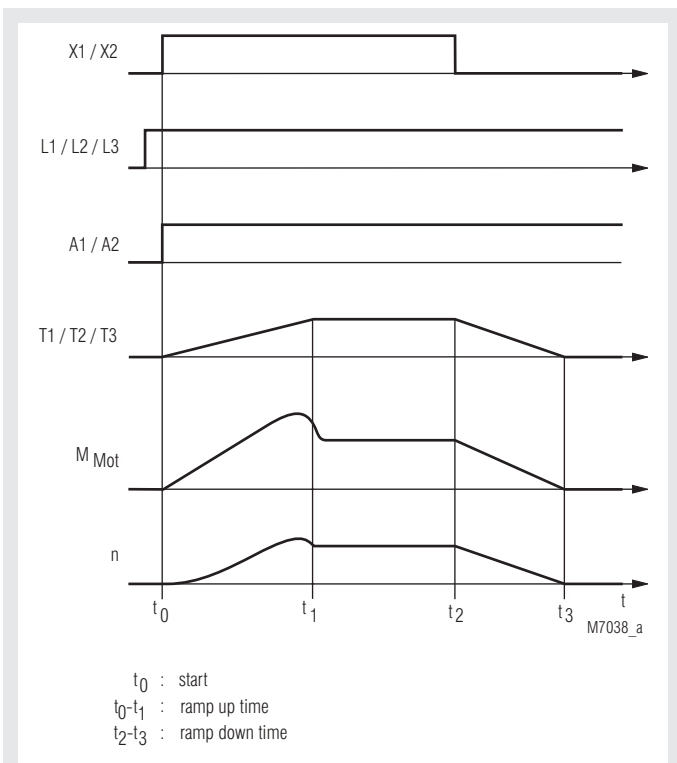




- According to IEC/EN 60947-4-2
- Softstart and softstop function
- 3-phase motor control
- For motors up to 5.5 kW
- Adjustable ramp time, starting torque and deceleration time
- Wide motor voltage range
- Galvanic separation of control input
- Galvanic separation of auxiliary power supply
- Integrated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

Function Diagram



Approvals and Markings



Applications

- Motor with gear, belt or chain drive
- Fans, pumps, conveyor systems, compressors
- Packaging machines, door-drives
- Start current limiting on 3-phase motors
- Reduces on off current on transformers and P.S.U's

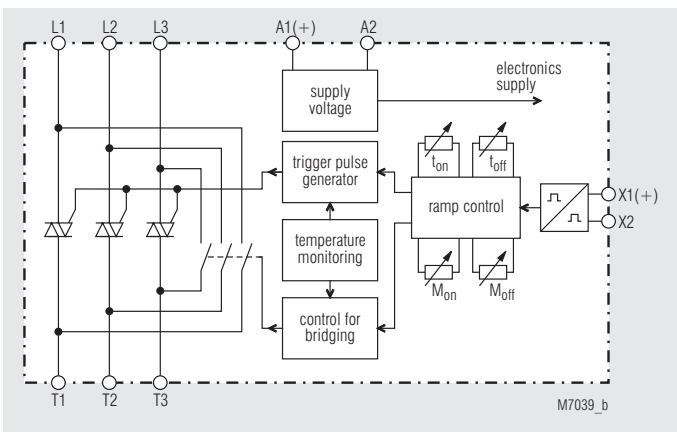
Function

Softstarts are electronic devices designed to enable 1-phase or 3-phase induction motors to start smoothly. The BA 9026 slowly ramps up the current on three 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 9026 are bridged to prevent internal power losses and heat build up to addition BA 9026 allows a softstop function prolonging the stop time of the motor preventing high counter torques from abruptly stopping the motor.

Indication

LED green	ON	= Power connected
LED yellow	ON	= Power semiconductors bridged
LED red	ON	= Overtemperature

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 of motor. However, standard line and motor protection is acceptable, but for high starting frequencies motor winding temperature monitoring is recommended.

Technical Data

Nominal voltage:	AC 200 ... 460 V	
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:	20/h 10/h	
$3 \times I_p, t_{acc} = 5 \text{ s}, J_v = 20^\circ$	Approx. 10 % of rated motor power	
Min. motor power:	Approx. 10 % of rated motor power	
Short-circuit protection		
Mode 1:	gG 32 A	
Mode 2:	Semiconductor fuse 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 time:	0.5 ... 5 s
Recovery time:	200 ms
Auxiliary voltage A1/A2:	DC 24 V \pm 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	
	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:	\leq 2000 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 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		
Wire guided:	Limit value class B	IEC/EN 60947-4-2
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

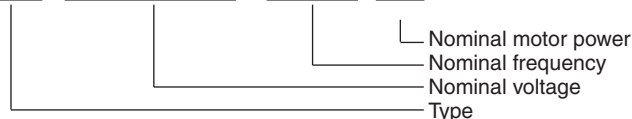
Width x height x depth: 45 x 74 x 121 mm

Standard Type

BA 9026	3 AC 200 ... 460 V	50/60 Hz	3 kW
Article number:	0046450		
• Nominal voltage:	3 AC 200 ... 460 V		
• Nominal motor power:	3 kW		
• Width:	45 mm		

Ordering Example

BA 9026 3 AC 200 ... 460 V 50/60 Hz 3 kW



Installation

This units must be mounted on a vertical mounting are a 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.

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 9026 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 9026 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.

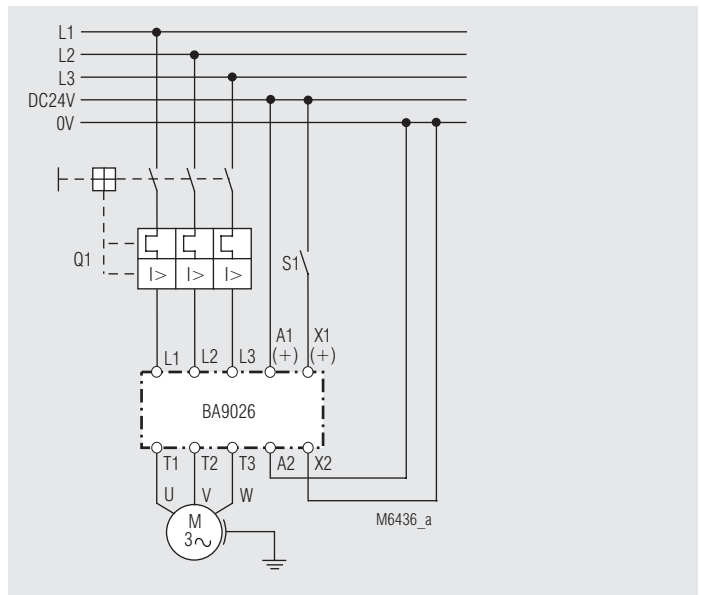


Functional error!

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.

Connection Example



Softstart and softstop

