Power Electronics / Installation Technique

MINISTART
Softstarter With Softstop
IL 9017/300

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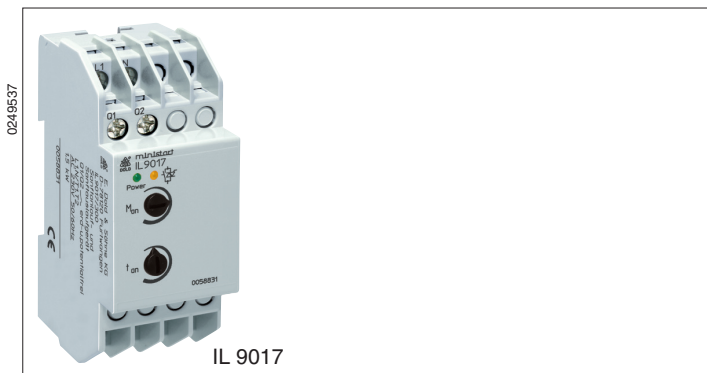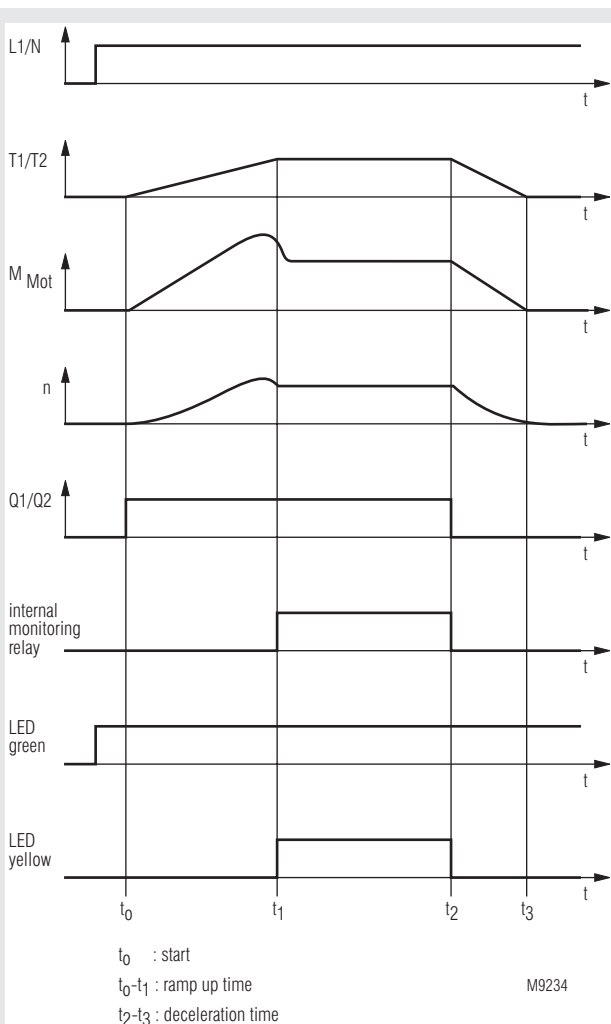

IL 9017

- According to IEC/EN 60947-4-2
- Increases life of 1-phase squirrel motors and mechanical drives
- For single phase motors up to 1.5 kW
- Adjustable ramp time/deceleration time and starting torque/ deceleration torque
- Control input for Start/Stop
- Semiconductors will be bridged after start up
- LED indication
- Width 35 mm

Function Diagram

t_0 : start

t_0-t_1 : ramp up time

t_2-t_3 : deceleration time

M9234

Connection Terminals

Terminal designation	Signal description
L1	Phase voltage L
N	Neutral
T1	Motor connection T1
T2	Motor connection T2
Q1	Control contact
Q2	Control contact

Approvals and Markings

CE

Applications

- Drives with gears, belts or chains
- Conveyor belts, fans
- Pumps, compressors

Function

These softstart and softstop devices are robust electronic control units for softstart and softstop of AC motors. By means of phase-angle control the current rises e. g drops continuously. The motor torque behaves in the same way during start-up e.g. deceleration. This ensures that the drive can start and stop without jerking. This eliminates the risk of damage to drive elements because the sudden starting e.g. deceleration torque does not occur during direct switch-on. This feature allows a low-cost design of the drive elements. A significant reduction in starting noise can also be observed.

