= blau / blue / bleu
br= braun / brown / brun
sw= schwarz / black / noir

AT 105

Bremsenansteuerung BSR

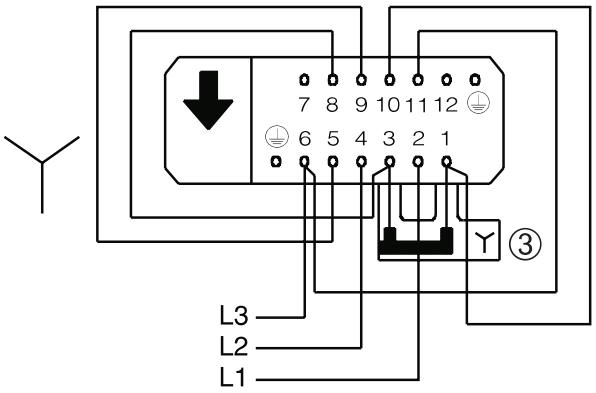
Bremsspannung gleich Δ -Spannung
Beispiel: Motor 230 V Δ / 400 V Y
Bremse 230 V AC

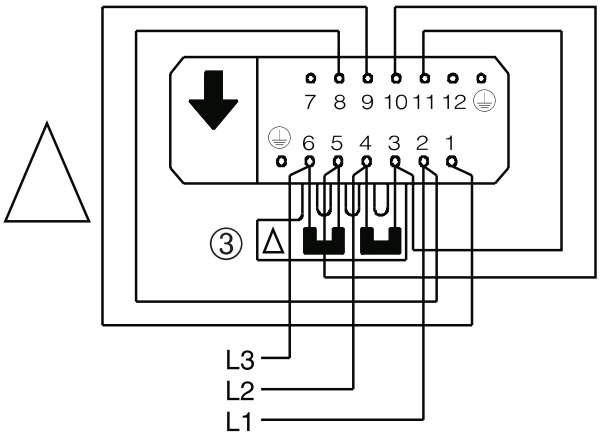
BSR Brake Control

Brake voltage equals Δ voltage
Example: Motor 230 V Δ / 400 V Y
Brake 230 V AC

Commande de frein BSR

Tension du frein égale à la tension Δ
Exemple: Moteur 230 V Δ / 400 V Y
Frein: 230 V AC

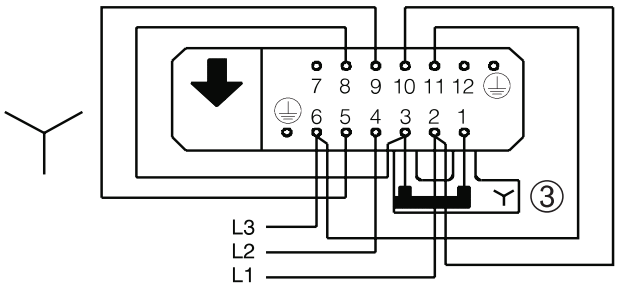




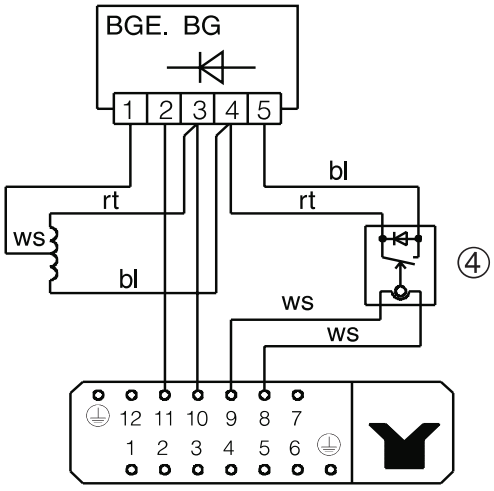
Bremsspannung gleich Y -Spannung
Beispiel: Motor 230 V Δ / 400 V Y
Bremse 400 V AC

Brake voltage equal to Y voltage
Example: Motor 230 V Δ / 400 V Y
Brake 400 V AC

Tension du frein égale à la tension Y
Exemple: Moteur 230 V Δ / 400 V Y
Frein: 400 V AC



③ Wechselklemmbrücke abgetrennt
③ Variable terminal link separated
③ Barrette adaptée Y ou Δ



① Bremsspule
① Brake coil
① Bobine de frein

④ Stromrelais SR 11
④ SR 11 current relay
④ Relais d'intensité SR 11

ws = weiß / white / blanc
rt = rot / red / rouge
bl = blau / blue / bleu
br = braun / brown / brun
sw = schwarz / black / noir

Drehstrombremsmotor mit Steckverbinder IS Bremsenansteuerung im Schaltschrank

AC Squirrel-Cage Motors with IS Integrated Connector Brake Control in Switch Cabinet

Moteurs-frein triphasés avec connecteur IS Commande de frein dans l'armoire de commande

SEW

Schaltbild
Circuit diagram
Schéma de branchement

09 765 197

AT 104

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen. Kontakte arbeiten parallel mit Motorschütz

Kontaktbelastbarkeit der Bremsschütze: AC3 nach EN 60947-4-1

- Steckverbinder Oberteil (kundenseitig zu verschalten)
- Steckverbinder Unterteil (werkseitig verschaltet)
- Wechselstromseitige Abschaltung (normales Einfallen der Bremse)
- Gleich- und wechselstromseitige Abschaltung (schnelles Einfallen der Bremse)

Observe Operating Instructions

To release apply brake voltage (see name plate). Contactors wired parallel with motor contacts.

Contact rating of brake contacts: AC3 as per EN 60947-4-1

- Is upper section (user wired)
- Is lower section (factory wired)
- Cut-off in the AC circuit (normal brake reaction)
- Cut-off in the DC and AC circuits (fast brake reaction)

Respecter les consignes de la notice d'utilisation

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Les contacts travaillent en parallèle avec le contacteur moteur

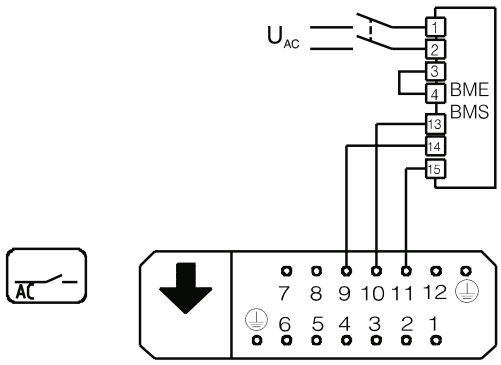
Capacité de charge des contacteurs de frein: AC3 selon EN 60947-4-1

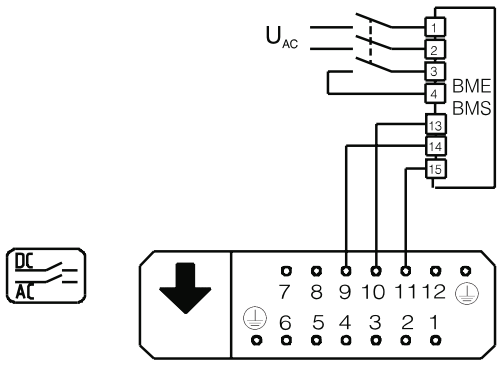
- Partie supérieure du connecteur (à câbler par le client)
- Partie inférieure du connecteur (câblée en usine)
- Coupure du frein côté courant alternatif (freinage normal)
- Coupure du frein côté courant alternatif et côté courant continu (freinage rapide)

