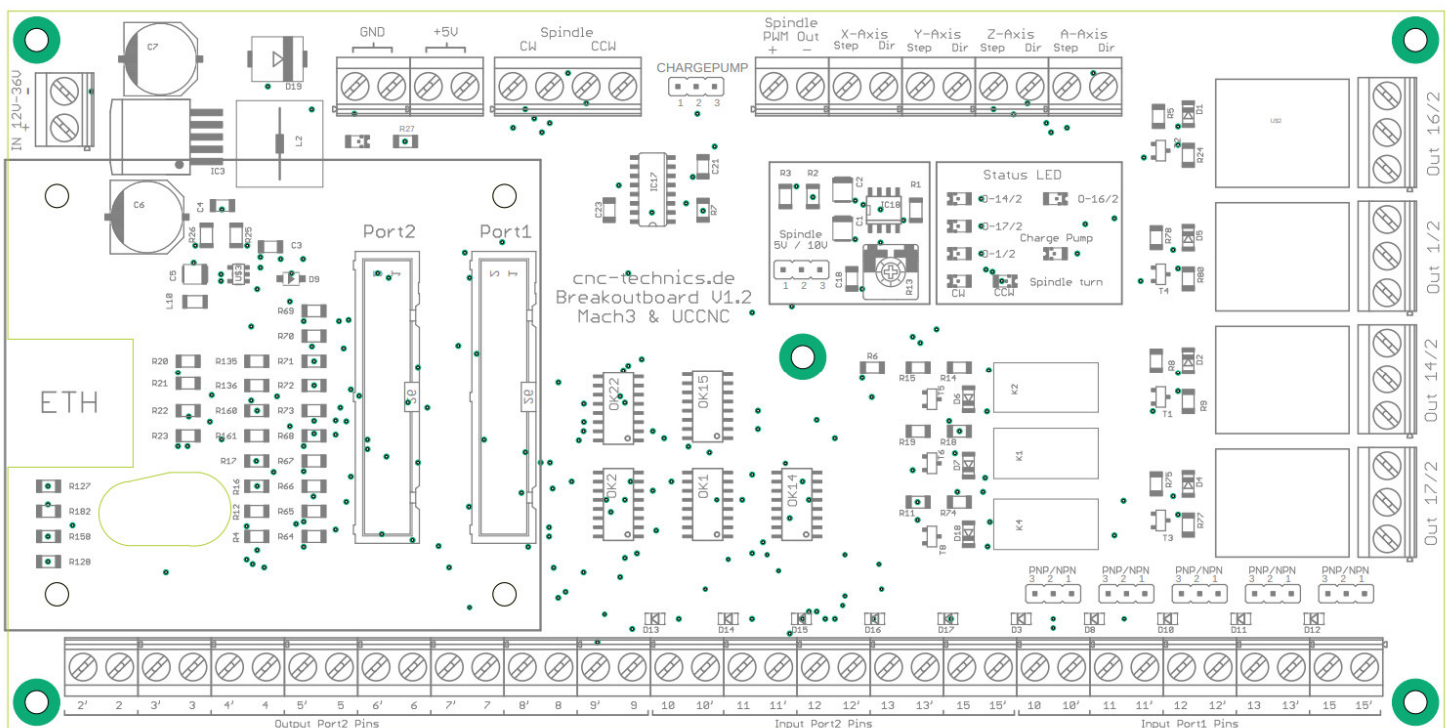


# Breakoutboard für UC400ETH R1.2



## Operation Manual

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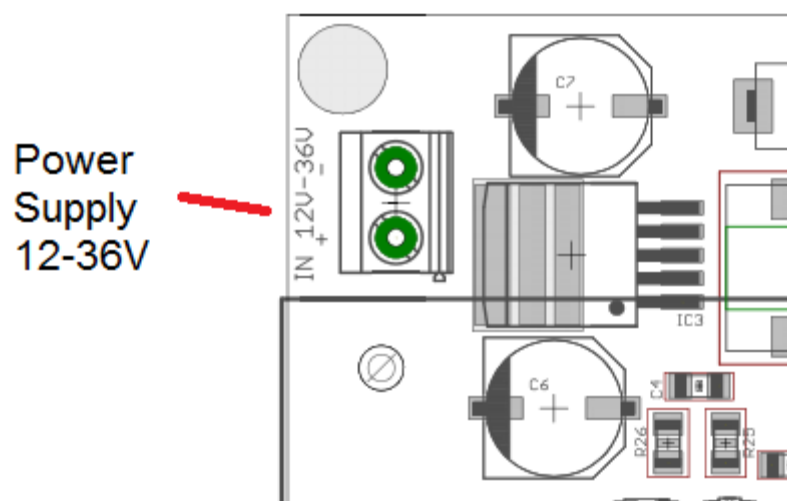
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# Introduction

This manual contains instructions for mounting, using the breakout board.

