

MINISTART Softstart / Softstop With Reverse Function RP 9210/300



Product description

The softstart/softstop devices with reversing function are mainly used for soft reversing of motors. The softstart/softstop function reduces the inertia when reversing, giving less stress to the mechanical components. Less wearing and lower maintenance cost are the result. The parameters for ramp up time and ramp down time as well as start and stop inertia are set via potentiometers. A thermistor or thermal switch can be connected to monitor the motor temperature. Non-wearing reversing by hybrid-technology.

Your advantages

- 3 functions in one unit
- Easy setup
- No EMC-filter necessary

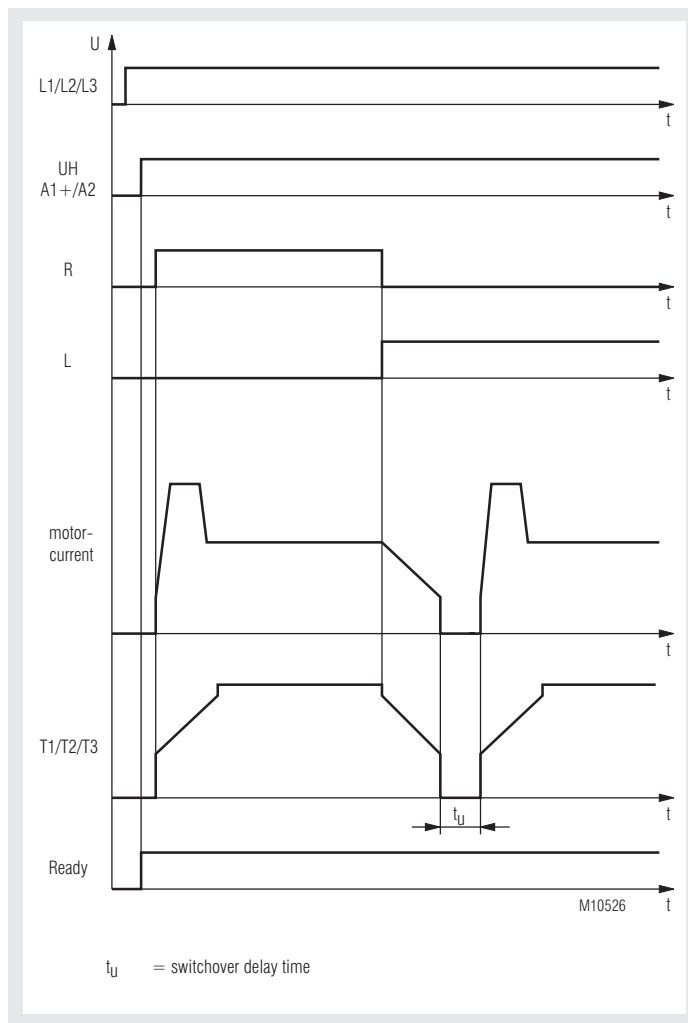
Features

- According to EN 60 947-4-2
- For controlling of 3-phase motors up to 750 W
- With 2-phase softstart and softstop
- Temperature monitoring of the motors with PTC or thermal switch
- 3 potentiometer for adjustment of softstart, softstop and starting - deceleration time
- 3 LED-indicators
- Reversing with relays, softstart and softstop with thyristors
- 2 x 24 V-inputs for clockwise rotation, anticlockwise rotation
- short circuit proof for 24 V monitoring output
- galvanic separation of control circuit and power circuit
- Width 72 mm