Bremsenansteuerung BME, BMS

BME, BMS Brake Control

Commande de frein BME, BMS

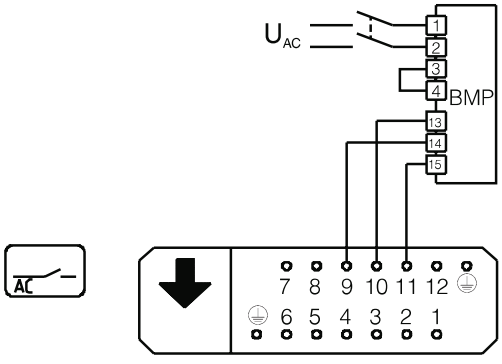


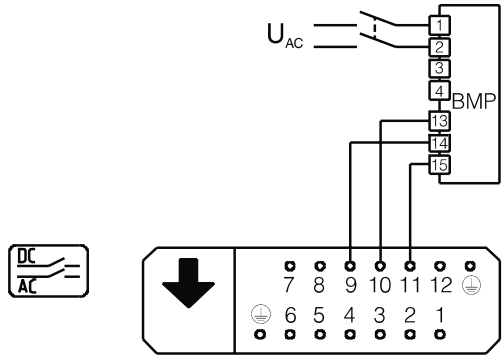


Bremsenansteuerung BMP

BMP Brake Control

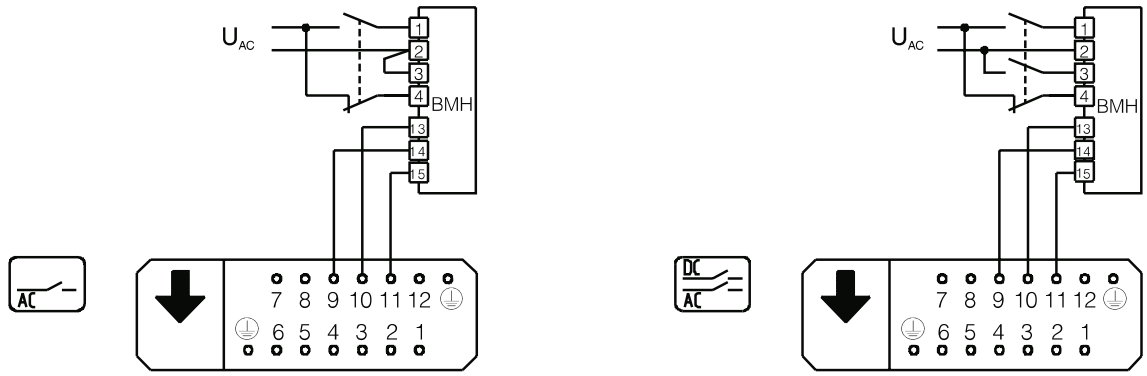
Commande de frein BMP



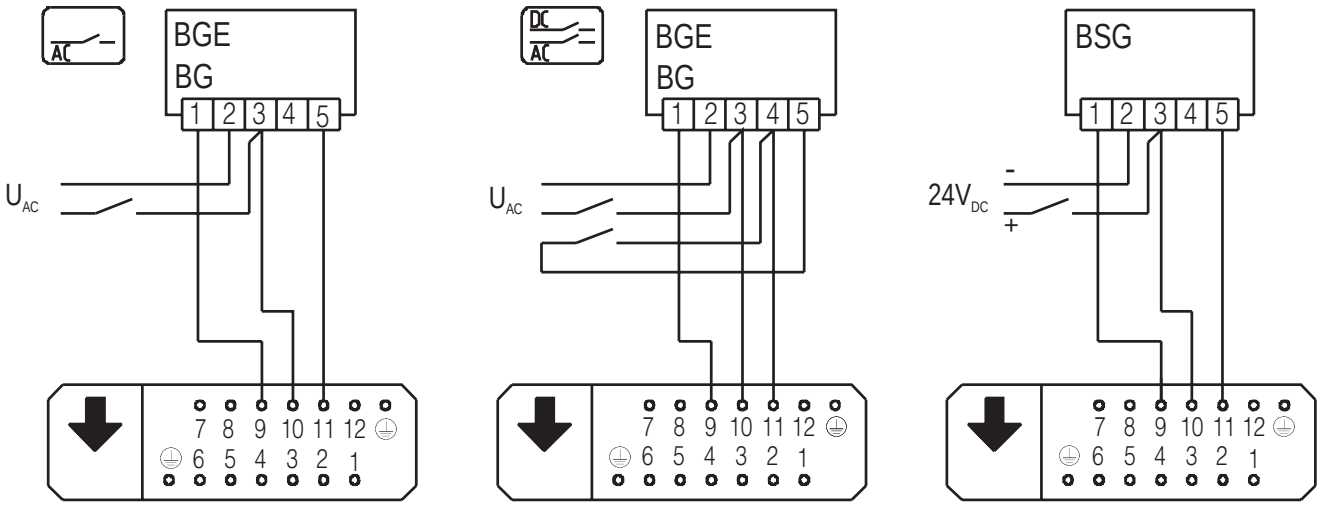


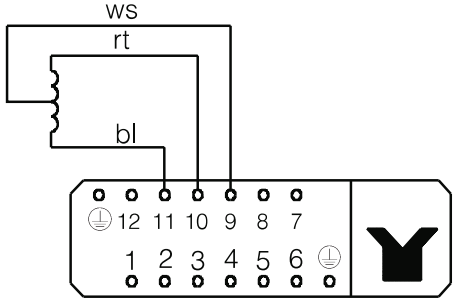
AT 104

Bremsenansteuerung BMH | **BMH Brake Control** | **Commande de frein BMH**



Bremsenansteuerung BGE, BG, BSG | **BGE, BG, BSG Brake Control** | **Commande de frein BGE, BG, BSG**





ws = weiß / white / blanc
rt = rot / red / rouge
bl = blau / blue / bleu

AT 106

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen.
Kontakte arbeiten parallel mit Motorschütz.
Kontaktbelastbarkeit der Bremsschütze:
AC3 nach EN 60947-4-1

- Steckverbinder Oberteil (kundenseitig zu verschalten)
- Steckverbinder Unterteil (werkseitig verschaltet)
- AC — Wechselstromseitige Abschaltung (normales Einfallen der Bremse)
- DC AC — Gleich- und wechselstromseitige Abschaltung (schnelles Einfallen der Bremse)

Follow the Operating Instructions

To release the brake, apply the voltage as shown on nameplate. Contacts operate in parallel to motor switch contactor.
Contact rating for the brake switch contactors:
AC3 as per EN 60947-4-1

- Connector Upper Part (To be connected by customer)
- Connector Lower Part (Connected in factory)
- AC — Switch off in the AC circuit (normal brake reaction)
- DC AC — Switch off in the AC and DC circuits (Rapid brake reaction)