**It is imperative to connect 230V connections by a knowledgeable electrician.**

These operating instructions have been prepared with care. If you still find errors, we would be grateful for an indication.



## Delifery

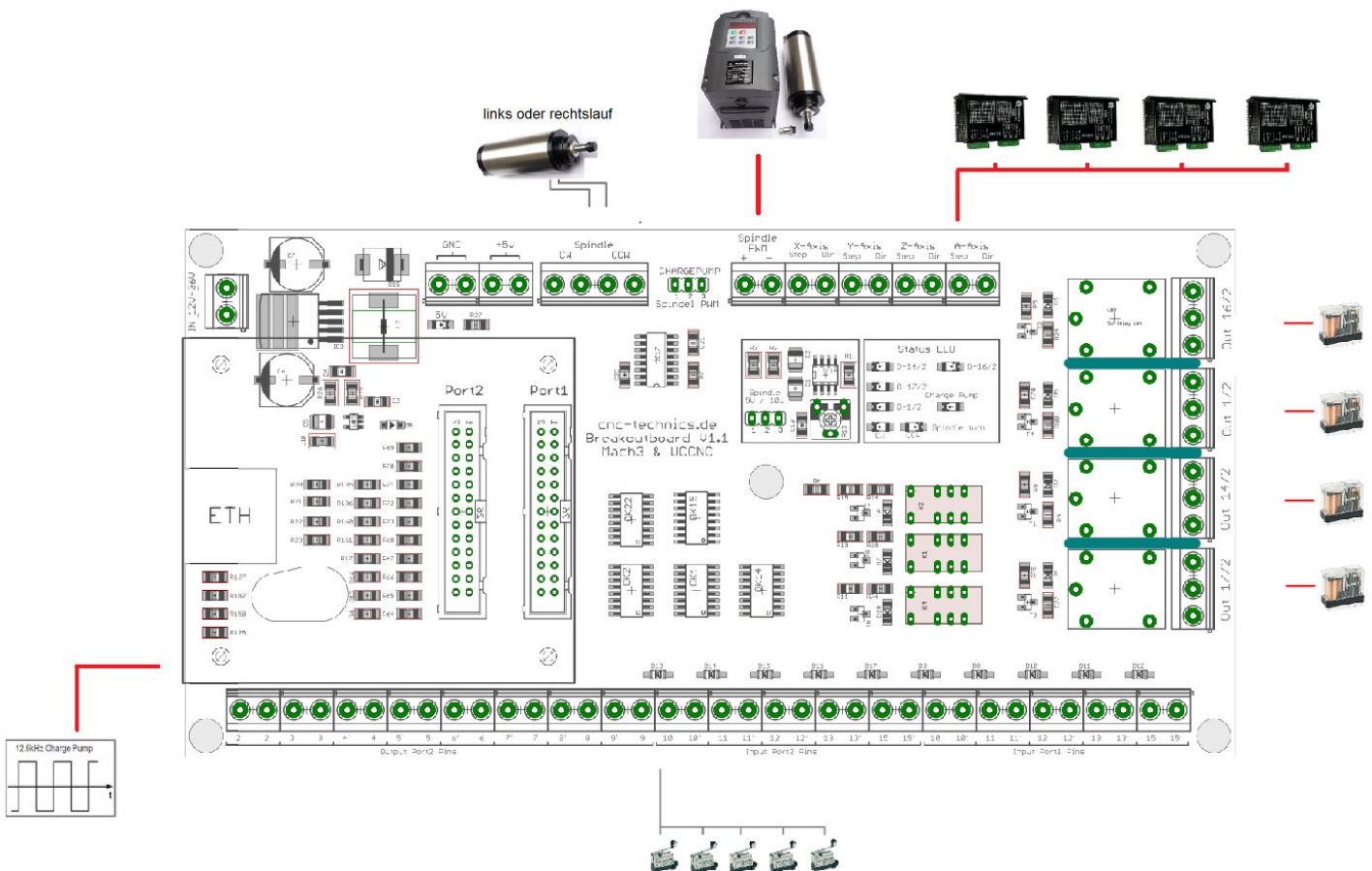
- Current version of the manual
- Breakoutboard

