

Documentation for
Stepper motor driver Tiny-Step II
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Functional description

Tiny-Step II is a one channel motor driver for 2-phase stepping motors with pulse and direction interface. Motor step size can be set to microstep resolutions down to 1/16th step. The motor output is protected against short circuit. The "mixed decay" current control reduces current noise in the motor coils, which leads to quieter motor movement and higher dynamic in the upper speed range. Thanks to the application of a modern driver stage with low power loss, only a small, soldered heat sink is necessary. The unit can be mounted horizontally or vertically with the designated mounting holes or clipped to a DIN rail with additional DIN rail mounting feet. There is an option available with case for space saving horizontal DIN rail mounting. The device can be supplied with different options on request.

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Technical Data

Supply voltage: 15-35V= und 5V= (max. 20mA)

Motor current: adjustable from 0.15 to 2.25A (peak)

Max. current consumption: 2A

Motor outputs: Short circuit protected

Signal inputs and outputs with 5V logic, no galvanic isolation

Exclusion of Liability, EMC (electromagnetic compatibility)

Even though all parts of the circuitry have been thoroughly checked and tested, mecha-pro® does not give any warranty or other assurance as to the operation or functionality of the circuitry or the documentation.

To the full extent permissible by law we disclaim all responsibility for any damages or losses (including, without limitation, financial loss, damages for loss in business projects, loss of profits or other consequential losses) arising from the use and/or operation of the presented circuitry.

The stepping motor driver "Tiny-Step II" is an OEM product made for use in industry, electronic trade and other EMC experienced sectors. According to EMVG §5, section 5 this product does not require CE qualification.

Cabling, used amplifiers, power supply, housing and the surrounding environment are factors that influence the EMC properties of a device. A device using one or more step motor drivers must of course be evaluated according to corresponding directives, when CE conformity must be documented. During development all possible means were used to conform to EMC regulations.

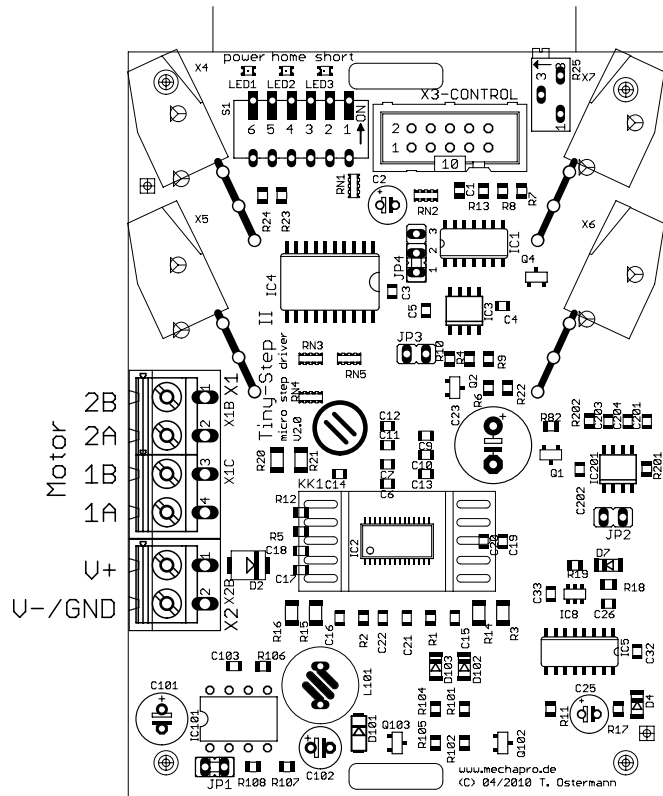
Initial operation

Before using the driver, set the DIP switches and jumpers to the desired settings according to following descriptions. Afterwards the driver can be mounted in a case or cabinet and get wired to the machine and the controller or interface. When all connections are done, the unit is ready to operate.

Connections

The following section gives a brief overview on the functions of the different connectors. Afterwards, the pin outs of the multipolar connectors are given in detail.