Voir prescriptions dans notice

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Le contact à fermeture travaille en parallèle avec le contacteur moteur.
Capacitè de charge des contacteurs frein:
AC3 selon EN 60947-4-1

- Couvercle connecteur (à câbler par le client)
- Embase connecteur (câblée en usine)
- AC — Coupure côté courant alternatif (retombée normale du frein)
- DC AC — Coupure côté courant continu et côté courant alternatif (retombée rapide du frein)

Bremsenansteuerung BGE, BG

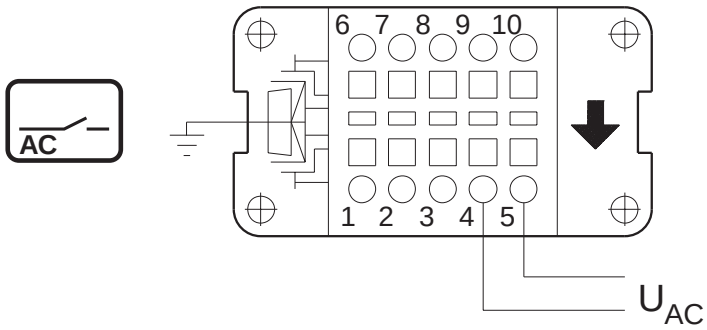
Externe Spannungsversorgung

Brake control system BGE, BG

External voltage supply

Commande de frein BGE, BG

Alimentation externe



Bremsenansteuerung BSG

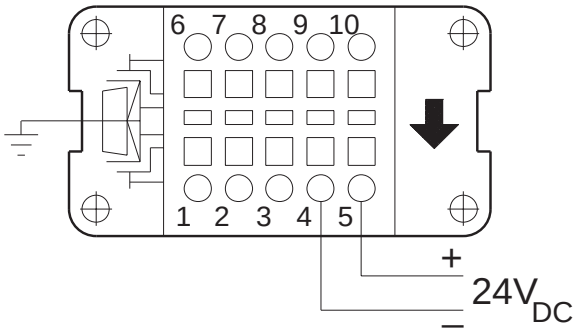
Nicht für Motor Größe 63

Brake control system BSG

Not for size 63 motor

Commande de frein BSG

Non disponible pour moteur de taille 63

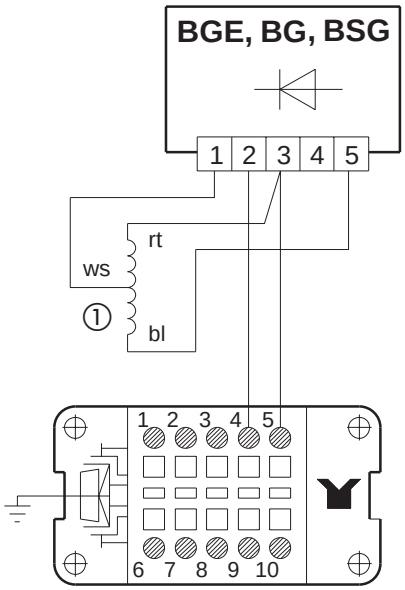


AT 106

Bremsenansteuerung BGE, BG, BSG

Brake control System BGE, BG, BSG

Commande de frein BGE, BG, BSG



① Bremsspule
① Brake coil
① Bobine de frein

Direkte Gleichspannungsversorgung

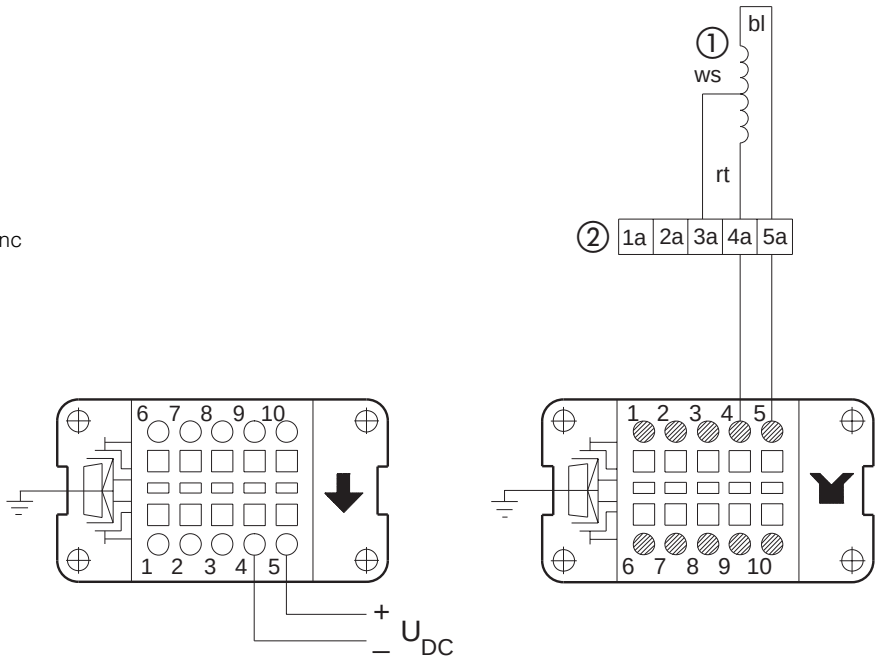
Nicht für Motoren ab Baugröße 112

Direct DC voltage supply

Not for motors size 112 and larger

Alimentation en tension continue directe

Non disponible pour moteurs à partir de la taille 112



① Bremsspule
① Brake coil
① Bobine de frein

② Klemmenleiste
② Terminal strip
② Barrette à bornes

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu

Drehstrombremsmotor mit Steckverbinder AS Bremsenansteuerung BUR/ BSR

AC Brake Motor with AS connector Brake control system BUR / BSR

Moteur-frein triphasé avec connecteur AS et commande de frein BUR / BSR

SEW

Schaltbild
Circuit diagram
Schéma de branchement

09 775 097

AT 107

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen.
Kontakte arbeiten parallel mit Motorschütz.
Kontaktbelastbarkeit der Bremsschütze:
AC3 nach EN 60947-4-1

- Steckverbinder Oberteil (kundenseitig zu verschalten)
- Steckverbinder Unterteil (werkseitig verschaltet)
- AC — Wechselstromseitige Abschaltung (normales Einfallen der Bremse)
- DC AC — Gleich- und wechselstromseitige Abschaltung (schnelles Einfallen der Bremse)

Follow the Operating Instructions

To release the brake, apply the voltage as shown on nameplate. Contacts operate in parallel to motor switch contactor.
Contact rating for the brake switch contactors:
AC3 as per EN 60947-4-1

- Connector Upper Part (To be connected by customer)
- Connector Lower Part (Connected in factory)
- AC — Switch off in the AC circuit (normal brake reaction)
- DC AC — Switch off in the AC and DC circuits (Rapid brake reaction)

Voir prescriptions dans notice

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Le contact à fermeture travaille en parallèle avec le contacteur moteur.
Capacité de charge des contacteurs frein:
AC3 selon EN 60947-4-1

- Couvercle connecteur (à câbler par le client)
- Embase connecteur (câblée en usine)
- AC — Coupure côté courant alternatif (retombée normale du frein)
- DC AC — Coupure côté courant continu et côté courant alternatif (retombée rapide du frein)