# Description of the breakout board

The breakout board enables the operation of up to 4 stepper motor or servo output stages on the UC400Eth.

For this the control Software Mach3 / UCCNC (not included) is used. The board has various inputs and outputs that can be individually set as many different configurations are possible. Depending on the selected configuration, additional functions are available, such as control of a frequency converter via an analog signal of 0-10V or 0-5V, reference switch, spindle direction relay, up to 3 relay outputs and one Charge Pump.

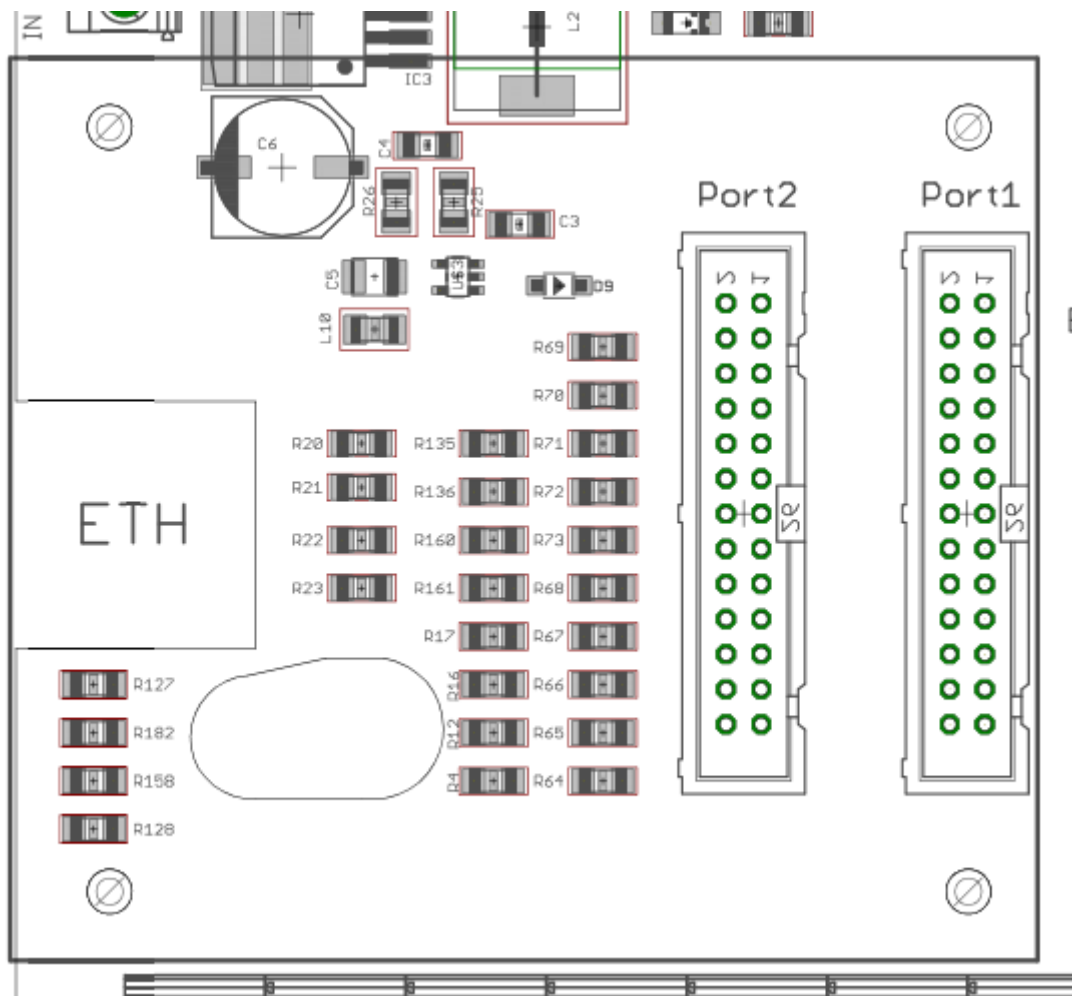
All signals are protected by Optocouplers. All machine-side signals are rated from 5V to 30V, ensuring robustness and compatibility even with industrial sensors (PNP and NPN SENSORS).



