

MINISTOP
Motor Brake Relay
BA 9034N/802

Translation
of the original instructions



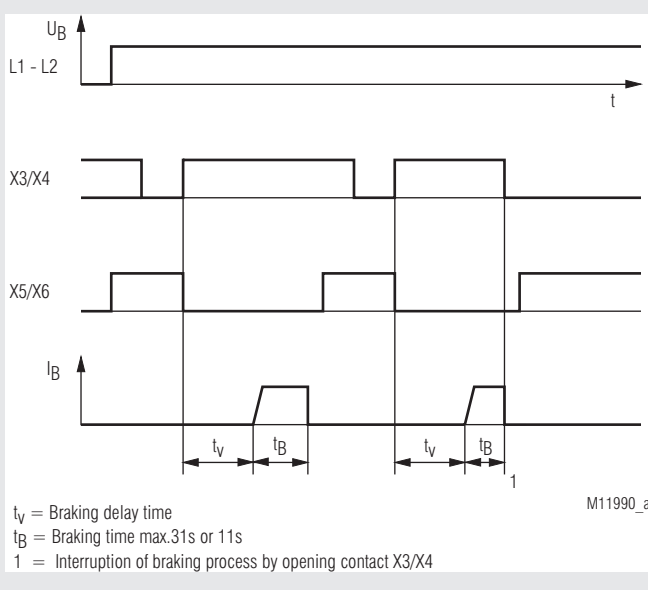
Your advantages

- Higher safety level and more economic by short stopping cycle
- Cost saving
- Compact design
- Easily appliance, no need for current measuring instrument
- Regulated braking current

Features

- According to IEC/EN 60947-4-2
- For all single and 3-phase asynchronous motors
- DC-brake with one way rectification up to max. 32 A_{eff}
- Controlled by microcontroller
- Easily fitted to existing installations
- Wear free and maintenance free
- Integrated braking contactor
- DIN-rail mounting
- Adjustable braking current (controlled current)
- Width: 45 mm

Function Diagram



Approvals and Markings



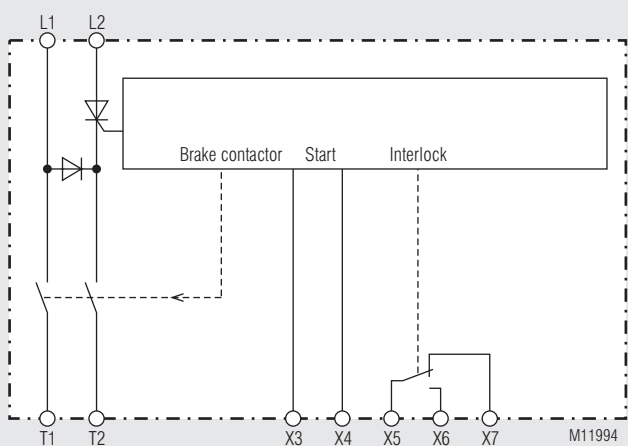
Applications

- Saws
- Centrifuges
- Woodworking machines
- Textile machines
- Conveyors

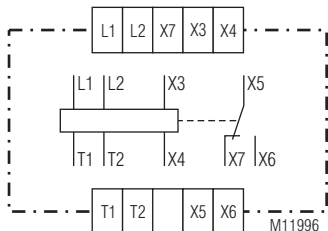
Function

The supply voltage is connected to terminals L1-L2 and the interlock contact X5-X6 closes to enable the motor contactor. A green LED indicates operation. The motor can be started with the start button. The braking DC-voltage is generated on terminals T₁ and T₂. The braking sequence is as follows:
When contact X3/X4 closes, the braking contactor is switched on after a safety time has elapsed for the duration of the braking time and the braking current flows through the stator winding.
Opening contact X3/X4 ends the braking process. The maximum possible braking time is 31 s resp. 11 s.

Block Diagram



Circuit Diagram



Connection Terminals

Terminal designation	Signal description
X3	Start braking, NC contact
X4	Start braking, NC contact
X5, X6	Interlock for monitor contactor
X5, X7	Star-contactor control
L1	Phase voltage L1
L2	Phase voltage L2
T1	Motor connection T1
T2	Motor connection T2

Indicators

LED green „RUN“:	- Ready:	Permanent on
LED red „Error“	- Mains frequency out of tolerance:	Flashes 1 times
	- Braking current is not present:	Flashes 2 times
	- Power semiconductors overheated:	Flashes 3 times
	- Synchronisation signal is not present:	Flashes 4 times
	- Temperature measuring circuit defective:	Flashes 5 times
	- Motor voltage not disconnected:	Flashes 6 times
LED yellow „I _B “	- Max. braking time 11 s Braking current is present:	Permanent on
	- Max. braking time 31 s Braking current is present:	Flashes

Technical Data

Nominal Voltage U_N:	AC 400 V ± 10 %
Nominal frequency:	50/60 Hz ± 3 Hz
Permissible braking current:	2 ... 10 A _{eff} , 5 ... 25 A _{eff} , 5 ... 32 A _{eff}
Duty-cycle at Max. braking current:	8 %
Braking voltage:	DC 10 ... 190 V
Max. braking time:	11 s, 31 s
Recovery time:	350 ms
Braking current rise time:	300 ms
Braking delay for fade out of back EMF:	Auto optimising (0.2 ... 2 s)
Nominal consumption for control circuit:	5 VA
Short circuit strength max. fuse rating	
Line protection:	20 A gG / gL IEC/EN 60947-5-1
Assignment type:	1 IEC/EN 60947-4-1
Semiconductor fuse:	Max. 1200 A ² s Typ gR
Assignment type:	2 IEC/EN 60947-4-1



Coordination Type!

Coordination type 1 according to IEC 60947-4-1: The engine control unit is defective following a short circuit and must be replaced.

Coordination type 2 according to IEC 60947-4-1: The engine control unit is still suitable for continued use following a short circuit.

Technical Data

Output

Contacts:	1 changeover contact 5 A / AC 250 V
Switching capacity to AC 15:	
NO contact:	5 A / AC 230 V IEC/EN 60947-5-1
NC contact:	2 A / AC 230 V IEC/EN 60947-5-1
Electrical life:	1 x 10 ⁵ switching cycles
Mechanical life:	50 x 10 ⁶ switching cycles

General Data

Operating mode:	Continuous operation
Temperature range:	
Operation:	0 °C ... + 45 °C
Storage:	- 25 °C ... + 75 °C
Relative air humidity:	93 % at 40 °C
Altitude:	≤ 2000 m
Usage category:	32A:AC-53a:1-31:9-25
Clearance and creepage distance	
Rated impulse voltage / pollution degree	
Relay contacts to supply voltage:	6 kV / 2 IEC 60664-1
Overvoltage category:	III

EMC

Interference resistance	
Electrostatic discharge (ESD):	8 kV (air) IEC/EN 61000-4-2
HF irradiation:	
80 MHz ... 1.0 GHz:	10 V / m IEC/EN 61000-4-3
1.0 GHz ... 2.5 GHz:	3 V / m IEC/EN 61000-4-3
2.5 GHz ... 2.7 GHz:	1 V / m IEC/EN 61000-4-3
Fast transients:	2 kV IEC/EN 61000-4-4
Surge between wires for power supply:	1 kV IEC/EN 61000-4-5
between wire and ground:	2 kV IEC/EN 61000-4-5
HF wire guided:	10 V IEC/EN 61000-4-6

Irradiation

Wire guided:	Limit value class B IEC/EN 60947-4-2
Radio irradiation:	Limit value class B IEC/EN 60947-4-2

Degree of protection

Housing:	IP 40 IEC/EN 60529
Terminals:	IP 20 IEC/EN 60529

Housing:

	Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance:	Amplitude 0.35 mm, Frequency 10 ... 55 Hz, IEC/EN 60068-2-6 00 / 045 / 04 IEC/EN 60068-1 EN 50005
Climate resistance:	
Terminal designation:	
Wire connection:	

Wire connection:	
Cross section:	2 x 2.5 mm ² solid or 1 x 1.5 mm ² stranded ferruled DIN 46228-1/-2/-3/-4
Stripping length:	10 mm
Wire fixing:	Flat terminals with self-lifting clamping piece IEC/EN 60999-1
Fixing torque:	0.8 Nm
Mounting:	DIN rail IEC/EN 60715
Weight:	600 g

Dimensions

Width x height x depth:	45 x 73 x 122 mm
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Standard Type

BA 9034N/802	10 A AC 400 V 50 / 60 Hz 2 ... 31 s
Article number:	0068407
• Integrated braking contactor	
• DIN-rail mounting	
• Width:	45 mm

Control Input

If the connection between X3-X4 is opened, the device turns into standby mode. After closing the connection, the device starts with braking. The braking process can be interrupted at any time by opening the contact.