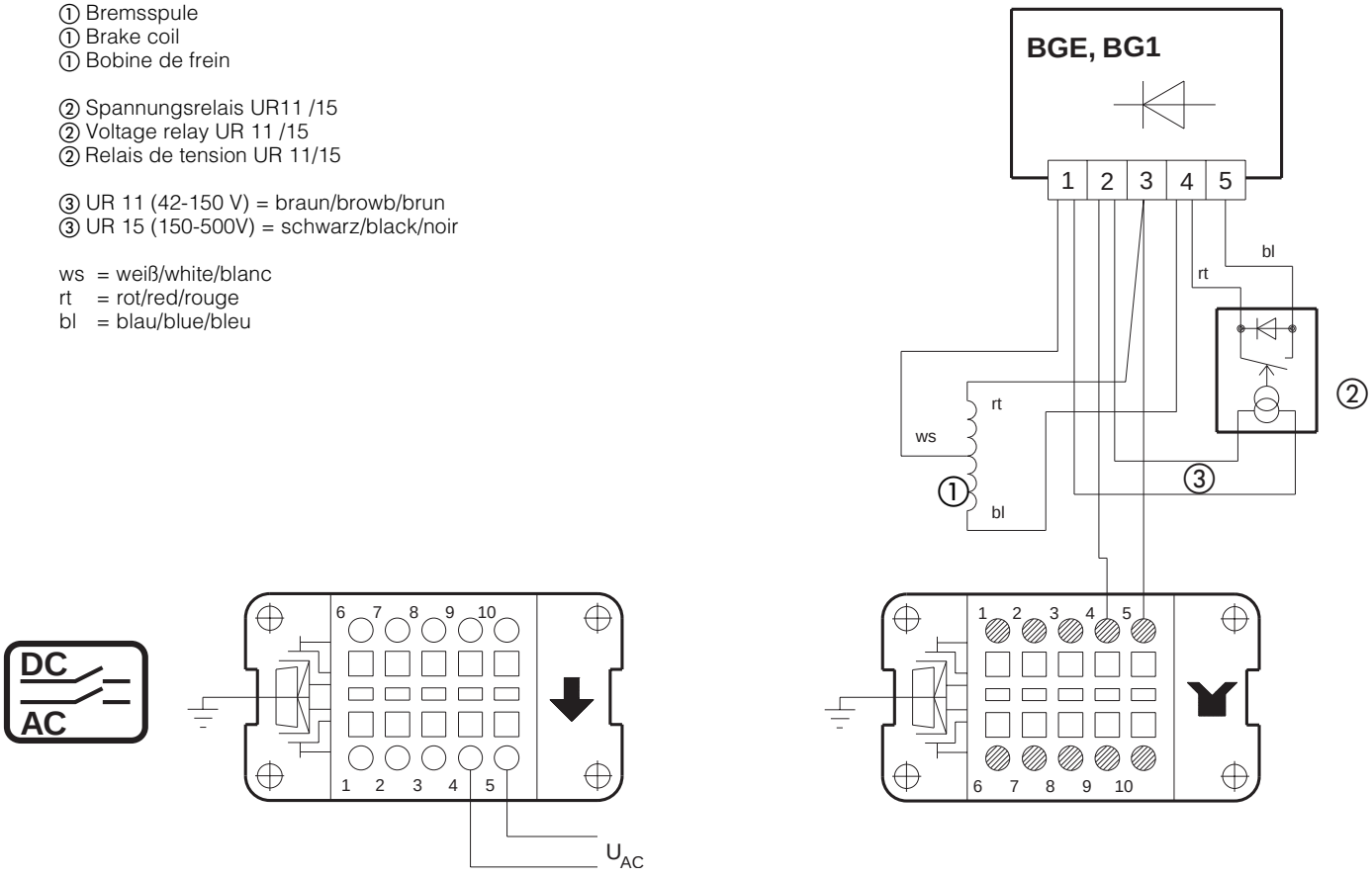
Bremsenansteuerung BUR

① Bremsspule
② Spannungsrelais UR11 /15
③ UR 11 (42-150 V) = braun/browb/brun
③ UR 15 (150-500V) = schwarz/black/noir

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu

Brake control system BUR

Commande de frein BUR



AT 107

Bremsenansteuerung BSR

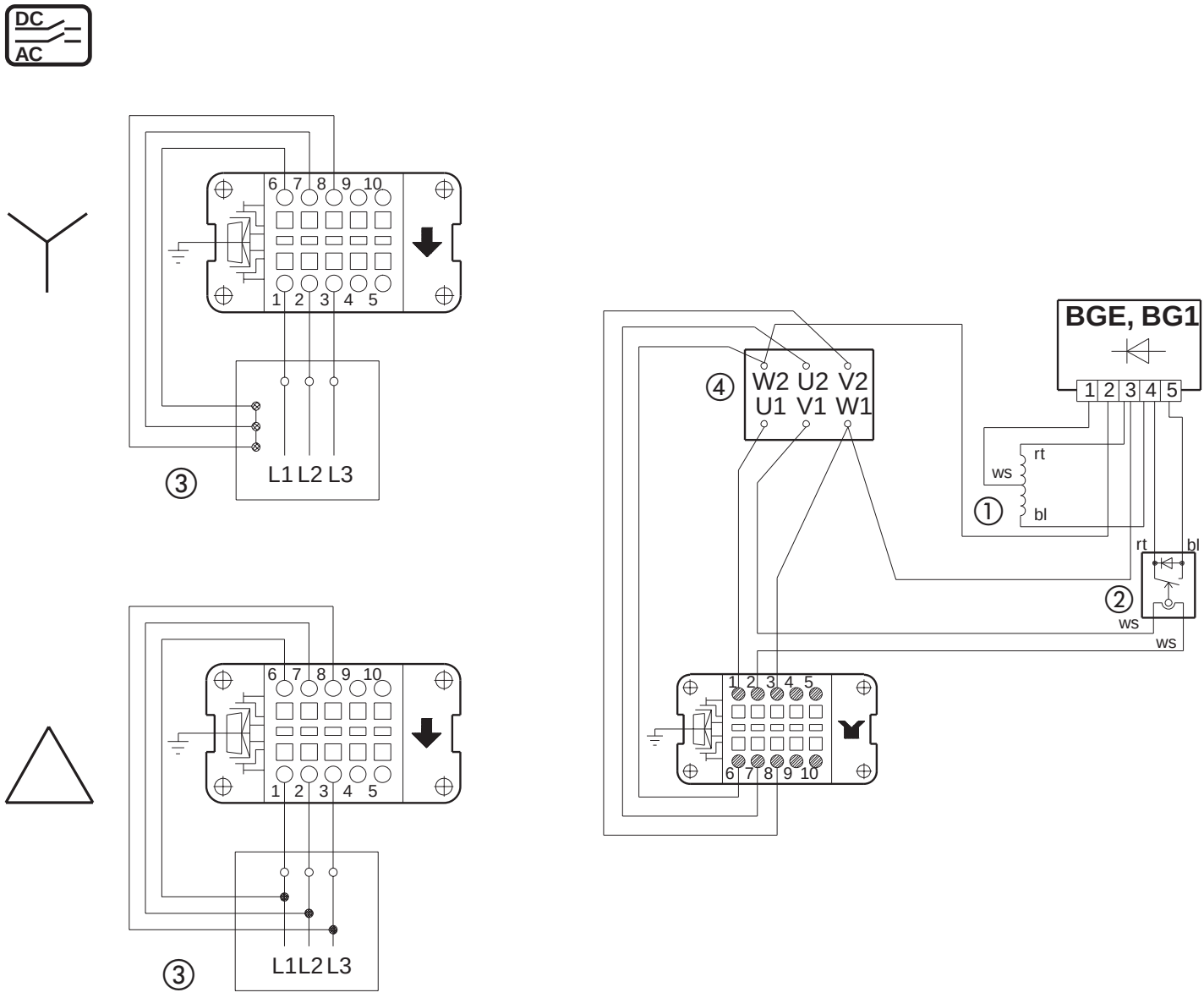
Bremsspannung gleich Δ-Spannung
Beispiel: Motor 230 V Δ / 400 V Y
Bremse 230 V AC

Brake control system BSR

Brake voltage = DELTA (Δ) voltage
Example: Motor 230 V Δ / 400 V Y
Brake 230 V AC

Commande de frein BSR

Tension du frein égale à la tension Δ
Exemple: Moteur 230 V Δ / 400 V Y
Frein 230 V AC



① Bremsspule
① Brake coil
① Bobine de frein

② Stromrelais SR11
② Current relay SR 11
② Relais d' intensité SR11

③ Schaltschrank
③ Wiring cabinet
③ Armoire de commande

④ Klemmenplatte
④ Terminal board
④ Plaque à bornes

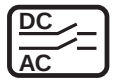
ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu
br = braun/brown/brun
sw = schwarz/black/noir

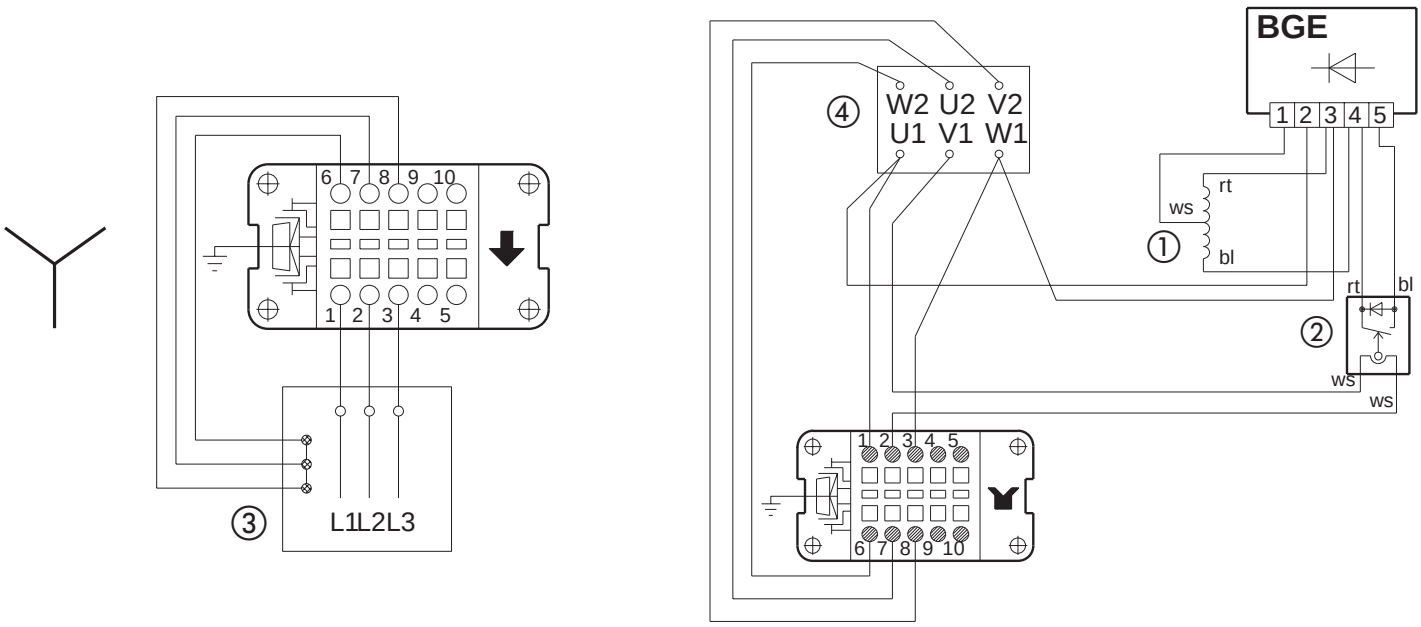
AT 107

Bremmsspannung gleich Y-Spannung
Beispiel: Motor 230 V Δ /400 V Y
Bremse 400 V AC

Brake voltage = STAR (Y) voltage
Example: Motor 230 V Δ /400 V Y
Brake 400 V AC

Tension du frein égale à la tension Y
Exemple: Moteur 230 V Δ /400 V Y
Frein 400 V AC





① Bremsspule
① Brake coil
① Bobine de frein

② Stromrelais SR11
② Current relay SR 11
② Relais d' intensité SR11

③ Schaltschrank
③ Wiring cabinet
③ Armoire de commande

④ Klemmenplatte
④ Terminal board
④ Plaque à bornes

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu
br = braun/brown/brun
sw = schwarz/black/noir

AT 108

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen.
Kontakte arbeiten parallel mit Motorschütz.
Kontaktbelastbarkeit der Bremsschütze:
AC3 nach EN 60947-4-1

- Steckverbinder Oberteil (kundenseitig zu verschalten)
- Steckverbinder Unterteil (werkseitig verschaltet)
- AC — Wechselstromseitige Abschaltung (normales Einfallen der Bremse)
- DC AC — Gleich- und wechselstromseitige Abschaltung (schnelles Einfallen der Bremse)

Follow the Operating Instructions

To release the brake, apply the voltage as shown on nameplate. Contacts operate in parallel to motor switch contactor.
Contact rating for the brake switch contactors:
AC3 as per EN 60947-4-1

- Connector Upper Part (To be connected by customer)
- Connector Lower Part (Connected in factory)
- AC — Switch off in the AC circuit (normal brake reaction)
- DC AC — Switch off in the AC and DC circuits (Rapid brake reaction)

Voir prescriptions dans notice

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Le contact à fermeture travaille en parallèle avec le contacteur moteur.
Capacitè de charge des contacteurs frein:
AC3 selon EN 60947-4-1

- Couvercle connecteur (à câbler par le client)
- Embase connecteur (câblée en usine)
- AC — Coupure côté courant alternatif (retombée normale du frein)
- DC AC — Coupure côté courant continu et côté courant alternatif (retombée rapide du frein)