# Commissioning

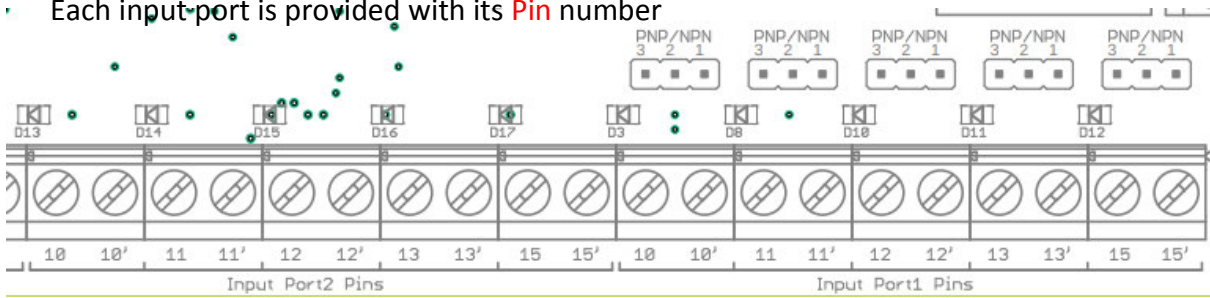
## Installation of the UC400ETH

- ➔ The UC400ETH is screwed onto the 4 spacer bolts with M3 screws
- ➔ The operating voltage is supplied via the Breakoutboard