Approval and Marking



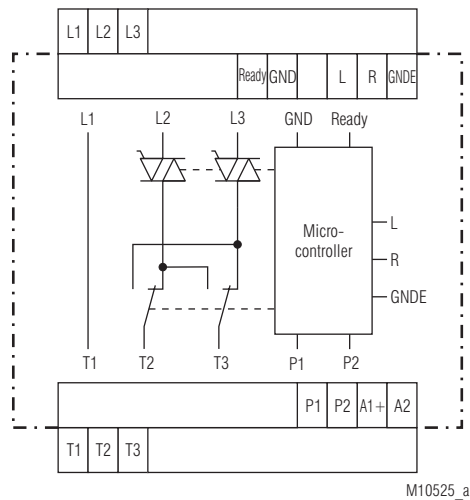
Function Diagram



Application

- Conveyors
- Packaging machines
- Door and gate drives

Circuit Diagram



Connection Terminals

Terminal designation	Signal designation
A1(+), A2	Auxiliary voltage DC
L1, L2, L3	Load voltage AC
T1, T2, T3	Motor connection
L, R	Control inputs direction of rotation
GNDE	Earth connection control inputs
Ready	Indicator output DC
GND	Earth Indicator output
P1	Thermo sensor
P2	Thermo sensor

Function

The Softstart unit RP 9210/300 includes the functions softstart, softstop and reversing. The reversing is done with relays.

Temperature monitoring

To protect the motor the temperature can be monitored by PTC or thermal switch. When overtemperature is detected the power semiconductors as well as the ready output switch off. The green Ready-LED flashes code 1. This failure state is stored. After the motor cooled down a reset can be made by temporarily disconnecting the power supply to the unit.

Softstart, Softstop

The unit ramps up or down the current on two phases, therefore allowing the motor torque to build up or to be reduced slowly. This reduces the mechanical stress on the machine and prevents damage to conveyed material. The starting e.g. deceleration time is adjustable by potentiometer.

Control inputs

Right and left rotation is selected via 2 control inputs. If both inputs are activated the one that came first has priority. When the control signal is disconnected the motor is braked for the adjusted braking time. Now the sense of rotation is inverted and the motor is softstarted in the opposite direction.

Monitoring output Ready

If no failure is indicated this short circuit proof output is on +24V.

Indication

green LED-Ready ON:	continuous	- supply connected
	flashes	- with failure code
yellow LED R:	continuous	- Motor turns right
	flashes	- softstarting or braking at right rotation
yellow LED L:	continuous	- Motor turns left
	flashes	- softstarting or braking at left rotation
Failure codes		
	1*)	- Motor overtemperature
	2*)	- Wrong frequency
	3*)	- Phase reversal
	4*)	- Phase failure
	5*)	- Motor overcurrent

1*) - 5*) = Number of flashing pulses in sequence

Setting facilities

Potentiometer t_{on} :	- Ramp up time 1 ... 10 s
Potentiometer t_{BR} :	- Braking delay time 1 ... 10 s
Potentiometer I_{max} :	- motor current control 0 ... 3.0 A eff.

Set-up Procedure

1. Connect motor and device according to application example. The 3 phases must be connected in correct sequence, wrong phase sequence will lead to failure (see failure code)
2. If the motor temperature sensor is not required the inputs P1 and P2 must be bridged. Turn potentiometer t_{on} and t_{off} fully clockwise, potentiometer $M_{on,off}$ fully anticlockwise.
3. Power up the unit and begin softstart via inputs R or L
4. Turn potentiometer $M_{on,off}$ fully clockwise, up to motor starts
5. Adjust the start up time by turning t_{on} to the required value. At correct setting, the motor should ramp up continuously to full speed.
6. Adjust the deceleration time to the required value.

Safety Remarks

- 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 (VDE, TÜV, BG).
- Adjustments may only be carried out by qualified specialist staff and the applicable safety rules must be observed.
- Installation and maintenance must only be carried out when the supply is disconnected.
- There is no galvanic separation between auxiliary supply (A1, A2) and measuring circuit (P1, P2). Necessary insulation measures have to be provided according to the application.

Technical Data

Nominal voltage L1/L2/L3:	3 AC 200 ... 400 V ± 10 %
Nominal frequency:	50 / 60 Hz auto detection
Auxiliary voltage A1, A2:	24 V DC ± 10 %
Nominal motor power:	750 W at AC 400 V
Min. motor power:	25 W
Measured thermal current¹⁾:	1.5 A
Operation mode:	1.5 A: AC 53a: 6-2: 100-30 acc. to IEC/EN 60 947-4-2
Measured nominal current:	1.5 A

¹⁾ The measured thermal current is the arithmetic mean of starting and measured nominal current of the motor in a turn cycle.