Monitoring Output

- X5, X6: Interlock contact for motor contactor. This contact will be open at system error, this means that the motor cannot be started!
- X5, X7: Activation of the star contactor in a star-delta circuit during braking

Adjustment Facilities

Potentiometer	Description	Initial setting
I _B	Braking current	Fully anti-clockwise

The braking current is controlled according to the adjusted value in Ampere.

For optimum braking the setting of the current should be max. 1.8 to 2 times the motor current. This corresponds to the saturation current of the magnetic field used to brake the motor. A higher current only overheats the motor. A higher braking efficiency can be obtained by using 2 or more stator windings. The permitted duty cycle is depending on the actual braking current and the ambient temperature.

Set-up procedure

- Connect the motor braking relay in accordance to the connection example and make sure to connect the same phases between (L1, L2) and /T1, T2).
Make sure that the interlocking contact X5, X6 is wired in series to the coil of the motor contactor so that the motor contactor cannot switch on, while the braking current is flowing
- Set the braking current in the potentiometer scale. To avoid overloading of the motor set the current to max. two times the nominal motor current.
- The braking time is fixed at 11 s resp. 31 s.
The braking process can only be cancelled by opening contact X3/X4.

Notes



Risk of electrocution!

WARNUNG

Danger to life or risk of serious injuries.

- The connection terminals X3, X4 are connected to mains potential, take care that the connection cables are installed with protection against touching.
- Voltage is present at the output terminals when the motor control unit is in the OFF state.



Risk of fire or other thermal hazards!

WARNUNG

Danger to life, risk of serious injuries or property damage.

- The minimum distance to adjacent units should be at least 50 mm.



Functional error!

WARNUNG

Danger to life, risk of serious injuries or property damage.

- Care must be taken that the interlock contact X5-X6 is used and connected correctly. Otherwise, there is a risk that the motor contactor is activated while the unit is in braking mode.



Installation Error!

WARNUNG

- The use of capacitive loads can lead to the destruction of switching components of the motor control unit. Do not operate capacitive loads on the motor control unit.



Attention!

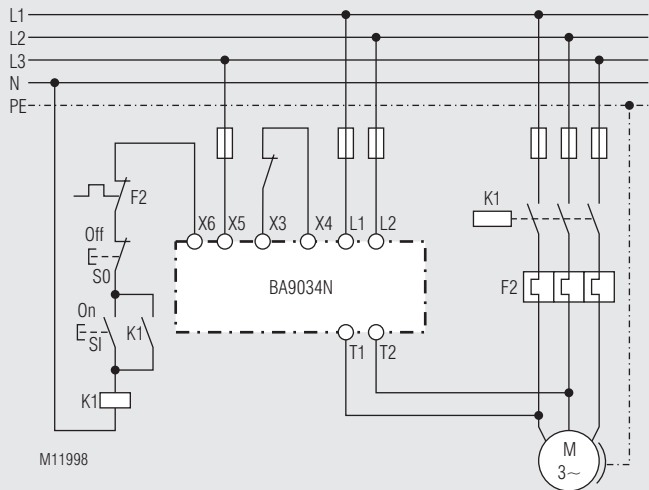
- If the back-EMF of the motor drops only slowly the unit may have a braking delay of up to 2 s.
- If the voltage L1 and L2 is switched on when the contact X3/X4 is closed, contact X3/X4 must first be opened before starting the motor.

