

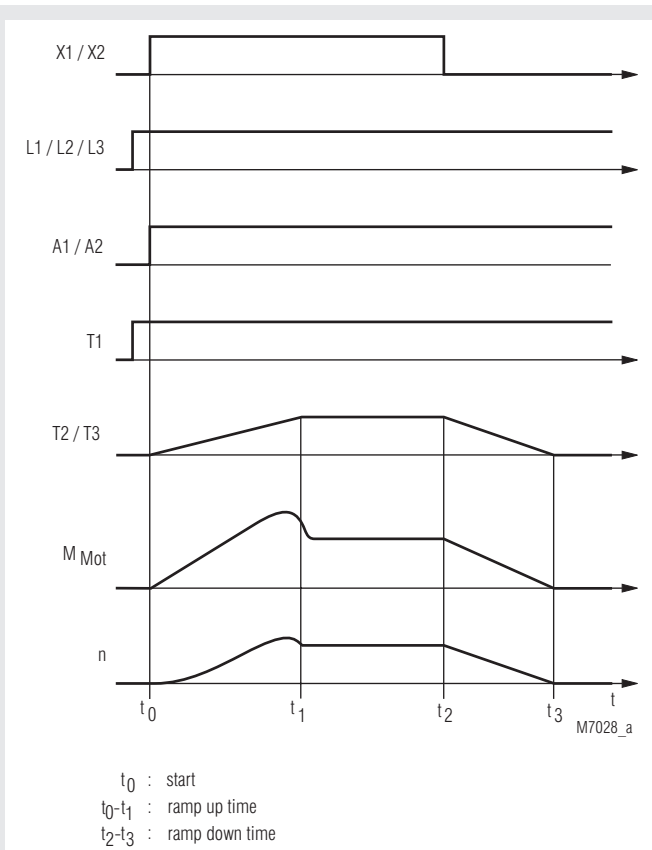
MINISTART Softstarter With Softstop BA 9019

Translation
of the original instructions



- According to IEC/EN 60947-4-2
- Softstart and softstop function
- 2-phase motor control
- For motors up to 5.5 kW
- Adjustable ramp time, starting torque and deceleration time
- Wide motor voltage range
- Galvanic separation of control input
- Galvanic separation of auxiliary power supply
- Integrated overtemperature monitoring
- Width: 45 mm

Function Diagram



Approvals and Markings



Applications

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

Function

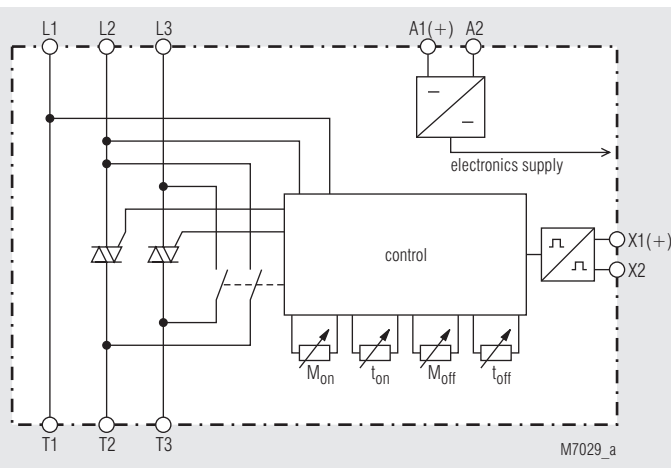
Softstarters are electronic devices designed to enable 3-phase induction motors to start smoothly. The BA 9019 slowly ramps up the current on two phases, therefore allowing the motor torque to build up slowly. This reduces the mechanical stress on the machine and prevents damage to conveyed material.

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

Block Diagram



Connection Terminals

Terminal Designation	Signal Description
A1(+), A2	Auxiliary voltage DC 24 V
X1(+), X2	Control input Start / Stop
L1, L2, L3	Connection supply voltage
T1, T2, T3	Connection motor

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

Nominal voltage L1/L2/L3:	3 AC 200 V -10% ... 460 V +10%	
Nominal frequency:	50 / 60Hz	
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, θ _U = 20 °C:	20 / h	10 / h
Min. motor power:	Approx. 0,1 P _N	
Short-circuit protection Mode 1: gG 32 A	Semiconductor fuse	
Mode 2:	max. 610 A ² s e. g. A60Q30-2	



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.

