Manual

STEPPER-BLOCK*plus*

Compact Stepper Driver
for 2-Phase Stepping Motors

Version: 2.0
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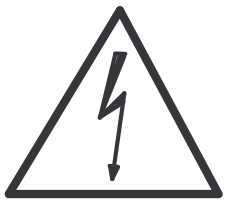
Table of Contents

1. General

The **STEPPER-BLOCK*plus*** is a compact stepper driver for 2-phase stepping motors with up to 70 V operating voltage and up to 5 A phase current, with boost 6,5 A. The **STEPPER-BLOCK*plus*** contains the complete power pack for direct connection to 230 VAC.

The driver is short circuit proof and all inputs and outputs are opto electronic isolated. As usual this unit works via pulse direction input and operates in full- and half step unit with max. 50 kHz step pulse frequency.

Please note



Attention: Shock hazard due to high voltage at component

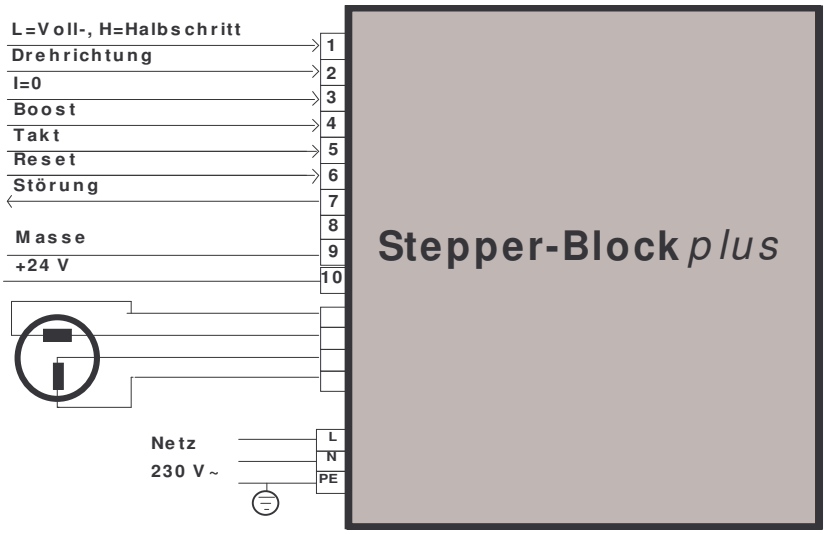
Please note: Do not connect or disconnect motor under voltage!

Please note: Do not install motor under voltage!

2. The first Steps

For the first steps please continue as follows:

- **connect motor**
- **connect pulse and direction**
- **connect main**
- **switch on**

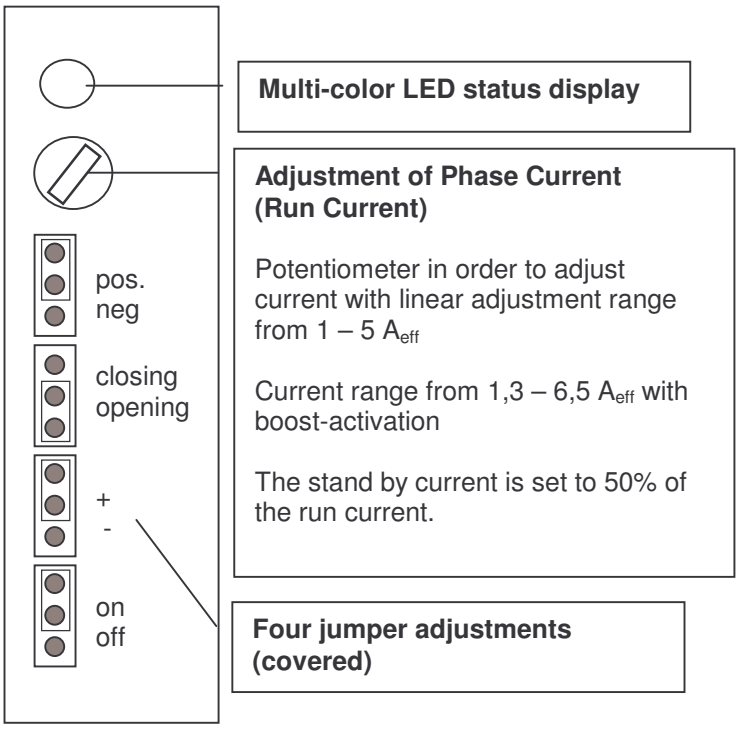


System Connection Diagram

3. Adjustments

The **Status – LED** indicates 4 different power stages of the driver:

Green	Ready The power stage is ready to operate.
Yellow	Busy The power stage receives pulses from the control system.
Red	Fault One of the monitoring circuits has sent an error signal. Motor current > 14 A Operating voltage < 40 V Heat sink temperature > 85 °C
LED off	Reset/Disabled/Power off Reset and/or I=0-Input The power supply is interrupted



3.1 Configuration

Opening of the STEPPER-BLOCK
In order to change fuses or jumper firstly unlock the four outer screws with an Inbus screwdriver. Then it is possible to fold down the cover and the hinged side wall to the side. Now it is possible to take out the driver. Jumper and fuses can easily be recognised. The diagram above shows the adjustment ex works.

