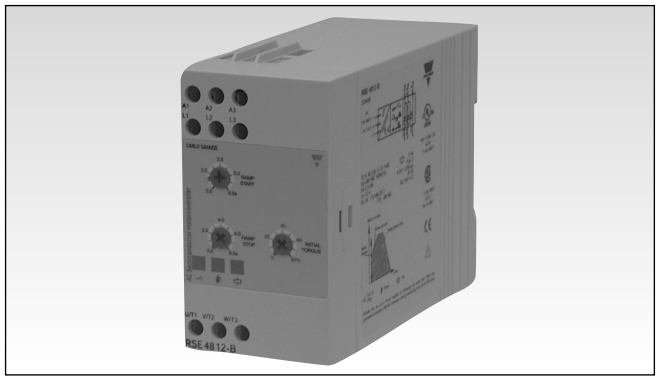
Motor Controllers
AC Semiconductor Motor Controller



- **Soft starting and stopping of 3-phase squirrel cage motors**
- **Rated operational voltage: Up to 600 VACrms, 50/60 Hz**
- **Rated operational current: 3 A or 12 AAC 53 b**
- **Potential-free control input**
- **LED-indications for supply and operation**
- **Transient overvoltage protection built-in**
- **Integral bypassing of semiconductors**

Product Description

Compact easy-to-use AC semiconductor motor controller. With this controller 3-phase motors with nominal load currents up to 8, 12 A can be soft-started and/or soft-stopped. Starting and stopping time as well as initial torque can be independently adjusted by built-in potentiometers.

Ordering Key

NIT4008A

- **Solid State Relay**
- **Motor controller**
- **E-line housing**
- **Rated operational voltage**
- **Rated operational current**
- **Control voltage**

	Rated operational		Control voltage U_c *)
NIT4008A	40: 480 VACrms, 50/60 Hz		A: 24 to 110 VAC/DC & 110 to 480 VAC

*) The control voltage should never be higher than the rated operational voltage.

Input Specifications (Control Input)

Control voltage U_c	
A1-A2:	24 - 110 VAC/DC ±15%, 12 mA
A1-A3:	110 - 480 VAC ±15%, 5 mA
Rated insulation voltage	630 V rms Overvoltage cat. III (IEC 60664)
Dielectric strength	
Dielectric voltage	2 kVAC (rms)
Rated impulse withstand volt.	4 kV (1.2/50 µs)

Output Specifications

Utilization category	AC-53b Integral bypassing of semiconductors

Supply Specifications

Power supply	Overvoltage cat. III (IEC 60664)
Rated operational volt. (U_e)	
through terminals L1-L2-L3	(IEC 60038)
22	127/220 VAC rms ±15% 50/60 Hz -5/+5 Hz
40	230/400 VAC rms ±15% 50/60 Hz -5/+5 Hz
48	277/480 VAC rms ±15% 50/60 Hz -5/+5 Hz
60	346/600 VAC rms ±15% 50/60 Hz -5/+5 Hz
Voltage interruption	≤ 40 ms
Dielectric voltage	None
Rated impulse withstand volt.	4 kV (1.2/50 µs)
Rated operational power supplied from	2 VA L1-L3

General Specifications

Accuracy	
Ramp up	5.5 - 7.5 s on max. ≤ 0.5 s on min.
Ramp down	6 - 10 s on max. ≤ 0.5 s on min.
Initial torque	70 - 100% on max. 5% on min.
EMC	Electromagnetic Compatibility
Immunity	acc. to EN 61000-6-2
Indication for	
Power supply ON	LED, green
Ramp up/down bypassing relay	LED, yellow
Environment	
Degree of protection	IP 20
Pollution degree	3
Operating temperature	-20° to +50°C (-4° to +122°F)
Storage temperature	-50° to +85°C (-58° to +185°F)
Screw terminals	
Tightening torque	Max. 0.5 Nm acc. to IEC 60947
Terminal capacity	2 x 2.5 mm²
Approvals	CSA (<7.5 HP @ 600 VAC), UL, cUL
CE-marking	Yes

Mode of Operation

This motor controller is intended to be used to softstart/softstop 3-phase squirrel cage induction motors and thereby reduce the stress or wear on gear and belt/chain drives and to give smooth operation of machines. Soft starting and/or stopping is achieved by controlling the motor voltage. During running operation the semiconductor is bypassed by an internal electromechanical relay.

