Elektroniksysteme GmbH
Development and production of electronical systems

Eichelreuth 13
83224 Grassau

Phone: +49 8641 598360
Fax: +49 8641 598364

E-Mail: info@rs-steiner.com
Internet: http://www.rs-steiner.com

Start-up instructions

Electronic soft-starter
Type: Picostart

Contents

1. General information

The electronic motor control devices Picostart... were developed for smooth and gentle start-up and running of three-phase squirrel-cage induction motors. When those motors are switched-on a high torque is produced which tends to damage the mechanical parts of the motor as well as the v-belt and the gearbox.

Picostart soft-starters make use of a phase angle control to achieve a smooth start of your motor. Ramp-up and ramp-down time as well as ramp-up and ramp-down torque can be adjusted independantly so that the devices can be adapted to numerous use cases.

The electronic starting device Picostart... is composed of modules. It is assembled with two basic components:

- power element with cooling system and thyristor switching facility
- control unit with electronic starting and control system

2. Installation of the soft-starter Picostart

To begin with, all electrical connections are to be made according to the accompanying wiring diagrams: L1, L2, L3, T1 (U), T2 (V), T3 (W).

The electronic smooth-starting devices must be connected to the power supply in accord with VDE specifications so that they can be disconnected from the mains using a suitable switching means (i. e., master switch, contactor, protective power switch).

Conduit installation:

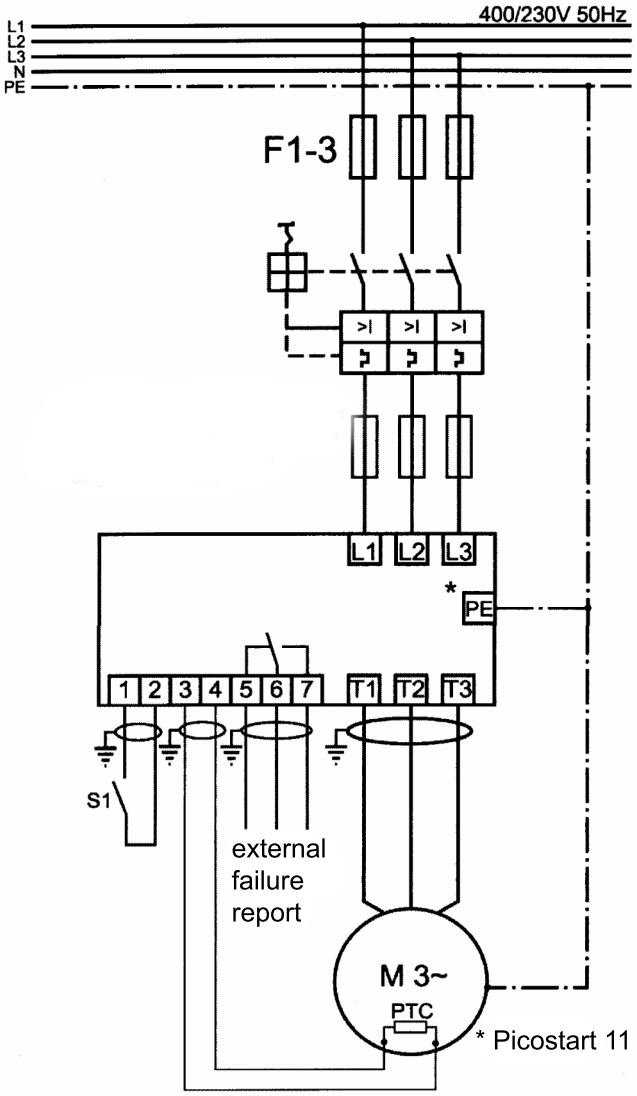
The mains power supply and motor power supply, as well as the control wiring, have to be in separate ducts or conduits. In order to avoid malfunctions it is advisable to install the electronic signal wiring separate from the power supply and/or protective control wiring and either to twist the feed and return signal lines or use shielded control lines.

On account of the internal wiring the neutral conductor mustn’t be connected when the load is at operation.

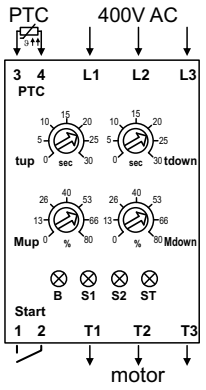
Please ensure that the clamps 3-4 are either connected to the PTC of the motor or that they are bridged (factory setting).

It is essential for the electric installation to comply to the stipulations of the VDE (German Electrical Engineers Association), specifically to VDE 0100, VDE0113, VDE 160.

3. Wiring diagram



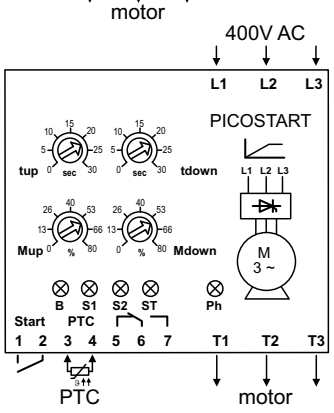
frame size A
Picostart
0,55 to 3,0



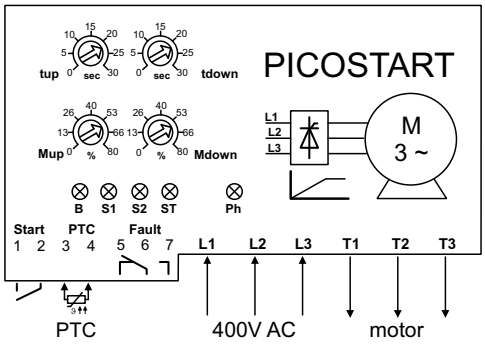
Potentiometers:
t_{up}: Ramp-up time 0...30s
t_{down}: Rundown-time 0...30s
M_{up}: Starting torque 0...80%
M_{down}: Stop torque 0...80%

LEDs:
B: Operation
S1: Activation
S2: End of ramp
ST: Internal fault
Ph: Phase failure

frame size B
Picostart
4,0 and 5,5



frame size C
Picostart
7,5 and 11,0



4. Operation

When putting the device into operation you have to ensure that the Picostart device isn't overloaded by many ramp-ups within a short period of time or by too high starting currents. Therefore the current of the different phases should be monitored and appropriate intervals between the ramp-ups should be scheduled as well.
Check that the device is connected properly - if questions should arise concerning this point consult the wiring diagram (p. 3).

If the supply voltage is available, LED B will light. In order to initiate ramp-up, the start contacts (1-2) have to be bridged. If "Start" is active, LED S1 lights at the beginning. If motor voltage has reached 100%, LED S2 lights.
Depending on the adjustment of the potis t_{up} and M_{up} different ramp-up characteristics can be achieved.

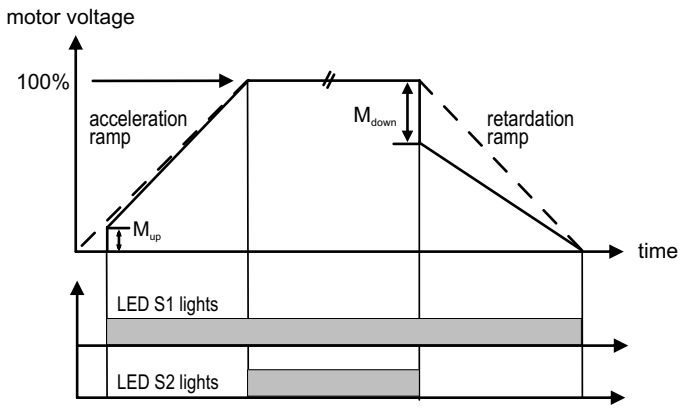
Deactivating the starting contacts will cause the ramp-down process to begin. LED S2 dies out soon afterwards. If motor voltage has decreased to 0%, LED S1 also dies out. Concerning the ramp-down process potis t_{down} and M_{down} are responsible (only frame sizes B, C).

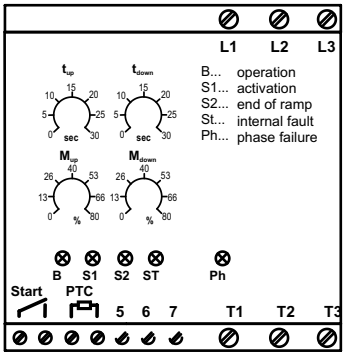
In case of temperature exceedance of the heat sink, incorrect phase direction or indications of the motor thermistor the power unit will be switched off and the electronic will be locked. At the same time LED St will light if a failure has been registered. Additionally, if the rotary field doesn't fit, LED Ph will light as well. Moreover, the device will switch off if phase failure is reported (because of the internal voltage supply) and LEDs Ph and St flash. Optionally, the failure can be indicated by relay contacts (clamps 5, 6, 7).

After the failure has been removed the Picostart must be reseted by deactivating the start contacts. Bridging them once again initiates a new ramp-up.

Frame size A doesn't possess any failure indication or contacts in case of phase failure or incorrect phase direction.

5. Progress of ramp-up and ramp-down process with a Picostart



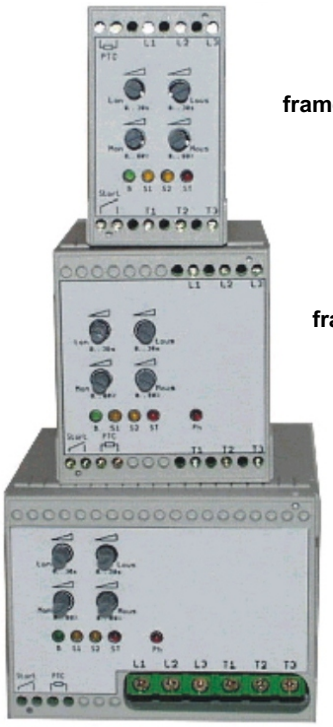


Possible adjustment intervals:
t_{up}: 0-30s t_{down}: 0-30s
M_{up}: 0-80% M_{down}: 0-80%

6. Survey of the individual types

Type	Motor power [kW]	Max. starting current [A]	Rec. semi-conductor fuse [A]	Mains fuse [A]	Rec. cross-section [mm²]	Weight [kg]	Frame size	Dimensions WxHxD [mm]	option: malfunction report con-tact
Picostart 0,55	0,55	5	8	16	1,5	0,3	A	45x75x110	-
Picostart 0,75	0,75	8	8	16	1,5	0,3	A	45x75x110	-
Picostart 1,5	1,5	10	15	25	2,5	0,3	A	45x75x110	-
Picostart 2,2	2,2	15	20	25	2,5	0,3	A	45x75x110	-
Picostart 3,0	3,0	18	25	25	2,5	0,3	A	45x75x110	-
Picostart 4,0	4,0	24	30	25	2,5	0,4	B	70x75x110	x
Picostart 5,5	5,5	30	35	25	2,5	0,4	B	70x75x110	x
Picostart 7,5	7,5	45	40	25	4,0	0,8	C	100x100x110	x
Picostart 11.0	11,0	60	40	32	4,0	0,8	C	100x100x110	x

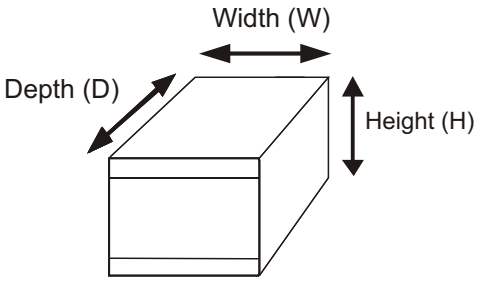
Errors and technical modifications excepted (Date: 2008/08)



frame size A

frame size B

frame size C



7. Diagnostic diagram

Fault	Possible reason	Solution
• no LED lights • centralized alarm indicates fault	• no supply voltage • phase failure • fault output locks mains contactor	• check connections of mains voltage • remove fault relay output so that mains contactor switches again
• LED B and S1 light • LED St and Ph are flashing • centralized alarm indicates fault	failure of one phase or wrong rotary field	check wires and fuses of the installation
• LED St is flashing • motor doesn't start	• bridge or PTC-sensor on ter. 3-4 is not available • temperature exceedance of motor	• bridge ter. 3-4 • check for temperature exceedance and restart • check PTC and wires for malfunction
• immediate start of motor with decreased power after supply voltage is connected • on activation of "Start" ramp-up is performed within the defined time	star-wired motor and neutral point is connected with N	remove N from neutral point
• immediate start of motor with decreased power after supply voltage is connected • "Start" command has no influence on motor current	• incorrect wiring • defect semiconductor	• check wires • device needs to be repaired
• LED B lights • LED S1, S2 light • motor "hums", but doesn't start within ram-up time	• incorrect wiring • defect semiconductor • device doesn't fit for the motor power or motor isn't intented for soft-start	• check wires • devices needs to be repaired • check motor data, contact your reseller

8. Technical data

Control voltage	110-440V AC +- 20 %
Frequency	50-60Hz +- 10 % (mains or control voltage)
Rotary field	self-synchronizing
Number of controlled phases	L1, L2, L3 (W3C-circuit)
Start-up cycles	max. 30/h at medium load
Ambient temperature	-20°C-45C°
Storage temperature	-25°C-75°C
Relative humidity	95% (non-condensing)
Max. altitude	1000m
Kind of protection	IP 40
LED-indications	ready for operation, Start, 100% U_{motor}
Suitable motor powers	0,55-11kW (cf. table “Survey of the individual types”, p. 5)
Failure indication	• temperature exceedance of device • PTC-input • phase failure (only B and C devices)
Standards of use	AC-53a according to IEC
Mounting position	vertical, electronic connections below
Centralized alarm (optional)	250V AC, 5A (frame sizes B, C)
CE-regulations	EMC Directive 2014/30/EU LVD 2014/35/EU

Errors and technical modifications excepted (Date: 2016/05)