Bremsenansteuerung BGE, BG

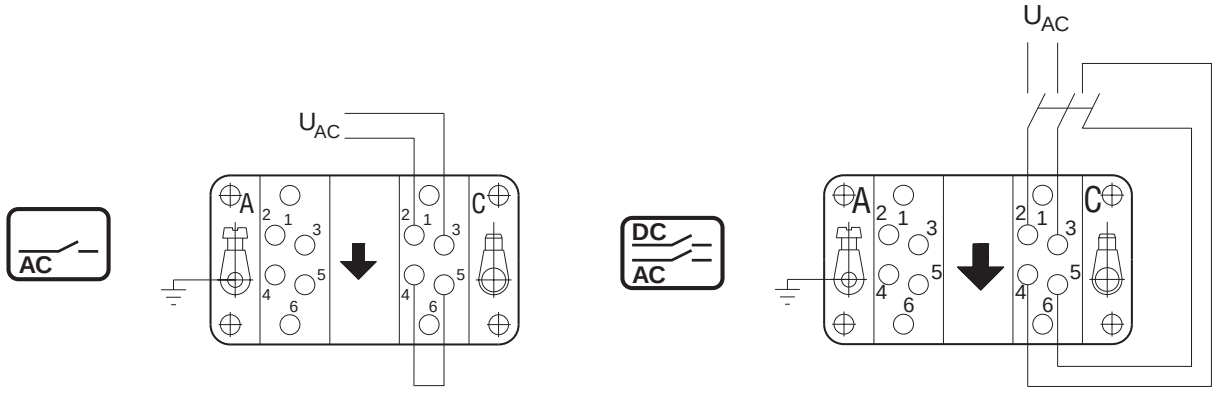
Externe Spannungsversorgung

Brake control system BGE, BG

External voltage supply

Commande de frein BGE, BG

Alimentation externe



Direkte Gleichspannungsversorgung

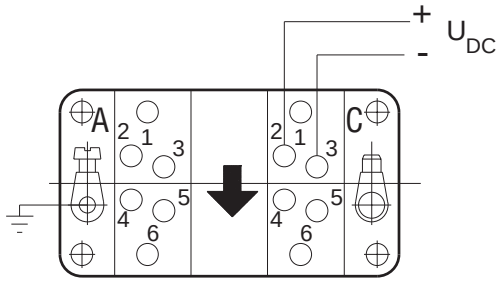
Nicht für Motoren ab Baugröße 112

Direct voltage supply

Not for motors larger than size 112

Alimentation en tension continue directe

Non disponible pour moteurs à partir de la taille 112



AT 108

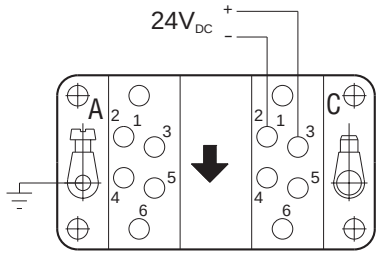
Bremsenansteuerung BSG

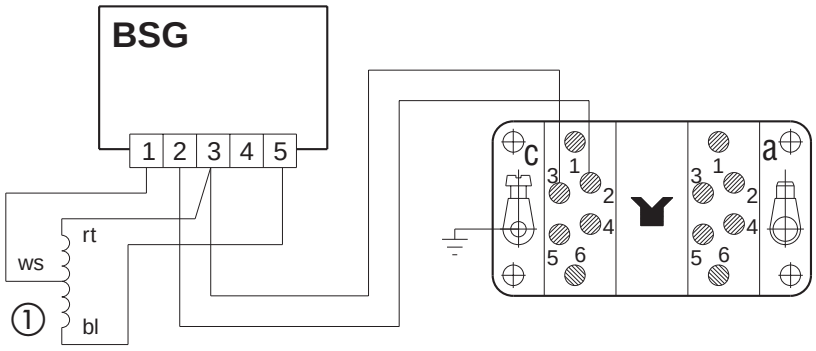
Brake control system BSG

Commande de frein BSG

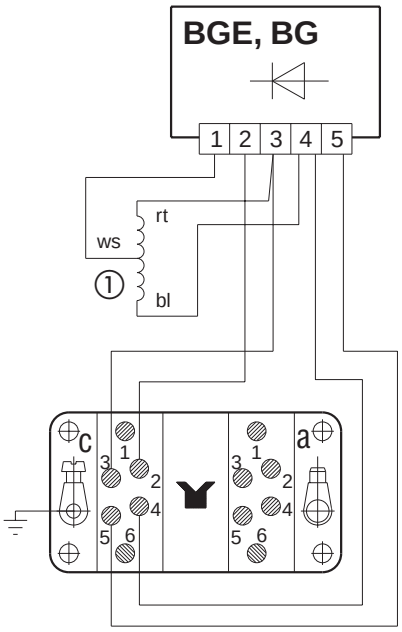
① Bremsspule
① Brake coil
① Bobine de frein

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu





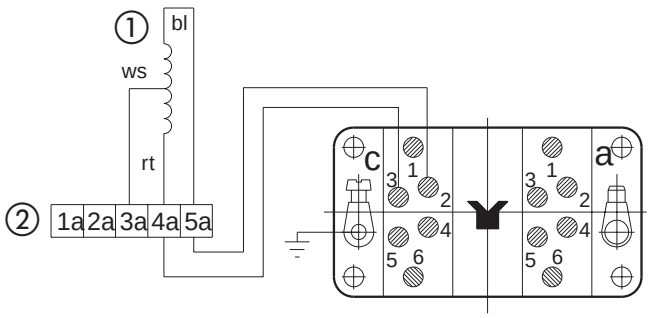
Bremsenansteuerung BGE, BG
Brake control system BGE, BG
Commande de frein BGE, BG



① Bremsspule
① Brake coil
① Bobine de frein

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu

Direkte Gleichspannungsversorgung
Direct voltage supply
Alimentation en tension continue directe



① Bremsspule
① Brake coil
① Bobine de frein

② Klemmenleiste
② Terminal strip
② Barrette à bornes

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu

Drehstrombremsmotor mit Steckverbinder AM Bremsenansteuerung BUR / BSR

AC Brake Motor with AM connector Brake control system BUR / BSR

Moteur-frein triphasé avec connecteur AM et commande de frein BUR / BSR

SEW

Schaltbild
Circuit diagram
Schéma de branchement

09 777 097

AT 109

Betriebsanleitung beachten

Zum Lüften der Bremse Spannung (siehe Typenschild) anlegen.
Kontakte arbeiten parallel mit Motorschütz.
Kontaktbelastbarkeit der Bremsschütze:
AC3 nach EN 60947-4-1

Steckverbinder Oberteil (kundenseitig zu verschalten)

Steckverbinder Unterteil (werkseitig verschaltet)

Gleich- und wechselstromseitige Abschaltung (schnelles Einfallen der Bremse)

Follow the Operating Instructions

To release the brake, apply the voltage as shown on nameplate. Contacts operate in parallel to motor switch contactor.
Contact rating for the brake switch contactors:
AC3 as per EN 60947-4-1

Connector Upper Part (To be connected by custommer)

Connector Lower Part (Connected in factory)

Switch off in the AC and DC circuit (Rapid brake reaction)