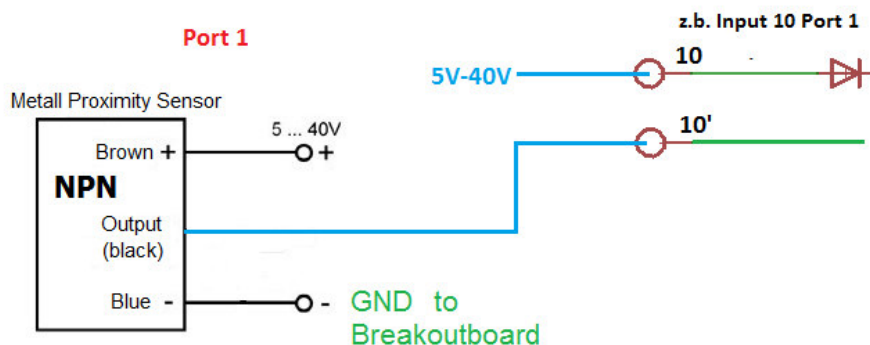
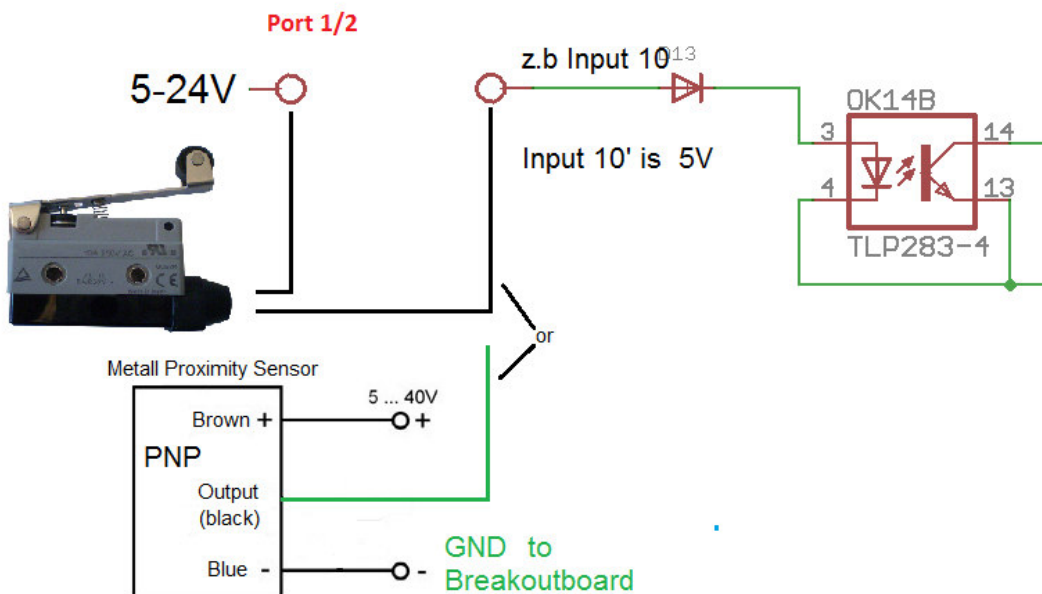
# Inputs

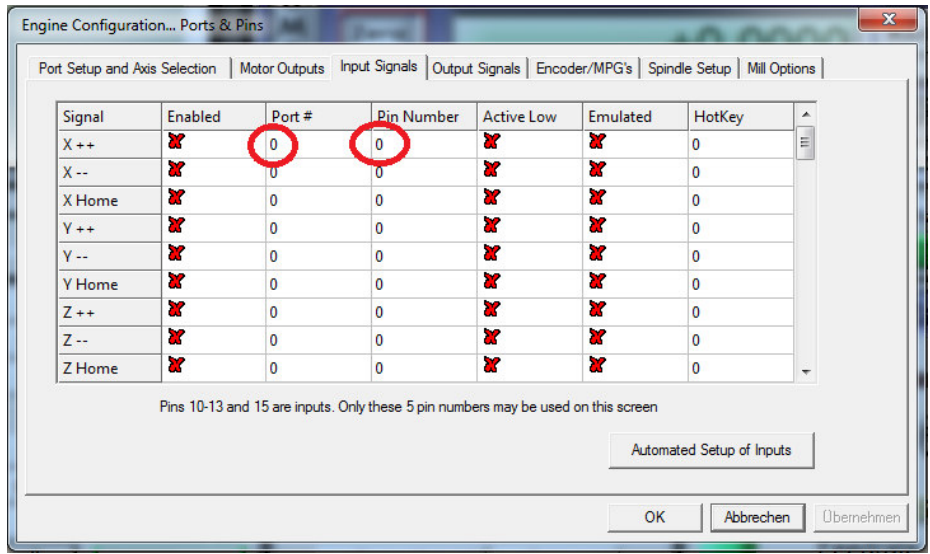
- Each input port is provided with its Pin number



in Mach3/UCCNC at Ports & Pins has to put a hook in **Active Low**.

When the limit switch is actuated, it internally switches to ground and Mach3 detects a response at the input. PNP sensors switch with the switching voltage so they are also direct connected. For PNP Sensor must the Jumper to PNP and for NPN Sensors must the Jumper to NPN





# Outputs

Like the input port, each output port is also provided with a pin number and an associated \* (output).