In belt conveyor systems, slippage or tipping over of the conveyed material is avoided. After successful start-up, the power electronics are bridged by means of an internal relay contact in order to minimise the losses in the device.
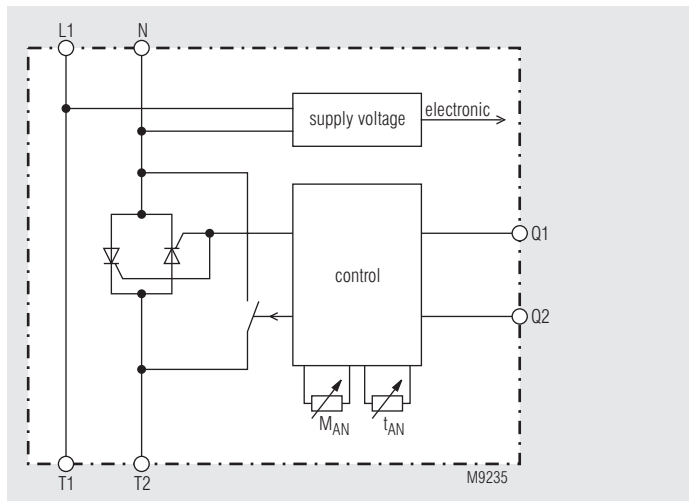
Indicators

LED green:	Softstart is on voltage
LED yellow:	On, when power semiconductors is bridged, short flashing when mains frequency is outside limits

Block Diagram

M9235

Notes

The speed setting of drives is not possible with these devices. Likewise, no pronounced soft starting behaviour is achieved in uncoupled state, i.e. without load. If the power semiconductor is to be protected against short-circuit or ground fault during start-up, a semiconductor fuse (see technical data) must be used. Otherwise, the usual cable and motor protection measures must be applied. In case of high switching frequency, monitoring the winding temperature is recommended as a motor protection measure. The soft starter must not be operated with a capacitive load, such as reactive power compensation, at the output.

To ensure the safety of persons and systems, only suitably qualified personnel may work on this device.

Technical Data

Nominal voltage U_N:	AC 230 V -15 % +10 %	
Nominal frequency:	50 / 60 Hz	
Nominal motor power P_N:	1.5 kW	
Min. motor power:	Approx. 0.1 P_N	
Nominal current:	10 A	
Semiconductor fuse:	Max. 340 A^{2}s	
Starting torque deceleration torque:	20 ... 70 %	
Ramp-up time/ deceleration time:	0.1 ... 10 s	
Recovery time:	45 ms	
Switching frequency:	10/h at 3 x I_r / t_{an} = 10 s, ϑ_U = 20 °C	
Power consumption:	1.4 VA	
Short circuit strength Max. fuse rating:	25 A gG / gL	IEC/EN 60947-5-1
Assignment type:	1	
Electrical life:	> 10 x 10^6 switching cycles	

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:	≤ 2000 m	
Clearance and creepage distances Overvoltage category:	III	
Rated impulse voltage / pollution degree:	4 kV / 2	IEC 60664-1
EMC Interference resistance Electrostatic discharge:	8 kV (air)	IEC/EN 61000-4-2
HF irradiation 80 Mhz ... 1.0 GHz:	10 V/m	IEC/EN 61000-4-3
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 voltages 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
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
Housing:	Thermoplastic with V0 behaviour according to UL subject 94	
Vibration resistance:	Amplitude 0.35 mm, frequency 10 ... 55 Hz	IEC/EN 60068-2-6
Climate resistance:	0 / 055 / 04	IEC/EN 60068-1
Terminal designation:	EN 50005	
Wire connection:	2 x 2.5 mm^2 solid or 2 x 1.5 mm^2 stranded ferruled DIN 46228-1/-2/-3	
Stripping length:	Max. 10 mm	

Technical Data

Wire fixing:	Flat terminals with self-lifting clamping piece	IEC/EN 60999-1
Fixing torque:	Max. 0.8 Nm	
Mounting:	DIN rail	IEC/EN 60715
Weight:	135 g	

Dimensions

Width x height x depth:	35 x 90 x 61 mm

Standard Type

IL 9017/300   AC 230 V   1.5 kW
Article number: 0058831
- Nominal voltage U_N: AC 230 V
- For motors up to 1.5 kW
- Width: 35 mm

Setting Facilities

Ramp up/deceleration time: With potentiometer $t_{on,off}$ the ramp up and decelertion time can be adjusted within the range 0.1 to 10 s.
Starting and deceleration torque: With potentiometer $M_{on,off}$ the starting torque and the deceleration torque can be adjusted in the range of 20 to 70 % of the max. value.

Set-up Procedure

1. Set potentiometer "$M_{on,off}$" fully anti-clockwise
   Set potentiometer "$t_{on,off}$" fully clockwise
2. Start motor by closing contact input Q1-Q2. If the motor does not start, interrupt the process and adjust "$M_{on,off}$" to a higher value. New start.
3. Adjust potentiometer "$t_{on,off}$" to give the desired ramp time.
   Stop and restart the motor, readjusting the potentiometers until the desired starting 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 relay.
Changes on potentiometer settings are only accepted in the waiting for start status.

Application Example

M9202

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