

MINISTART
Softstarter With Softstop
BA 9018

Translation
of the original instructions



Your advantages

- For soft and shockfree start of your asynchronous motors
- Less wearing and longer life for your motors and components
- Space saving and easy fitting
- Reduce load from supply mains by reducing of starting current

Features

- According to IEC/EN 60947-4-2
- Softstart with softstop
- For motors up to 5.5 kW
- 2-phase control
- Adjustable ramp time, starting torque and deceleration time
- Width 45 mm

Function

The BA 9018 softstarters are electronic devices designed to enable 1-phase or 3-phase induction motors to start smoothly. It slowly ramps up the current on two phases, 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 are bridged to prevent internal power losses and heat build up. In addition BA 9018 allows a softstop function prolonging the stop time of the motor, preventing high counter torques from abruptly stopping the motor.

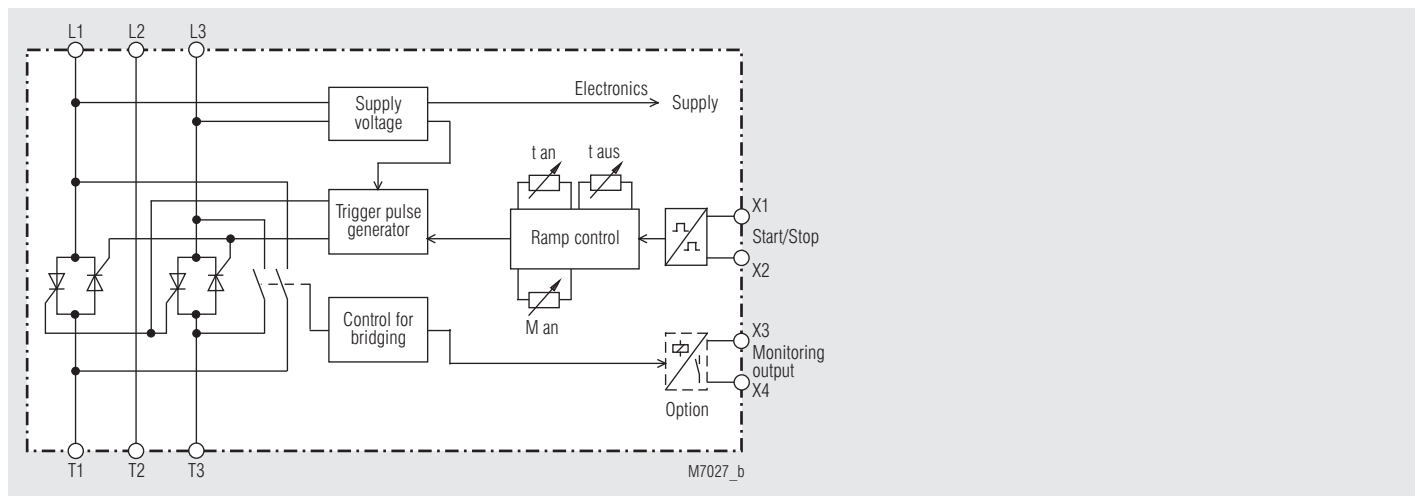
Approvals and Markings



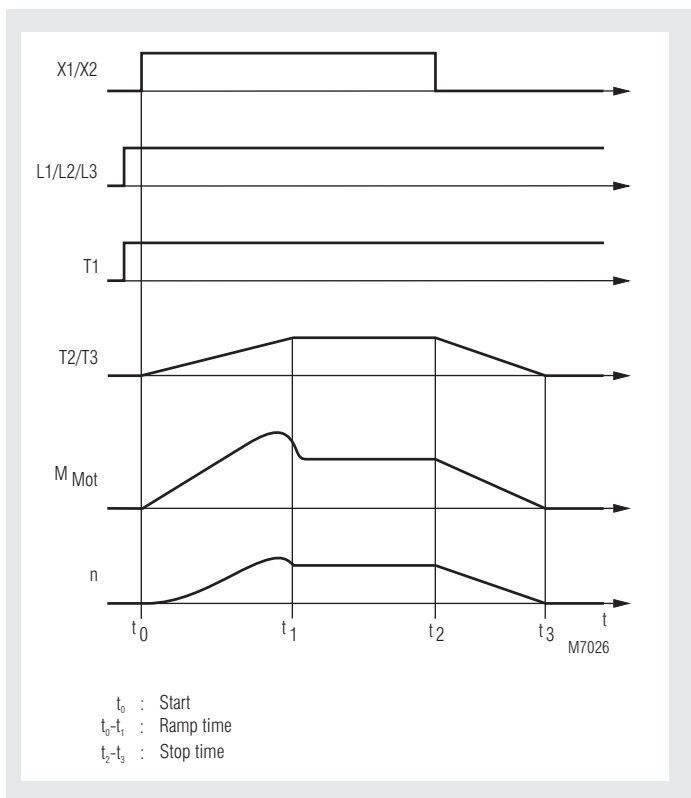
Applications

- Motors with gear, belt or chain drive
- Fans, pumps, conveyor systems, compressors
- Packaging machines, door drives
- Start current limiting on 3 phase motors

Block Diagram



Function Diagram



Indication

LED green	ON	=	Power connected
LED yellow	ON	=	Power semiconductor bridged

Notes

Motor load must always be connected as continuous operation of the softstart with no load may cause overheating of the motor and softstart. It is recommended that the softstart is protected by superfast semiconductor fuses rated as per the current rating of the softstart or motor. However, standard line and motor protection is acceptable, but for high starting frequencies motor winding temperature monitoring is recommended.

