Function
Softstarters are electronic devices designed to enable 3-phase induction motors to start smoothly. The BA 9019 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 in BA 9019 are bridged to prevent internal power losses and heat build up. In addition BA 9019 allows a softstop function prolonging the stop time of the motor, preventing high counter torques from abruptly stopping the motor.

Indication
- **LED green**: On, when power connected
- **LED yellow**: On, when power semiconductors bridged
- **LED red**: On, when temperature monitoring active

**BA 9019/100**
- **LED green**: On, when auxiliary supply connected
- **LED yellow**: Flashing, during ramp up or down continuously on, when power semiconductors 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.

All technical data in this list relate to the state at the moment of edition. We reserve the right for technical improvements and changes at any time.
Technical Data

Nominal voltage L1/L2/L3: 3 AC 200 V -10% ... 460 V +10%
Nominal frequency: 50 / 60 Hz
Nominal motor power $P_n$ at
400 V: 3 kW 5.5 kW
200 V: 1.5 kW 2.2 kW
Rated current: 8 A 12 A
Switching frequency up 3 x $I_n$, 5 s, $\vartheta_i = 20 ^\circ$: 20 / h 10 / h
Min. motor power: Approx. 0.1 $P_n$
Short-circuit protection
Mode 1: gG 32 A
Mode 2: Semiconductor fuse max. 610 A's e. g. A6OQ30-2
Start torque: 50 ... 80 %
Ramp time: 0.5 ... 5 s
Deceleration torque: 30 ... 80 %
Deceleration time: 0.5 ... 5 s
Recovery time: 200 ms
Auxiliary voltage A1 + / A2: DC 24 V ± 20 %
Power consumption: 3 W
Residual ripple: 5 %

Control Input

Voltage range X1/X2: DC: 0 ... 28.8 V
Softstart: > 13 V
Softstop: < 5 V

General Data

Operating mode: Continuous operation
Temperature range: Operation: 0 ... + 55 °C
Storage: - 25 ... + 75 °C
Relative air humidity: 93 % at 40 °C
Altitude: < 1000 m
Clearance and creepage distance
Rated insulation voltage: AC 300 V
Overvoltage category: III
Rated impuls voltage / pollution degree between auxiliary voltage/control circuit nominal voltage: 4 kV / 2 IEC/EN 60 664-1

EMC

Interference resistance
Electrostatic discharge (ESD): 8 kV (air) IEC/EN 61 000-4-2
HF-irradiation
80 Mhz ... 1.0 Ghz: 10 V / m IEC/EN 61 000-4-3
1.0 GHz ... 2.5 Ghz: 3 V / m IEC/EN 61 000-4-3
2.5 Ghz ... 2.7 Ghz: 1 V / m IEC/EN 61 000-4-3
Fast transients: 2 kV IEC/EN 61 000-4-4
Surge voltage between wires for power supply: 1 kV IEC/EN 61 000-4-5
between wire and ground: 2 kV IEC/EN 61 000-4-5
HF-wire guided: 10 V IEC/EN 61 000-4-6
Voltage dips IEC/EN 61 000-4-11

Interference emission
Wire guided: Limit value class A* IEC/EN 60 947-4-2
* The device is designed for the usage under industrial conditions (Class A, EN 55011). When connected to a low voltage public system (Class B, EN55011) radio interference can be generated. To avoid this, appropriate measures have to be taken.

Radio irradiation: Limit value class B IEC/EN 60 947-4-2

Degree of protection:
Housing: IP 40 IEC/EN 60 529
Terminals: IP 20 IEC/EN 60 529
Vibration resistance: Amplitude 0.35 mm frequency 10 ... 55 Hz, IEC/EN 60 068-1
Climate resistance: 0 / 055 / 04 IEC/EN 60 068-1

Technical Data

Wire connection: 2 x 2.5 mm² solid or 1 x 1.5 mm² stranded wire with sleeve DIN 46 228-1/-2/-3/-4
Stripping length: 10 mm
Fixing torque: 0.8 Nm
Wire fixing: Flat terminals with self-lifting clamping piece IEC/EN 60 999-1
Mounting: DIN rail
Weight: 300 g

Dimensions

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

Standard Type

BA 9019 3 AC 200 ... 460 V 50/60 Hz 3 kW
Article number: 0051284
• Nominal voltage: 3 AC 200 ... 460 V
• Nominal motor power: 3 kW
• Width: 45 mm

Variant

BA 9019/60: With CSA-approval for 3 AC 200 V - 10 % ... 400 V + 10 %
10 A nominal current
BA 9019/100: Eceleration time from 0 ... 5 s adjustable

Ordering example for variant

BA 9019 /60 3AC 200 ... 460 V 50/60 Hz 3 kW
Nominal motor power
Nominal frequency
Nominal voltage
Variant, if required
Type

Adjustment Facilities

Potentiometer Description Initial setting
Mon Starting voltage fully anti-clockwise
ton Ramp-up time fully clockwise
Moff Deceleration voltage fully clockwise
toff Deceleration time fully clockwise

Installation

If a voltage of more than 13 V DC is connected to terminals X1/X2, the device begins with softstart. If the voltage falls lower than DC 5 V the device will softstop.

Ensure that no external heat source is placed below the unit and a 40 mm air gap is maintained above and below. Other devices may be directly mounted either side of the unit.

Control Input

If a voltage of more than 13 V DC is connected to terminals X1/X2, the device begins with softstart. If the voltage falls lower than DC 5 V the device will softstop.

Ordering example for variant

BA 9019 /60 3AC 200 ... 460 V 50/60 Hz 3 kW
Nominal motor power
Nominal frequency
Nominal voltage
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Control Input

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Temperature Monitoring

BA 9019 features overtemperature monitoring of its internal power semiconductors. When the safe running temperature is exceeded the power semiconductors will turn off and a red LED on the front of the unit will illuminate. BA 9019 can be reset after the semiconductors have cooled down by momentarily removing the auxiliary supply voltage.

Set-up Procedure

Set potentiometer "M an" to minimum (fully anti-clockwise).
Set potentiometer "M ab" to maximum (fully clockwise).
Set potentiometer "t an" to maximum (fully clockwise).
Set potentiometer "t ab" to maximum (fully clockwise).
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 "M an" until the motor starts to visibly slow down at the initiation of the softstop cycle.
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.

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.