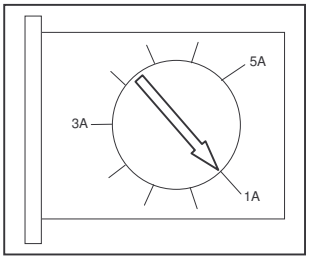
Jumper
Logic: pos. / neg.(please do not change)
Error: Closing type contact = active for error, opening type contact = active if in order
Prefer motor direction: - = left run / + = right run
Overdrive: On / Off (Overdrive offers an increase of the torque by > 5 U/s)

3.2 Switching on

Firstly connect the necessary **control system signals** according to the system connecting diagram. For the driver at least the pulse input is necessary, all other signals on request.

After the **power-on** on the front panel the LED ok (green) is on. The motor is up to the stand-by current steady. At lower motor frequencies the LED beam is cyclic.

3.3 Current Adjustment



Via potentiometer instead the former snap switch.

In order to gain an exact current position a measuring device can be switched into a current phase.

During standstill the **stand by current (direct current)** is measured and adjusted. The stand by current should be so low that at least the minimum holding torque is reached. Too much stand by current means unnecessary increase of temperature (the driver automatically switches back to stand by current).

Then the **run current (alternating current)** should be measured and adjusted with a root mean square value measuring device.

4. In- and Outputs

All connectors are removable plug-in terminals.

4.1 Connector Controller Signals

The in- and outputs are galvanic isolated by opto couplers from the signalling wires.

Pin-No.	Indication	Description
1	Full-/Half Step	0 V = Full Step
2	Direction	Rotation Direction Change
3	I=0	No current at the motor. The phase combination remains.
4	Boost	The potentiometer for boost setting is active.
5	Pulse	With each pulse the stepping motor moves 1 step forward.
6	Reset	The internal phase counter is set to zero. Impulses are not carried out.
7	Fault	Active through under-voltage < 40 V, heat sink temperature > 85 °C or current > 14 A. The output can be adjusted via jumper to active low or high. Reset through power-off or reset input.
8		NC
9	Mass	GND of operating voltage
10	+24 V	Operating voltage 12 - 30 V

4.2 Connector Motor

When connecting the motor please follow the manufacturer's instructions.

4.3 Connector Main

The connections are identified with L = phase, N = zero and PE = protection earth.

5. Technical Data

Connection	230 VAC, +/- 10%, 50/60 Hz standard
Main Adaption	115 VAC, connect A2-A1, E1-E2, E2-L 260 VAC, connect E1-E2, E2a-L Voltage ranges +/- 10% each
Operating voltage	Typical 65 VDC at main nominal voltage
I max	5 A_{eff} (6,3 A_{eff} with boost), maximum current 9,1 A minimum wire cross section: 1 mm² maximum motor wire length: 50 m
f max	100 kHz
Inputs	galvanic isolated via opto electronic coupler low = 0 – 2 V high = 3 – 30 V I min = 5 mA
Step pulse	> 5 µs duration
Phase sequence	Changing over (alteration) only when motor is on stop, > 10 µs prior to step pulse
Fuses	2 A time-lag The fuse is located underneath the main connector. The fuse can be unlocked with half a turning.
Fault output	Displayed by a red LED 1. motor current > 14 A 2. operating current < 40 V 3. heat sink temperature > 85 °C
Temperature	0 – 50 °C
Ventilation	By natural convection up to 3,5 A. A fan can be mounted lateral to the cooling plate if necessary. The driver is disconnected due to overheating (> 85 °C).
Dimensions	Main board: H x B = 180 x 195 [mm] Housing: H x B x T = 132 x 168 x 180 [mm]
Weight	5,7 kg
Identification-No.	ZN 2B02.5

6. Error Trapping

Interruption	Cause	Resolution
LED does not beam.	Missing distribution voltage or fuse failure.	Check distribution voltage and connect correctly, change fuse.
Motor does not run and does not have a holding torque.	Signal I=0 is active or motor is incorrectly wired.	Reset input, connect motor correctly.
Motor does not run but does have a holding torque.	No pulses	Check pulse input, timing and voltage level.
Motor runs irregularly.	Pulse and direction control inputs faulty, wrong motor connection, overload, motor brook down.	Adjust timing and voltage level. Connect motor correctly. Check load conditions. Replace motor.
Motor turns to wrong direction	Motor phase leads exchanged.	Connect motor phase leads correctly
The holding torque of the motor is too low.	Motor phase current incorrectly Adjusted	Adjust phase current