The initial torque can be adjusted from 0 to 85% of the nominal torque.

The soft-start and soft-stop time can be adjusted from 0.5 to approx. 7s.

A green LED indicates supply. Two yellow LEDs indicate Ramp up/down and Running mode.

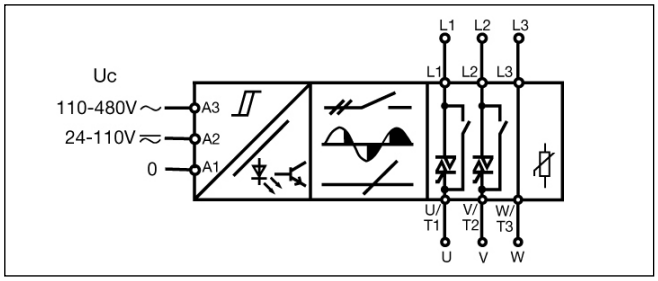
Overload protection is not provided in this motor controller and must therefore be installed separately.

The controller is switching 2 lines. The 3rd line is continuously connected to the load.

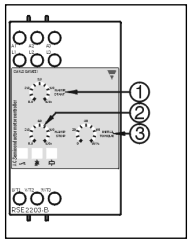
Semiconductor Data

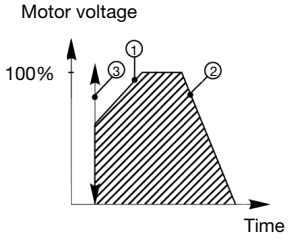
Rated operational current	I^2t for fusing t = 1 - 10 ms	I_{TSM}	dI/dt
3 A	72 A^2s	120 A_p	50 A/µs
12 A	610 A^2s	350 A_p	50 A/µs

Functional Diagram



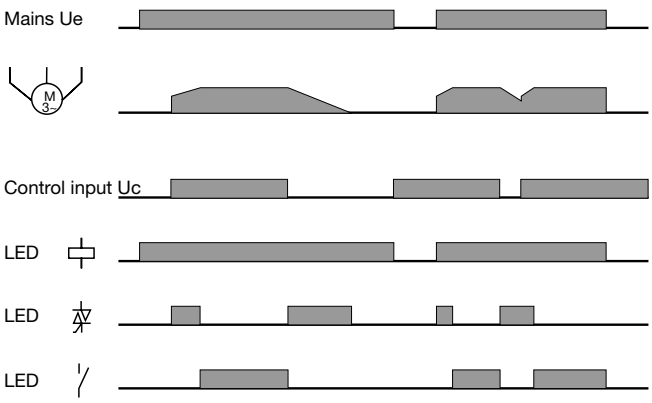
Operation Diagram 1



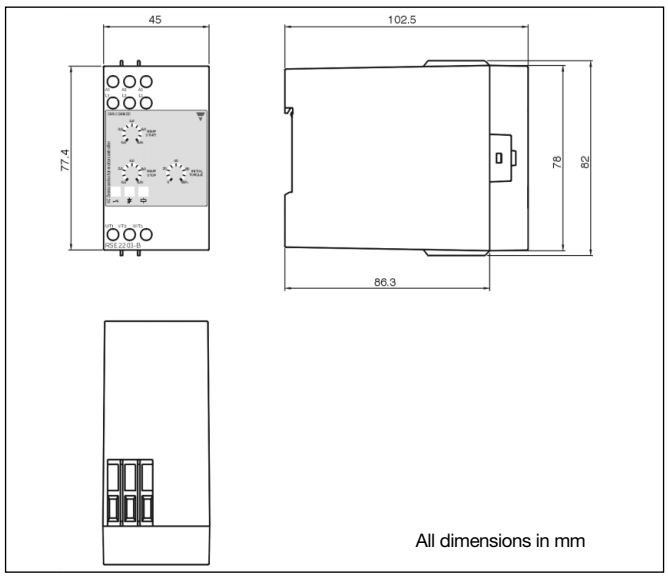


① Ramp-up time 0.5 to 6.5s. Time from zero load voltage to full load voltage.
② Ramp-down time 0.5 to 8.0s. Time from full load voltage to zero load current.
③ Initial torque 0 to 85% voltage at the start of the ramp-up function.