Voir prescriptions dans notice

Pour débloquer le frein, appliquer la tension indiquée sur la plaque signalétique. Le contact à fermeture travaille en parallèle avec le contacteur moteur.
Capacité de charge des contacteurs frein:
AC3 selon EN 60947-4-1

Couvercle connecteur (à câbler par le client)

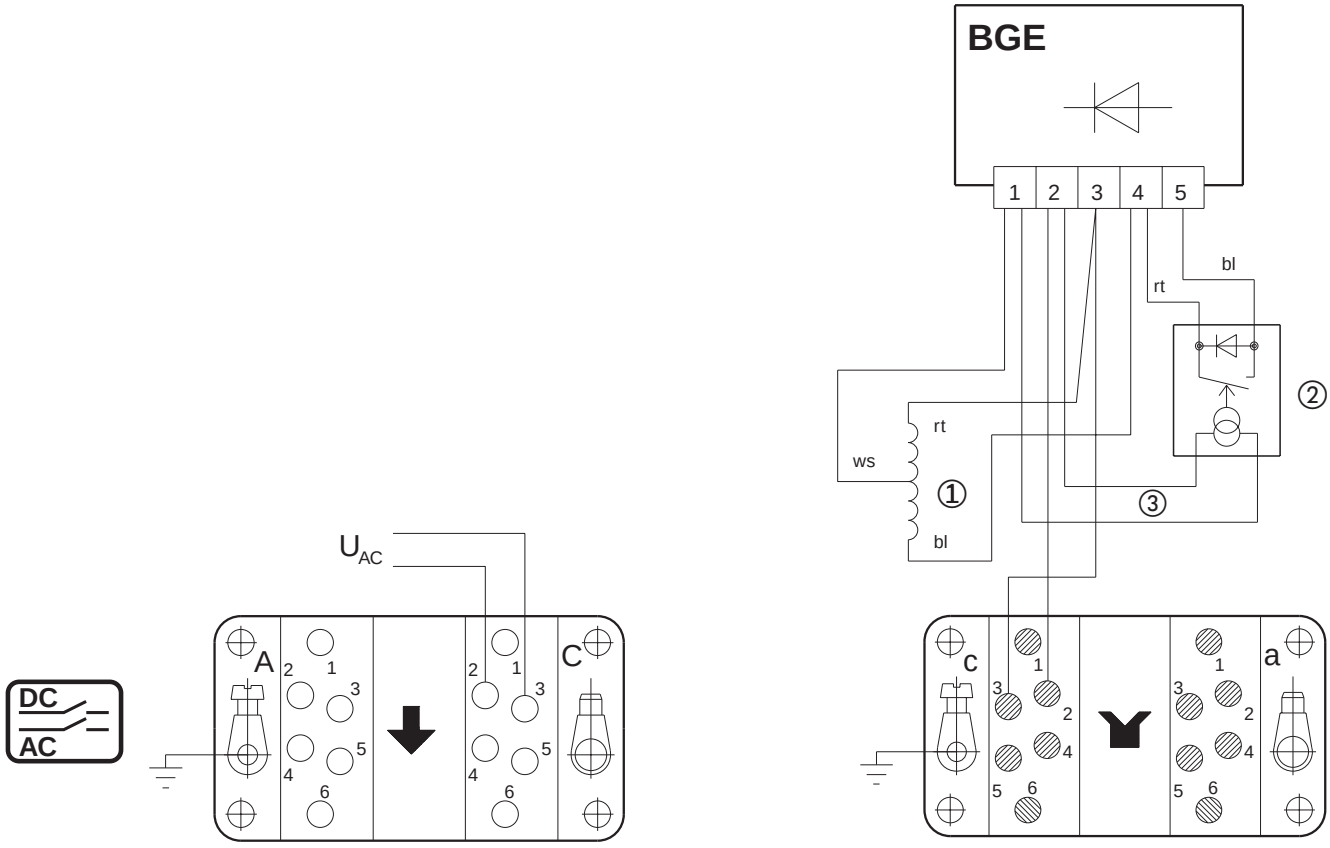
Embase connecteur (câblée en usine)

Coupure côté courant continu et côté courant alternatif (retombée rapide du frein)

Bremsenansteuerung BUR

Brake control system BUR

Commande de frein BUR



① Bremsspule
① Brake coil
① Bobine de frein

② Spannungsrelais UR 11 / 15
② Voltage relay UR 11 /15
② Relais de tension UR11 / 15

③ UR 11 (42-150V) = braun/brown/brun
③ UR 15 (150-500 V) = schwarz/black/noir

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu

AT 109

Bremsenansteuerung BSR

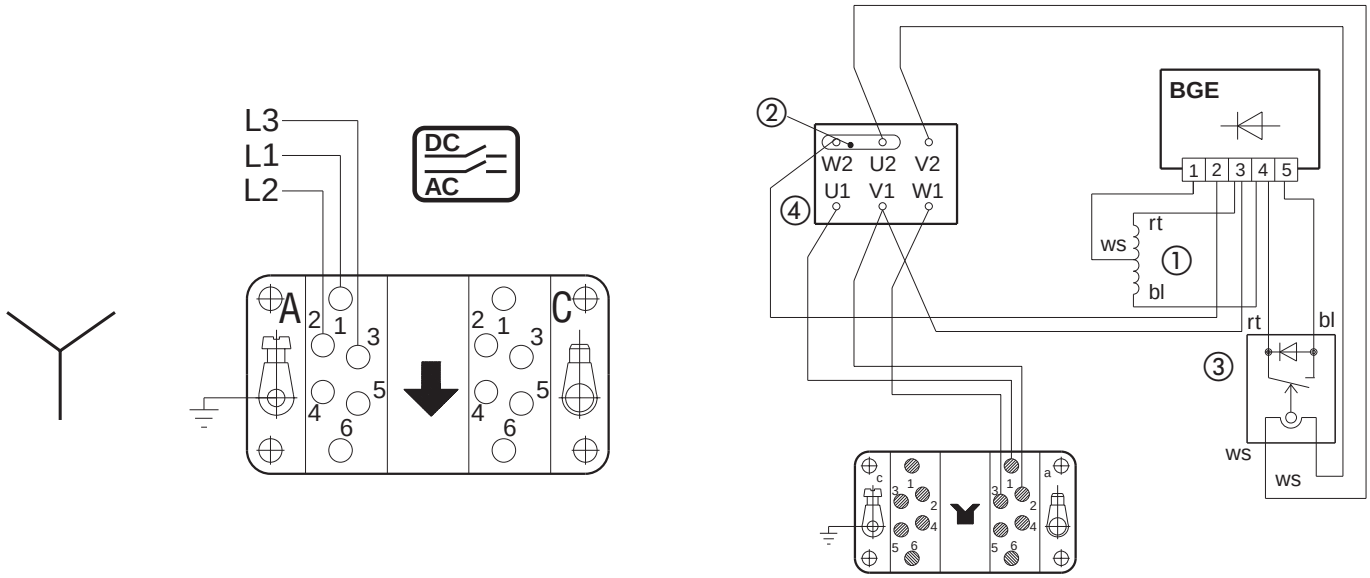
Bremsspannung gleich Δ-Spannung
Beispiel: Motor 230 V Δ / 400 V Y
Bremse 230 V AC