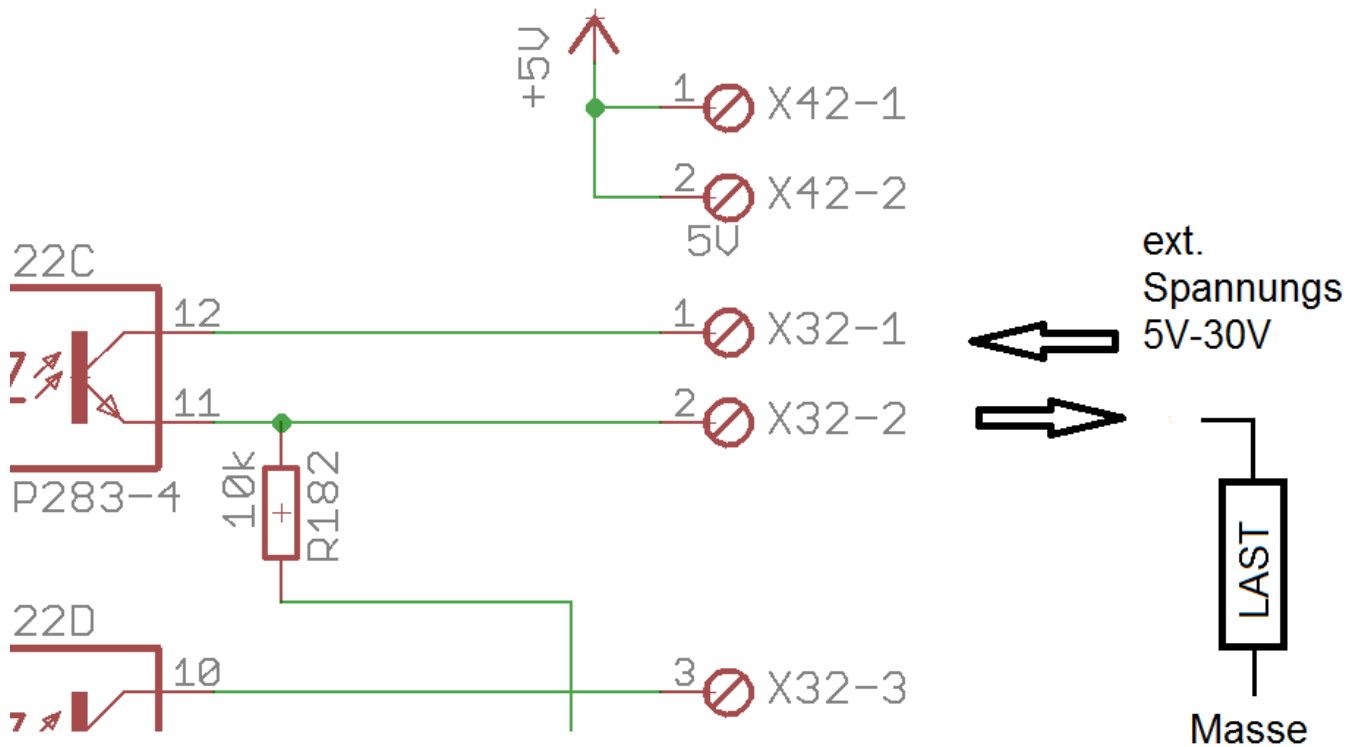
example

X32-1 is Number 6 = Port2/Pin6 and

X32-2 is Number 6\* = Port2/Pin6

For switching max 50mA per output are available. If you need higher currents for switching you can connect inexpensive relay modules.