Current reduction from 40°C:	0.05 A / °C
Surge current (T_v = 45°C):	65 A (t _p = 20 ms)
Load limit integral:	21 A ² s (t _p = 10 ms)
Peak reverse voltage:	1000 V
Overvoltage limiting:	460 V
Leakage current in off state:	< 3 x 0.5 mA
Starting/deceleration voltage:	30 ... 80 %
Ramp up time:	1 ... 10 s
Declaration ramp:	1 ... 10 s
Consumption	1 W
Switchover delay:	150 ms
Start up delay:	max. 25 ms
Release delay:	max. 30 ms

Input

Control input

right, left:	DC 24 V
Nominal current:	5 mA
Softstart:	DC 15 ... 30 V
Softstop:	DC 0 ... 5 V
Connection:	polarity protected diode
Motor temperature sensor:	PTC-Sensor acc. to DIN 44 081 / 082
Response value:	4.3 ... 5.1 kΩ
Bimetal switch	
Switching current:	approx. 0.5 mA
Switching voltage:	max. 5 V

Indicator Output

Semiconductor, short circuit proof:	DC 24 V
Thermal current I_{th}:	0.5 A

General Data

Nominal operating mode:	Continuous operation
Temperature range:	0 ... 55 °C
Clearance and creepage distance	
Rated impuls voltage / pollution degree	
Motor voltage - control voltage:	2.5 kV / 2 EN 50 178
EMC	
Electrostatic discharge (ESD):	8 kV (air) IEC/EN 61 000-4-2
Fast transients:	2 kV IEC/EN 61 000-4-4
Surge voltage between wires for power supply:	1 kV IEC/EN 61 000-4-5
between wire and ground:	2 kV IEC/EN 61 000-4-5
HF-wire guided:	10 V IEC/EN 61 000-4-6
Voltage dips:	IEC/EN 61 000-4-11
Radio interference:	IEC/EN 60 947-4-2
Radio interference voltage:	IEC/EN 60 947-4-2
Degree of protection	
Housing:	IP 40 IEC/EN 60 529
Terminals:	IP 20 IEC/EN 60 529
Vibration resistance:	amplitude 0.35 mm frequency 10 ... 55 Hz, IEC/EN 60 068-2-6
Climate resistance:	0 / 055 / 04 IEC/EN 60 068-1
Wire connection	
fixed screw terminal (S),	0.2 ... 4 mm ² solid or

Technical Data

Wire fixing:	0.2 ... 1.5 mm ² stranded wire with sleeve DIN 46 228-1/-2/-3/-4 captive Plus-minus terminal screws M3.5 box terminals with wire protection
Mounting:	DIN-rail IEC/EN 60 715
Weight:	185 g

Dimensions

Width x height x depth:	72 x 90 x 72 mm
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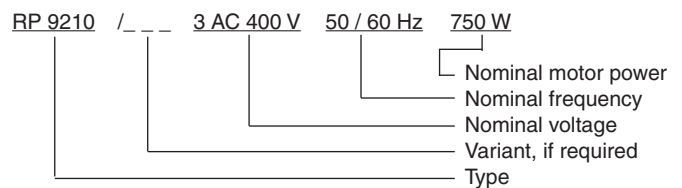
Standard type

RP 9210/300	3 AC 400 V	50 / 60 Hz	750 W
Article number:	0062931		
• Nominal motor power at AC 400 V:	750 W		
• Control input:	right, left		
• With softstart, softstop and reversing			
• Width:	72 mm		

Variants

RP 9210/100:	with softstart, without softstop without reversing
RP 9210/200:	with softstart, with softstop, without reversing

Ordering example for variants



Application Example