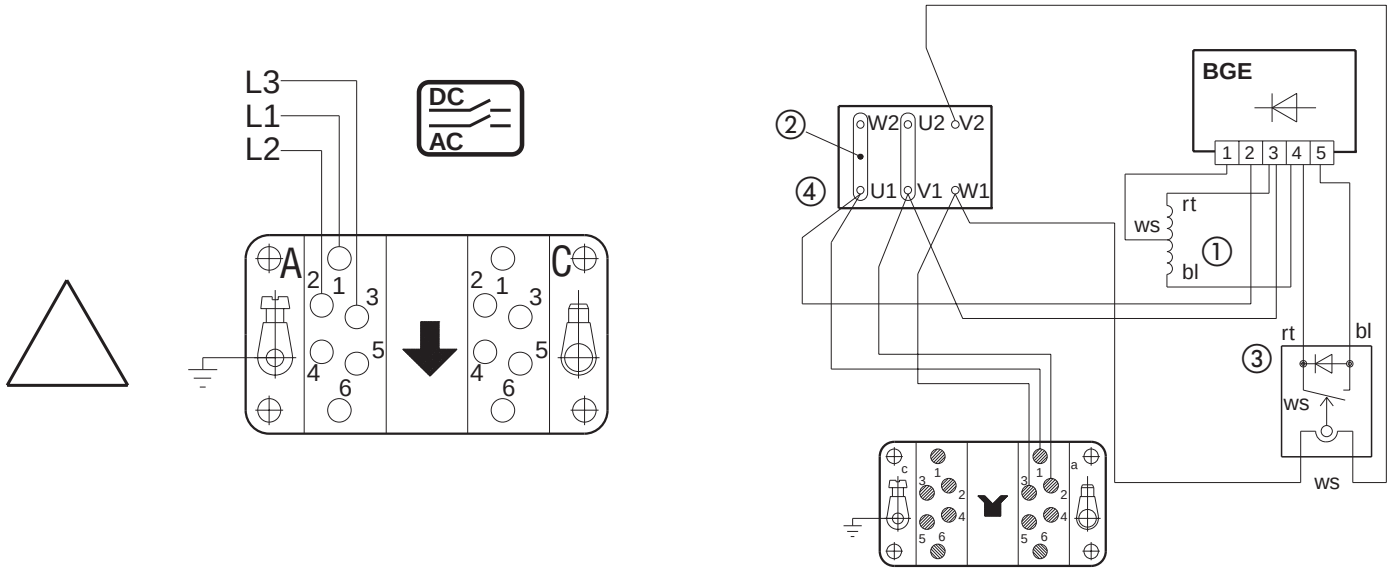
Brake control system BSR

Brake voltage = DELTA (Δ) voltage
Example: Motor 230 VΔ / 400 V Y
Brake 230 V AC

Commande de frein BSR

Tension du frein égale à tension Δ
Exemple: Moteur 230 VΔ / 400 V Y
Frein 230 V AC





① Bremsspule
① Brake coil
① Bobine de frein

② Klemmbrücke
② Terminal link
② Barrette de couplage

③ Stromrelais SR11
③ Current relay SR 11
③ Relais d' intensité SR11

④ Klemmenplatte
④ Terminal board
④ Plaque à bornes

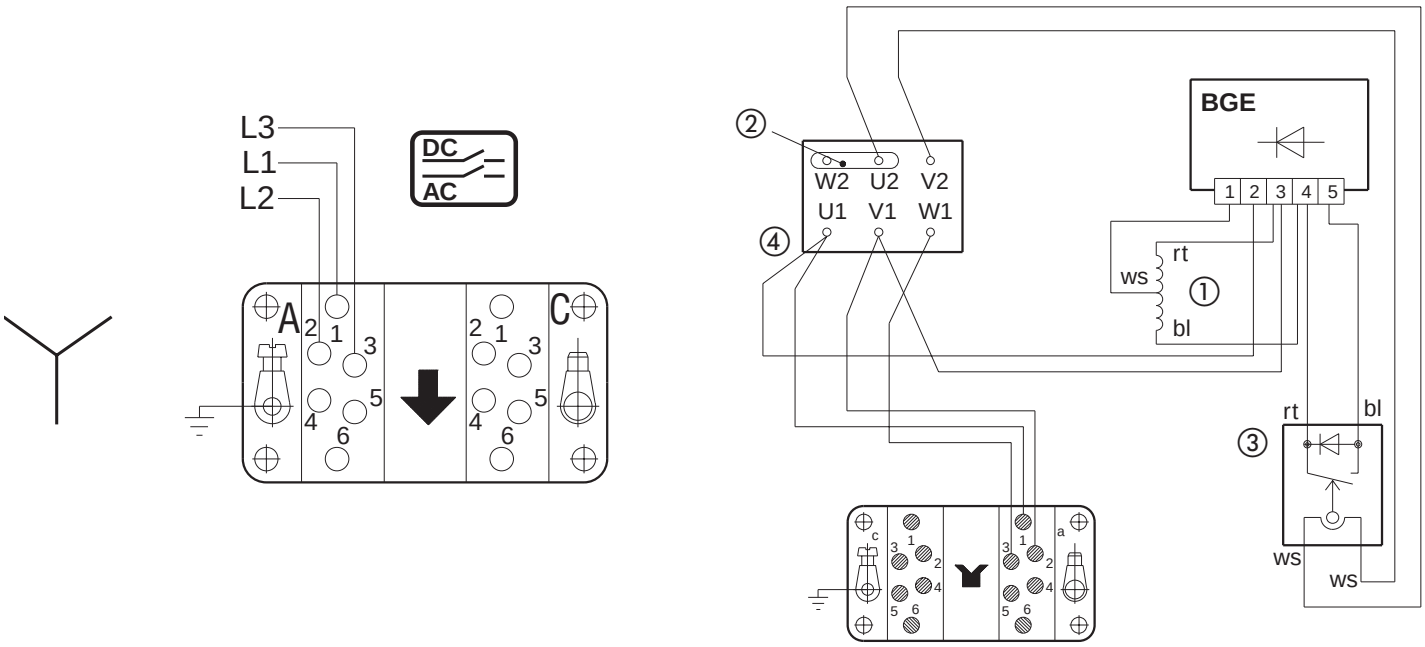
ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu
br = braun/brown/brun
sw = schwarz/black/noir

AT 109

Bremsspannung gleich Y-Spannung
Beispiel: Motor 230 V Δ / 400 VY
Bremse 400 V AC

Brake voltage = STAR (Y) voltage
Example: Motor 230 V Δ / 400 VY
Brake 400 V AC

Tension du frein égale à la tension Y
Exemple: Moteur 230 V Δ / 400 VY
Frein 400 V AC



① Bremsspule
① Brake coil
① Bobine de frein

② Klemmbrücke
② Terminal link
② Barrette de couplage

③ Stromrelais SR11
③ Current relay SR 11
③ Relais d' intensité SR11

④ Klemmenplatte
④ Terminal board
④ Plaque à bornes

ws = weiß/white/blanc
rt = rot/red/rouge
bl = blau/blue/bleu
br = braun/brown/brun
sw = schwarz/black/noir