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:	0 ... + 55 °C	
Operation:	At an altitude of > 1000 m the maximum permissible temperature reduces by 0.5 °C / 100 m	
Storage:	- 25 ... + 75 °C	
Relative air humidity:	93 % at 40 °C	
Altitude:	≤ 2000 m	
Clearance and creepage distance		
Rated insulation voltage:	AC 300 V	
Overtoltage category:	III	
Rated impuls voltage / pollution degree between auxiliary voltage/control circuit nominal voltage:	4 kV / 2	IEC/EN 60664-1
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

Technical Data

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 voltage 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
Voltage dips		IEC/EN 61000-4-11

Interference emission

Interference suppression: Limit value class A*)



Danger of emitted interference!

May cause property damage
*) The device is designed for use in an industrial environment (class A, EN 55011). Connecting the device to a low voltage supply grid (class B, EN 55011) may cause radio frequency interference. Take suitable measures to avoid this.

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
Vibration resistance:	Amplitude 0.35 mm frequency 10 ... 55 Hz, IEC/EN 60068-1 0 / 055 / 04 IEC/EN 60068-1	
Climate resistance:	2 x 2.5 mm ² solid or 1 x 1.5 mm ² stranded wire with sleeve DIN 46228-1/-2/-3/-4	
Wire connection:	10 mm 0.8 Nm Flat terminals with self-lifting clamping piece IEC/EN 60999-1 DIN rail	
Stripping length:	300 g	
Fixing torque:		
Wire fixing:		
Mounting:		
Weight:		

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

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.

Adjustment Facilities

Potentiometer	Description	Initial setting
M _{on}	Starting voltage	Fully anti-clockwise
t _{on}	Ramp-up time	Fully clockwise
M _{off}	Deceleration voltage	Fully clockwise
t _{off}	Deceleration time	Fully clockwise

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_{ab}" 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.



Temperature Monitoring

BA 9019 features overtemperature monitoring of its internal power semi-conductors. When the safe running temperature is exceeded the power semiconductor 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.

! Safety Notes



Installation Error!

- For engine control units, the minimum loads indicated in the data sheet must be observed.
- 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.



Although the motor is at standstill, it is not galvanically separated from the mains.

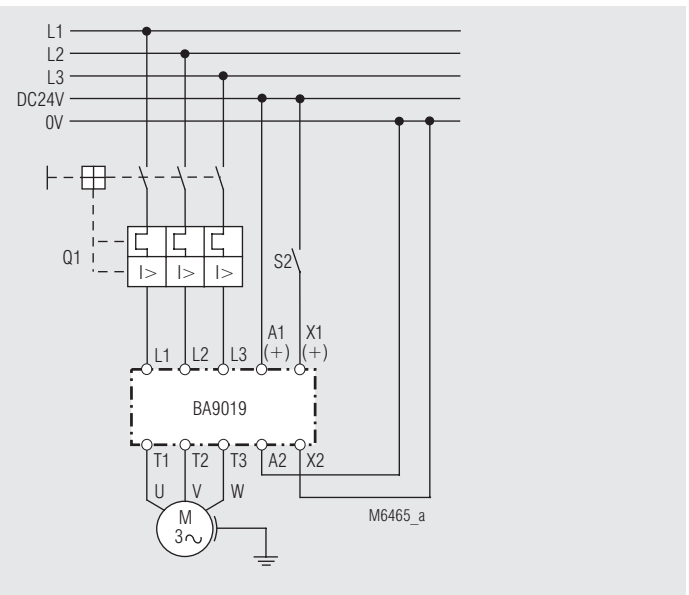


Functional error!

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

- It must be ensured that the motor start signal is removed before the reset, otherwise the motor will start again.

Application Example



Softstart and softstop