Fault Indication by Flashing Code

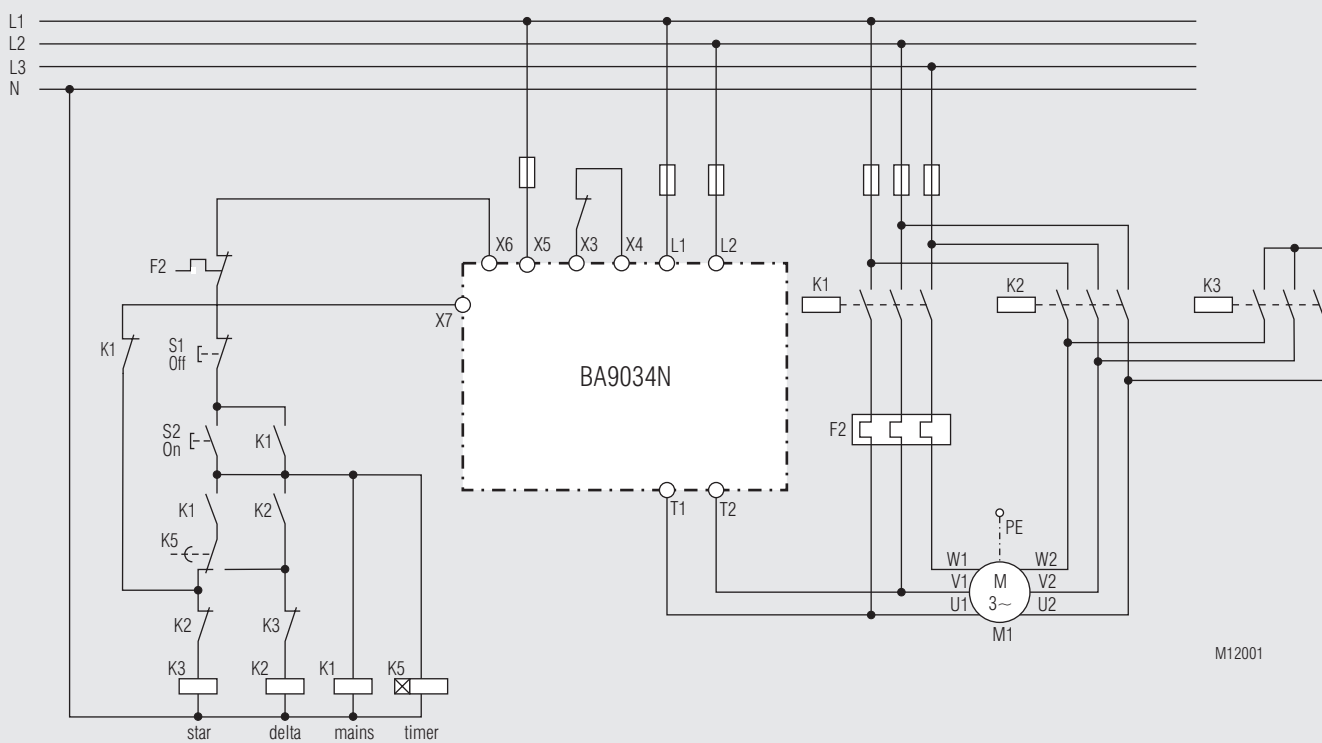
During normal operation failure messages may occur. The messages are indicated by a flashing sequence of the „Error“ LED.

Flashes	Fault	Reason	Failure recovery
1 x	Mains frequency out of tolerance	Wrong mains frequency	Device not suitable for the frequency. Contact manufacturer
2 x	Braking current is not present	Braking current circuit broken Motor coil resistance is too high	Check the wiring Set braking current lower until the error disappears
3 x	Power semiconductors overheated	Permitted duty cycle exceeded	Decrease current and set the braking time longer. Wait till heat sink cools down
4 x	Synchronisation signal is not present	Unit defective or temporary interruption of power supply	The unit has to be repaired Switch unit Off and On
5 x	Temperature measuring circuit defective	Unit defective or overtemperature on power semiconductors while switching on	The unit has to be repaired Wait till heat sink cools down
6 x	Motor is still connected to voltage while braking should start already	Motor contactor welded Wiring incorrect	Change motor contactor Check wiring

Connection Examples



BA 9034N/802, 3-phase



BA 9034N/802, 3-phase, \star - Δ -start up