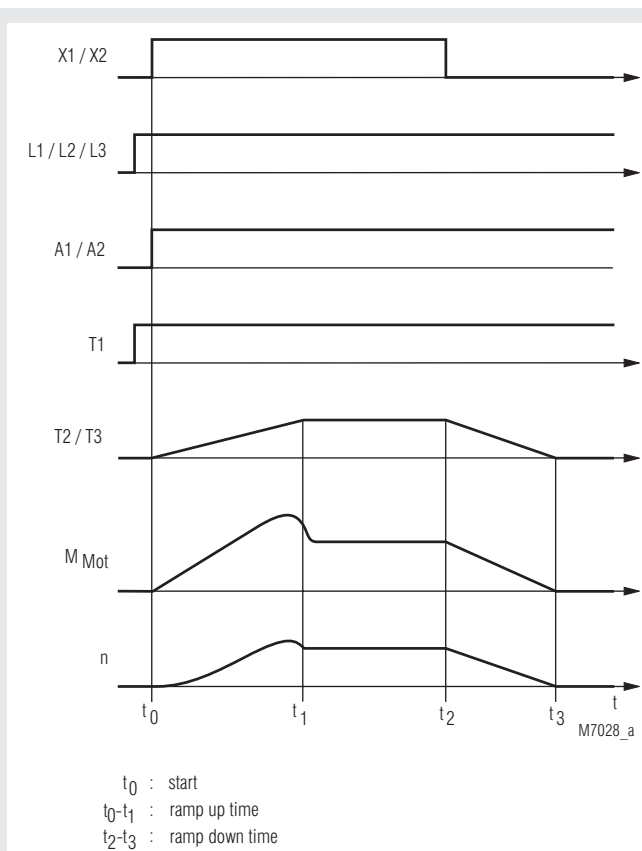




- Increases the life of squirrel cage motors and mechanical drives
- Easily fitted to existing installations
- 2-phase control softstart and softstop
- For motors up to 5.5 kW
- Start current limited to 2 to 3 times rated motor current
- Semiconductors bridged after softstart
- Adjustable ramp time, starting torque and deceleration time
- LED indication
- DIN rail mounting
- Galvanic isolation of control input and auxiliary power supply
- Integrated overtemperature monitoring
- Wide motor voltage range 200 to 460 V AC
- Width 45 mm

Function Diagram



Approvals and Marking



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 |

Principle of Operation

For direct on line or star delta applications, terminals L1, L2, L3 are connected to the mains contactor, with the motor connected to terminals T1, T2, T3. A 24V DC auxiliary supply is connected to terminals A1, A2 and a 24 V DC control signal connected to terminals X1-X2.

When power is connected to terminals L1, L2, L3 and 24V DC is present at terminals X1-X2, the softstart will commence. Potentiometer "t_{an}" (0.5 - 5 s) adjusts the ramp time (time motor takes to get to full speed) and potentiometer "M_{an}" adjusts the start voltage (50-80% nomV).

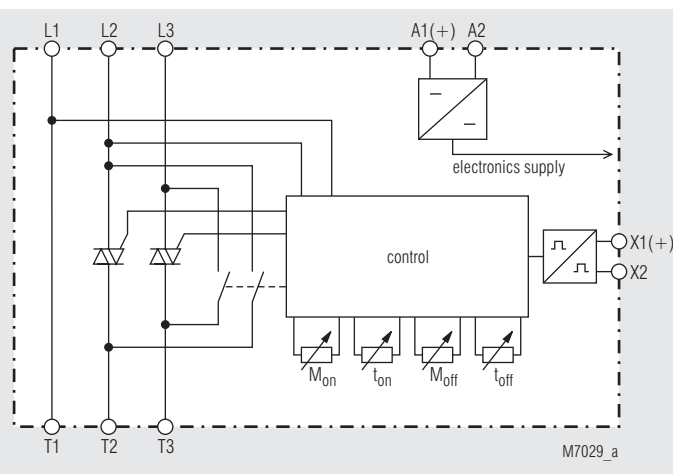
When the softstart is complete the internal semiconductors are automatically bridged.

When 24 V DC is removed from terminals X1-X2, the softstop function will commence for the deceleration time period set on potentiometer "t_{ab}" (0.5 - 5 s) and deceleration voltage level set on potentiometer "M_{ab}" (30-80% nomV).

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.

Block Diagram



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. 10 % of rated motor power	
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

Temperature range:	0 ... +55°C	
Storage temperature:	-25 ... +75°C	
Testing voltage:	2.5 kV	
Degree of protection:	Housing: IP 40	IEC/EN 60 529
	Terminals: IP 20	IEC/EN 60 529
Climate resistance:	0 / 055 / 04 IEC/EN 60 068-1	
Wire connection:	up to 2.5 mm ² stranded ferruled	
Mounting:	DIN-rail mounting	
Weight:	300 g	

Dimensions

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

BA 9019	3 AC 200 ... 460 V	50/60 Hz	3 kW	
Article number:	0051284			stock item
• 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

Installation

This units must be mounted on a vertical mounting area with the connections in a vertical plane, i.e. top to bottom. 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.

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.

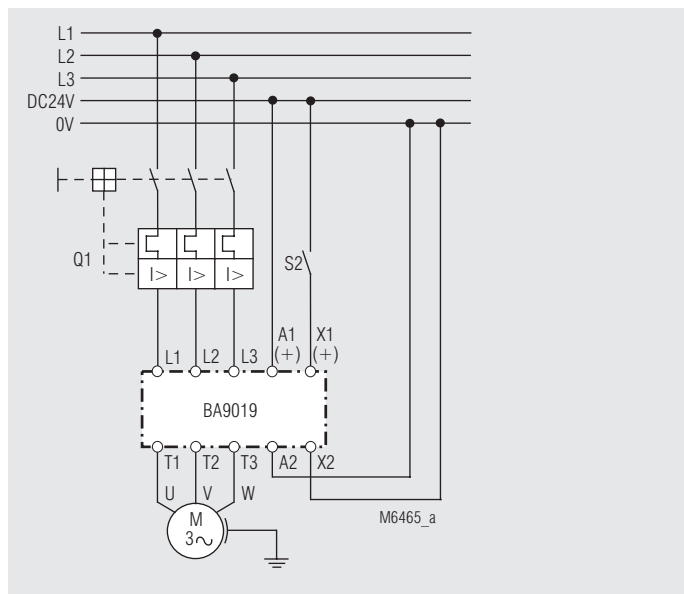
Temperature Monitoring

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

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.

Application Example



Softstart and softstop