Softstart and softstop function
2-phase control
For motors up to 15 kW at 3 AC 400 V
Acceleration and deceleration time resp. starting and switch-off torque are separately adjustable
Wide input voltage range of the power semiconductors
Galvanic isolation of control input with wide voltage range up to AC/DC 480 V control input
3 auxiliary voltages at the device up to AC 230 V
Integrated overtemperature monitoring
LED indication
According to EN 60 947-4-2
90 mm width

Additional information about this topic
For motors up to 5.5 kW we recommend the softstarter BA 9018 or BA 9019.

Approvals and marking

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

Function
Softstarters are electronic devices designed to enable 1-phase or 3-phase induction motors to start smoothly. The devices 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 the device are bridged to prevent internal power losses and heat build up. In addition the device allows a softstop function prolonging the stop time of the motor, preventing high counter torques from abruptly stopping the motor.

Block diagram
Nominal voltage: 3 AC 200 V - 15 % ... 480 V + 15 %
Nominal frequency: 50 / 60 Hz

Width: 90 mm
Nominal motor power PN at
480 V: 18.5 kW
400 V: 15 kW
200 V: 7.5 kW

Switching frequency
at 3 x I N , 10 s , Ө U = 45 °C: 30 / h 10 / h

Time between 2 starts
min 110 s min. 350 s

Min. motor power: approx. 0.1 P N
Start torque: 30 ... 80 %
Ramp time: 1 ... 10 s
Deceleration torque: 30 ... 80 %
Deceleration time: 1 ... 20 s
Recovery time: 200 ms

Auxiliary voltage:
A1/A2, AC 115 V +10 % , -15 % : bridge A1 - Y1
A2/A1, AC 230 V +10 % , -15 % : bridge Y1 - Y2
A3/A4, DC 24 V +10 % , -15 % : polarity protected

Power consumption: 3 W
Residual ripple: 5 %
Semiconductor fuse: 50 A superfast

EMC
Electrostatic discharge: 8 kV (air) IEC/EN 61 000-4-2
HF-irradiation: 10 V/m IEC/EN 61 000-4-3
Fast transients: 2 kV IEC/EN 61 000-4-4
Surge voltages between
wire for power supply: 1 kV IEC/EN 61 000-4-5
between wire and ground: 2 kV IEC/EN 61 000-4-5

Degree of protection:
Housing: IP 40 IEC/EN 60 529
Terminals: IP 20 IEC/EN 60 529

Vibration resistance: Amplitude 0.35 mm IEC/EN 60 068-1
frequency: 10 ... 55 Hz

Climate resistance: 0 / 055 / 04 IEC/EN 60 068-1

Wire connection:
Load terminals: 1 x 10 mm² solid
1 x 6 mm² stranded ferruled
1 x 4 mm² solid or
1 x 2.5 mm² stranded ferruled (isolated)
or
2 x 1.5 mm² stranded ferruled (isolated)
DIN 46 228-1/-2/-3/-4 or
2 x 2.5 mm² stranded ferruled
DIN 46 228-1/-2/-3

Weight:
BI 9025: 870 g
BL 9025: 835 g

Ordering example:
BI 9025 3 AC 200 ... 480 V 50/60 Hz 15 kW
Nominal motor power at AC 400 V: 11 kW
Width: 90 mm

Control input
Voltage range X1/X2: AC/DC 24 - 480 V
Softstart: > 20 V
Softstop: < 5 V

General data:
Temperature range: 0 ... + 40 °C
It is possible to operate the unit at 40 °C ... 60 °C, the number of starts per hour must then be reduced by 1.5 % / °C temperature increase.
Storage temperature: - 25 ... + 75 °C
Usage category: according to EN 60 947-4-2, AC-53 b

Clearance and creepage distances:
overvoltage category / contamination level
Control voltage to auxiliary voltage, motor voltage: 6 kV / 2 IEC 60 664-1
Auxiliary voltage to motor voltage: 4 kV / 2 IEC 60 664-1

Notes:
Variation of speed is not possible with this device. Without load a softstart cannot be achieved. 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.

The softstarter must not be operated with capacitive load e.g. power factor compensation on the output.
Temperature monitoring

BH/BL/BI 9025 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. BI/BL 9025 can be reset after the semiconductors have cooled down by momentarily removing the auxiliary supply voltage. An LED indicates the fault (see fault detection).

- Never clear a fault when the device is switched on
- 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 instructions

- 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.

Connection example

![Connection Diagram]

Softstart and softstop
Netz: 3 AC 400 V

---

Set up procedure

Set potentiometer "M on" to minimum (fully anti-clockwise).
Set potentiometer "M off" to maximum (fully clockwise).
Set potentiometer "t on" to maximum (fully clockwise).
Set potentiometer "t off" to maximum (fully clockwise).
Start the motor and turn potentiometer "M on" up until the motor starts to turn without excessive humming.
Stop the motor and restart.
Adjust potentiometer "t on" to give the desired ramp time.
Stop and restart the motor.
Adjust potentiometer "M on" until the motor starts to visibly slow down at the initiation of the softstop cycle.
Stop and restart the motor.
Adjust potentiometer "t on" to give the desired deceleration time.
Stop and restart the motor, readjusting the potentiometers until the desired starting/stopping characteristics are achieved.
During softstop the device must be connected to the 3-phase system.

- 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.