- X1 is the clamp for the motor coils.
- X2 is the clamp for the supply voltage. 12V to 35V DC are accepted. Take care of the polarity!
- Clamp X3 is used for the logic input and output signals.
- On the version with DIN rail case the clamps X4 and X5 are used to connect motor and power supply, the I/O signals can be connected to either X3 or X6 and X7.
- The DIP switch S1 allows to set the microstep resolution, the motor current and activates the automatic current reduction in standstill.



Default settings:

Resolution: 1/16 step
Current: 0,15 Apeak

X1 / Motor connector

Pin no.	Function
Pin 4	coil 1
Pin 3	coil /1
Pin 2	coil 2
Pin 1	coil /2

X2 / Supply voltage

Pin no.	Signal	Function
Pin 1	V+	positive supply voltage
Pin 2	V-	negative supply voltage (ground)

X3 / I/O Signals

Pin no.	Function
Pin 1	not connected
Pin 2	/Clock (Trigger on rising edge, non active signal on high)
Pin 3	/Error (output, pulled low when short circuit is detected)
Pin 4	Direction (Clockwise rotation on high)
Pin 5	/Disable (pull to ground to disable the power bridge)
Pin 6	/Current reduction (reduces the motor current when pulled low, depending on JP4)
Pin 7&8	Input for +5V= logic supply
Pin 9&10	0V (GND)

Alle I/Os are pulled up to +5V with internal pullups.

X4/X5 / Power signals (DIN rail case only)

Pin no.	Function
Pin X5.1	V+ positive supply voltage
Pin X5.2	V- negative supply voltage (GND)
Pin X5.3	coil 1
Pin X4.3	coil /1
Pin X4.2	coil 2
Pin X4.1	coil /2

X6/X7 / I/O signals (DIN rail case only)

Pin no.	Function
Pin X6.1	/Clock
Pin X6.2	Direction
Pin X6.3	/Current reduction
Pin X7.1	/Disable
Pin X7.2	/Error output
Pin X7.3	/Stop Disables the internal clock generator without disabling the power bridge

S1 / DIP switch

Step width	S1.6	S1.5
1/1	1	1
1/2	1	0
1/4	0	1
1/16	0	0

Current _{peak}	Current _{eff}	S1.4	S1.3	S1.2	S1.1
0,15A	0,11A	0	0	0	0
0,30A	0,21A	0	0	0	1
0,45A	0,32A	0	0	1	0
0,60A	0,42A	0	0	1	1
0,75A	0,53A	0	1	0	0
0,90A	0,64A	0	1	0	1
1,05A	0,74A	0	1	1	0
1,20A	0,85A	0	1	1	1
1,35A	0,95A	1	0	0	0
1,50A	1,06A	1	0	0	1
1,65A	1,17A	1	0	1	0
1,80A	1,27A	1	0	1	1
1,95A	1,38A	1	1	0	0
2,10A	1,45A	1	1	0	1
2,25A	1,60A	1	1	1	0

Jumper

- JP1 Close to supply the logic from X3, leave open on models with internal voltage regulator.
- JP2 Use internal clock generator (option). Don't use /Clock input when JP2 is closed!
- JP3 Test point to measure the reference voltage for the current controller.
- JP4 Current reduction on logic high (pins 1-2, default) or at logic low (pins 2-3)

LEDs

- LED1 +5V Logic supply present
- LED2 Home is lit in every 4th fullstep position (=one electrical revolution)
- LED3 Error, short circuit detected

Options / Variants

The following versions are available on request:

Version „Plus“

Additional functions:

- With internal voltage regulator for 5V logic
- On X1 and X2 pluggable cage clamps are used (Phoenix Combicon)
- Internal clock generator: outputs an adjustable clock frequency which makes it possible to move the motor continuously at a defined speed.

Version DIN rail case:

Additional functions like „Plus“ version, in addition:

- Delivered in plastic case to be mounted on DIN rails, width 22.5mm
- Connections: on clamps X4 to X7, X1 and X2 not nicht assembled



Notes:

Dimensions:

