

MINISTART
Softstarter
BA 9010, BN 9011

Translation
of the original instructions



Your Advantage

- Increases the life of squirrel cage motors and mechanical drives
- Easily fitted to existing installations
- No neutral conductor required
- For snapping onto 35 mm standard top-hat rail
- For simple applications, the f/U converter can often be dispensed with
- Semiconductors bridged after softstart

Features

- According to IEC/EN 60947-4-2
- For motors up to 5.5 kW (BA 9010) and to 11 kW (BN 9011)
- 1 phase control
- Adjustable ramp time and starting torque. Can be combined with motor brake units
- LED indication
- BA 9010: Width 45 mm
- BN 9011: Width 100 mm

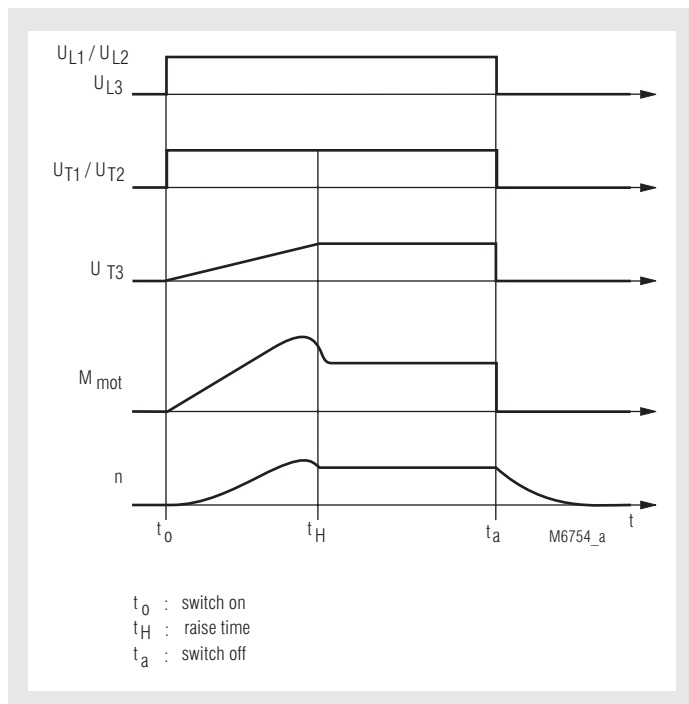
Product Description

The BA 9010 and BN 9011 are electronic devices designed to enable 1-phase or 3-phase induction motors to start smoothly. BA 9010 / BN 9011 slowly ramps up the current on one phase, therefore allowing the motor torque to build up slowly. This reduces the mechanical stress on the machine and prevents damage to conveyed material. When the motor is up to full speed the semiconductors in BA 9010 / BN 9011 are bridged to prevent internal power losses and heat build up.

Approvals and Markings



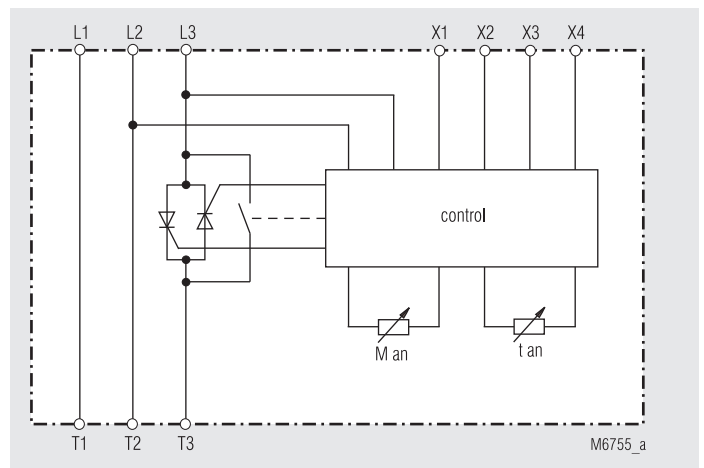
Function Diagram



Applications

- Motor with gears, belt or chain drive
- Fans, pumps, conveyor systems, compressors
- Door drives, packaging machines
- Start current limiting on single phase motors

Block Diagram



Indication

LED green	ON	=	Power connected
LED yellow	ON	=	Softstart complete

Notes

If units are used in 230 V 3-phase mains, the next higher power level must be used for the same motor power, because the motor current determines the size of the unit.

Speed adjustment of drives is not permitted with these units and is not possible at all. Likewise, in the uncoupled state, i.e. without load, no distinct soft start behaviour is achieved.

The starting current in the mains cannot be reduced with these units. To achieve this at the same time as torque reduction, unit types GC 9012 or GC 9014 must be used.

If the power semiconductor is to be protected against short circuits or earth faults during start-up, a superfast fuse (see technical data) must be used. Otherwise, the usual line and motor protection measures must be applied. If the switching frequency is high, it is recommended to monitor the winding temperature of the motor. The soft starter must not be operated with a capacitive load, such as power factor correction, at the output.