Technical Data

	3 AC 400 V \pm 15 % (others on request) * Special voltages up to 480 V can only be made for units > 3 kW. For special voltages > 500 V a separate auxiliary supply is necessary. It has to be connected to terminals X3 and X4. The variant with monitoring contacts (/100) is not possible in this case. Auxiliary supply is either 230 V AC or 24 V DC.		
Nominal voltage:			
Nominal frequency [Hz]:	50 / 60		
Rated current [A]:	3.5	6.5	12
Nominal motor power at 400 V supply voltage [kW]:	1.5	3	5.5
Min. motor power [P_N]:	Approx. 0.4		
Start torque:	0 ... 80 %		
Deceleration torque:	Fixed at 70 %		
Ramp time [s]:	0.5 ... 12		
Deceleration time [s]:	0.5 ... 12		
Recovery time [ms]:	200		
Switching frequency (3 x I_N, t_{an} = 10 s):	90/h	60/h	30/h
Semiconductor fuse I²t-value [A²s]:	72	265	610
Backup value (coordination type 1) [A]:	10	10	20



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.

Indicator output

Potential-free output as operating signal
Switching capacity: 250 V / 8 A AC, 30 V / 8 A DC

General Data

Temperature range

Operation: 0 ... + 45 °C
Storage temperature: - 25 ... + 75 °C
Power reduction: Higher than 45 °C - 2 % / °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

Installationsklasse:

3

Ambient temperature:

0 ... + 45 °C up to 1000 m altitude, non-condensing

EMC

Interference emission:

Continuous operation EN 50081-1
High and return IEC/EN 60947-4-2
EN 50082-2-2 1995

Interference resistance:

Degree of protection:

Housing:

IP 40

Terminals:

IP 20

Climate resistance:

25 / 075 / 04

IEC/EN 60068-1

Wire connection

Fine-stranded:

Up to 2.5 mm²

Mounting:

Snaps onto 35 mm standard top-hat rail

Weight:

400 g

Special voltages [s]:

230	230	230
-	480	480

Dimensions

Width x height x depth: 45 x 74 x 121 mm

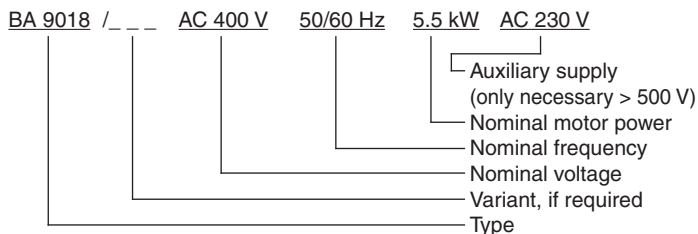
Standard Type

BA 9018 3 AC 400 V 50/60 Hz 1.5 kW
 Article number: 0047690 stock item
 • Nominal voltage: 3 AC 400 V
 • Nominal motor power: 1.5 kW
 • Width: 45 mm

Variants

BA 9018/010: Start via control input X1, X2 DC 10 ... 42 V
 BA 9018/100: X3, X4 closed when motor on operation
 BA 9018/101: X3, X4 closed when semiconductors bridged

Ordering example for variants



Control Input

As described in Principles of Operation BA 9018 are normally controlled by a voltfree contact on terminals X1-X2.

BA 9018/010:

If external DC voltage control is desired the BA 9018 can be set at the factory to accept a DC control voltage of 10 ... 42 V DC at terminals X1+,X2-.

Setting facilities

Potentiometer	Description	Basic setting
M_{an}	Starting voltage	Eft end of scale
t_{an}	Ramp up time	Right stop
t_{ab}	Deceleration ramp	Right stop

Set-up Procedure

Set potentiometer " M_{an} " to minimum (fully anti-clockwise).
 Set potentiometer " t_{an} " to maximum (fully clockwise).
 Set potentiometer " t_{ab} " to mid position.
 Start the motor and turn potentiometer " M_{an} " up until the motor starts to turn without excessive humming.
 Stop the motor and restart.
 Adjust potentiometer " t_{an} " to give the desired ramp time.
 Stop and restart the motor.
 Adjust potentiometer " t_{ab} " to give the desired deceleration time.
 Stop and restart the motor, readjusting the potentiometers until the desired starting/stopping 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.



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!

Safety Notes

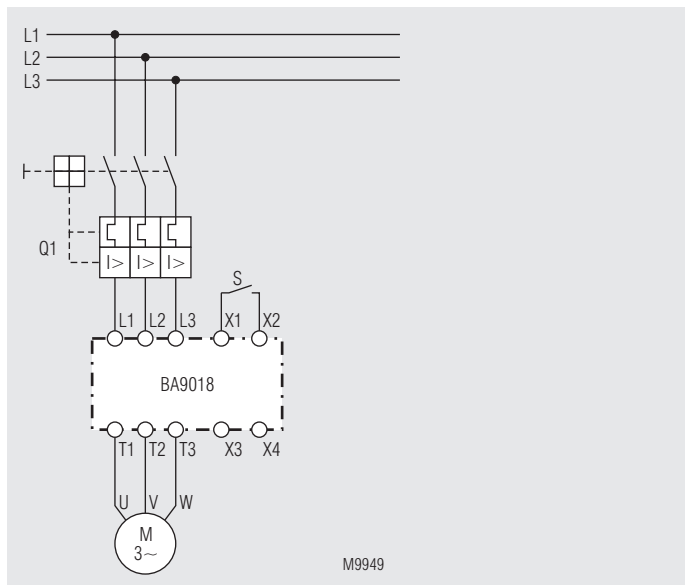
- Never clear a fault when the device is switched on
- **Attention:** This device can be started by potential-free contact, while connected directly to the mains without contactor (see application example). Please note, that even if the motor is at rest, it is not physically separated from the mains. Because of this the motor **must** be disconnected from the mains via the corresponding manual motor starter.
- 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.

Connection Example



Softstart with softstop