Operation Diagram 2



Dimensions



Housing Specifications

Weight	270 g
Housing material	PC/ABS Blend
Colour	Light grey
Terminal block	PBTP
Colour	Ligh grey
Bottom clip	POM
Colour	Black
Diode cover	PC
Colour	Grey Transparent
Front knob	PA
Colour	Grey

Applications

Changing from Direct ON Line start to soft start (Line controlled soft-start)
(*Fig. 1* & *Fig. 2*)
Changing a Direct On Line start into a soft start is very simple with the soft-starting relay:

1) Cut the cable to the motor and insert the relay.

2) Connect control input to two of the incoming lines. Set initial torque to minimum and ramp up and down to maximum.

3) Power up again - adjust the start torque so the motor starts turning immediately after power is applied, and adjust ramp time to the appropriate value.

When C1 is operated, the motor controller will perform soft-start of the motor. When C1 is switched off, the motor will stop, the motor controller will reset and after 0.5 s a new soft-start can be performed.

Please note that the controller does not insulate the motor from the mains. Contactor C1 is therefore needed as a service switch for the motor.

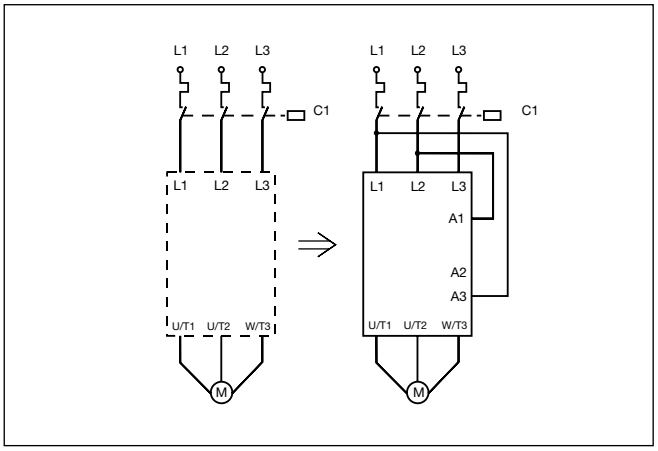


Fig. 1

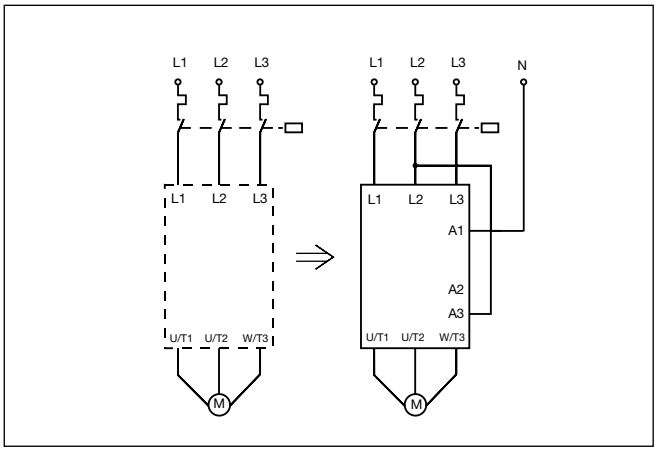


Fig. 2 For voltages higher than 480 VAC

Soft-start and soft-stop
(Fig. 3)
When S1 is closed, soft-start of the motor will be performed according to the setting of the ramp-up potentiometer and the setting of the initial torque potentiometer. When S1 is opened, soft-stop will be performed according to the setting of the ramp-down potentiometer.

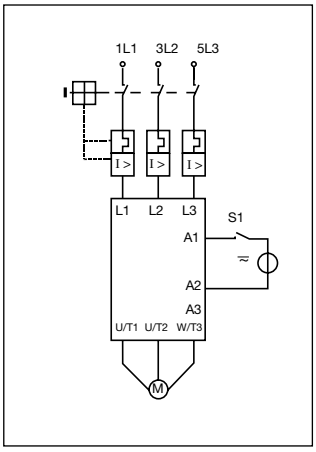


Fig. 3