To ensure the safety of persons and equipment, only appropriately qualified personnel may work on this unit.

Technical Data

Type designation:	BA 9010		BN 9011	
Nominal voltage [V]:	3 AC 230 / 400			
Voltage range:	60 ... 240 V \pm 10 % 380 ... 480 V \pm 10 %			
Nominal frequency [Hz]:	50/60			
Rated current [A]:	6.5	12	15	25
Nominal motor power P_N at 400 V [kW]:	3	5.5	7.5	11
230 V [kW]:	1.5	3	4	5.5
Min. motor power [P_N]:	Approx. 0.1			
Start torque [%]:	0 ... 70			
Ramp time [s]:	0.5 ... 5			
Recovery time [ms]:	200			
Max. Switching frequency ($5 \times I_e$ and $5 \times t_{an}$):	100/h	80/h	50/h	30/h
($3 \times I_e$ and $5 \times t_{an}$):	240/h	200/h	120/h	70/h
Semiconductor fuse I²t-value [A²s]:	265	610	4900	4900
External semiconductor protection fuse [A]:	25	35	60	100
Backup value (coordination type 1) [A]:	16	20	25	35



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.

Consumption [VA]:	1.5	3.5	3.5	3.5
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General Data

Temperature range

Operation:	0 ... + 45 °C
Storage temperature:	- 25 ... + 75 °C
Power reduction:	Higher than 40 °C - 2 % per 1 °C up to max. 60 °C and installation heights above 1000 m - 2 % per 100 m (The reductions refer to the rated power)

Overvoltage category /

pollution degree:	III / 2
Installation class:	3
Protection class:	IP 20 IEC/EN 60529
Wire connection:	Max. 2 x 2.5 mm ² fine stranded
Mounting:	DIN rail mounting
Weight	
BA 9010:	300 g
BN 9011:	500 g

Dimensions

Width x height x depth:

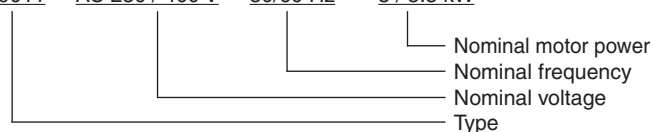
BA 9010:	45 x 74 x 121 mm
BA 9011:	100 x 74 x 121 mm

Standard Type

BA 9010	3 AC 230 V / 400 V	50/60 Hz	1.5 kW / 3 kW	
Article number:		0045241		stock item
• Nominal voltage:	3 AC 230 V / 400 V			
• Nominal motor power:	1.5 kW / 3 kW			
• Width:	45 mm			

Ordering Example

BN 9011 AC 230 / 400 V 50/60 Hz 3 / 5.5 kW



Control Input

To operate the device at AC 230 V it's necessary to bridge the terminals X1, X2. For change pole motor applications the terminals X3, X4 have to be connected via a contact. Otherwise they have to be bridged.

Setting Facilities

Ramp up time: With potentiometer " t_{an} " the ramp up time until the Triacs are bridged can be adjusted between 0.5 and 5 s.

Starting torque: With potentiometer " M_{an} " the starting torque can be adjusted between 0 and 50 % of the maximum value.

Set-up Procedure

1. Set potentiometer " M_{an} " to minimum (fully anti-clockwise)
Set potentiometer " t_{an} " to maximum (fully clockwise)
2. Start the motor and turn potentiometer " M_{an} " up until the motor starts to turn without excessive humming. Stop the motor and restart.
3. Adjust potentiometer " t_{an} " to give the desired ramp time.
Stop and restart the motor, readjusting the potentiometers until the desired starting characteristics are achieved.

Attention: If the ramp-up time is adjusted to short, the internal bridging contact closes before the motor is on full speed.
This may damage the bridging contactor or bridging relay.



Safety Notes

- Never clear a fault when the device is switched on
- The user must ensure that the device and the necessary components are mounted and connected according to the locally applicable regulations and technical standards.
- Adjustments may only be carried out by qualified specialist staff and the applicable safety rules must be observed.



Danger to life due to electric shock!

- Terminals X1 and X2 have mains potential; the connected contact must therefore be potential-free.

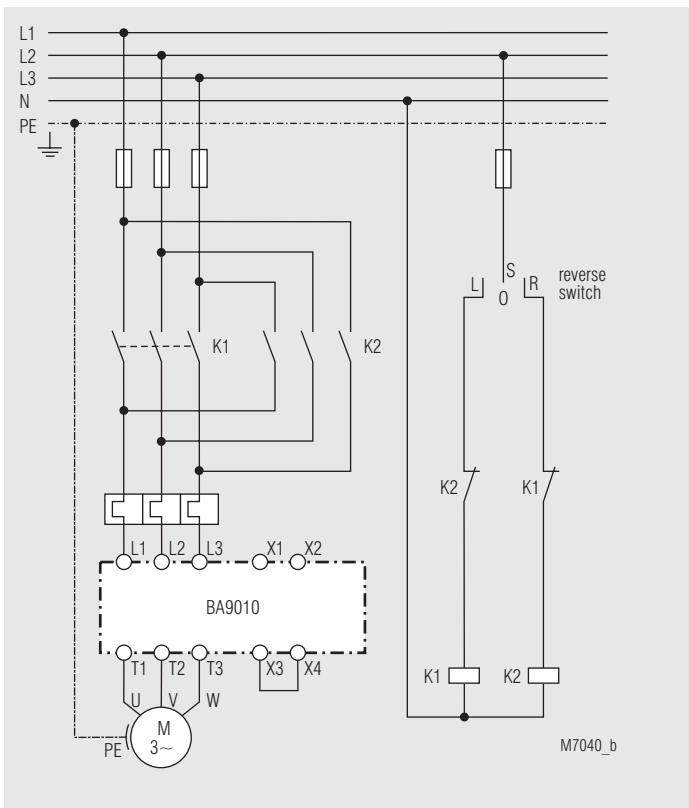
Attention:

- Please pay attention and consider for the operation of IE3-motors while dimensioning of softstarters the resulting higher starting currents.
- For the use of IE3-motors we highly recommend to dimension and design the needed softstarters one size higher.

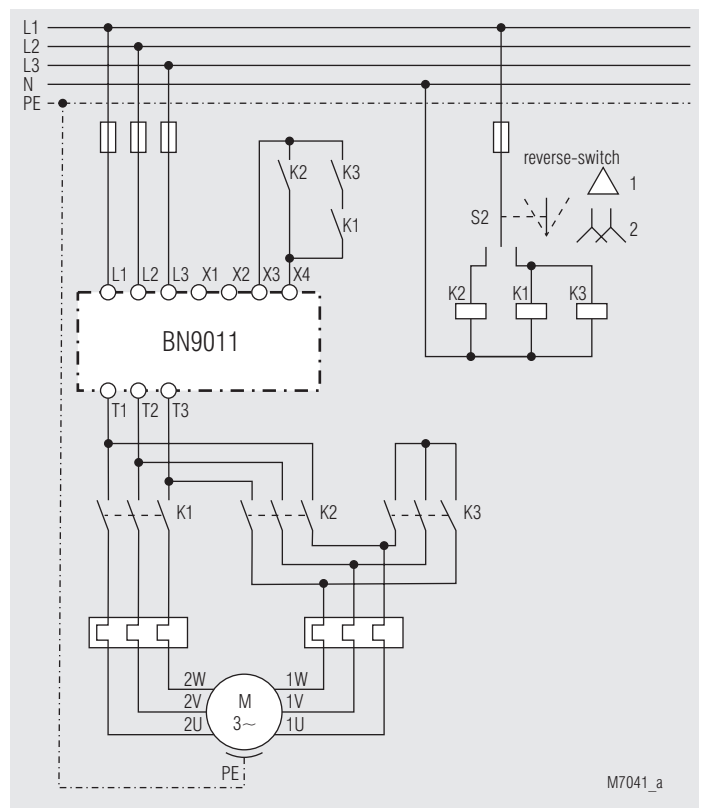
Warning:

- To avoid heat accumulation, keep a distance of at least 40 mm between the cable duct and the unit.
- Make sure that the specified switching frequency is not exceeded! After each start, the power semiconductors must be given sufficient time to cool down. Starting processes in a short time sequence can destroy the power semiconductors! Operation in bridged state also allows the power semiconductors to cool down!

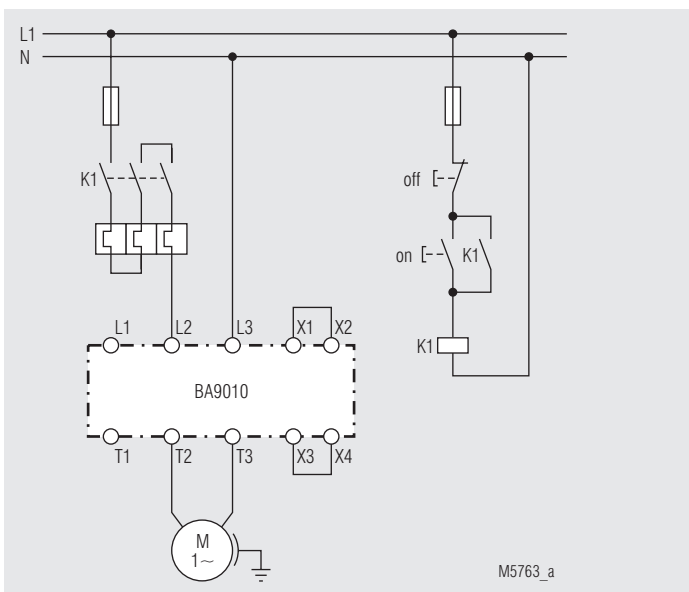
Application Examples



BA 9010 connected to a 3 phase induction motor with reversing



BN 9011 connected to a 3 phase multi-pole (Dahlander) motor with reversing



Softstart of a single phase motor on 230 V AC supply