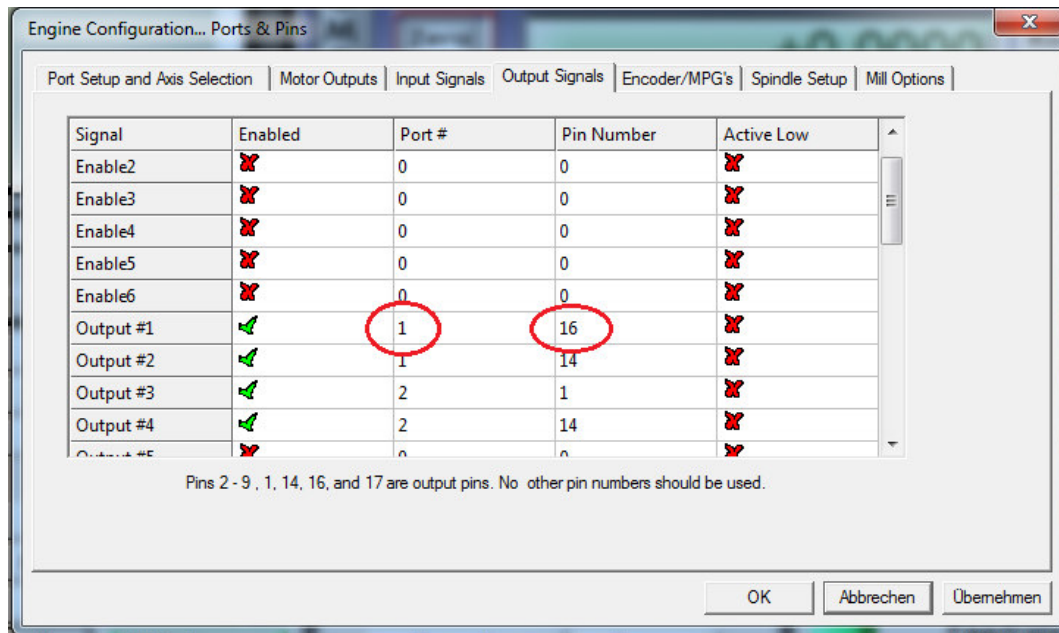
You can connect to any pin **without** \* a direct voltage, max to 30V.





# Integrate Outputs in Mach3

The Port Number and the Pin Number are used, the hook at enabled to enable output



# Set Axes in Mach3/UCCNC

These are fixed values that should not be changed.

Engine Configuration... Ports & Pins

Port Setup and Axis Selection | Motor Outputs | Input Signals | Output Signals | Encoder/MPG's | Spindle Setup | Mill Options

Signal	Enabled	Step Pin#	Dir Pin#	Dir LowActi...	Step Low A...	Step Port	Dir Port
X Axis		2	3			1	1
Y Axis		4	5			1	1
Z Axis		6	7			1	1
A Axis		8	9			1	1
B Axis		2	3			2	2
C Axis		4	5			2	2
Spindle		1	1			1	1

OK | Abbrechen | Übernehmen

RUN | TOOLPATH | OFFSETS | TOOLS | **CONFIGURATION** | DIAGNOSTICS | CAM | HELP

AXIS SETUP | I/O SETUP | I/O TRIGGER | GENERAL SETTINGS | APPEARANCE | PROFILES

X-AXIS | Y-AXIS | Z-AXIS | A-AXIS | B-AXIS | C-AXIS | SPINDLE | AUX ENC.

**Achsenauswahl**

Axis enabled

Step pin: 2 port: 1  Active low

Dir pin: 3 port: 1  Active low

Enable pin: 0 port: 0  Active low

Limit - pin: 0 port: 0  Active low

Limit + pin: 0 port: 0  Active low

Home pin: 0 port: 0  Active low  Direction positive

Homing speed up (Units/min): 500

Homing speed down (Units/min): 250

Write offset on homing (Units): 0  Auto set

Steps per Unit: 200

Velocity (Units/min): 2000

Acceleration (Units/s^2): 200

Softlimit - (Units): 0

Softlimit + (Units): 0

Comp. Acceleration (Units/s^2): 240

Backlash distance (Units): 0  Enable backlash

Slave axis: None

OFFLINE MODE

CYCLE START

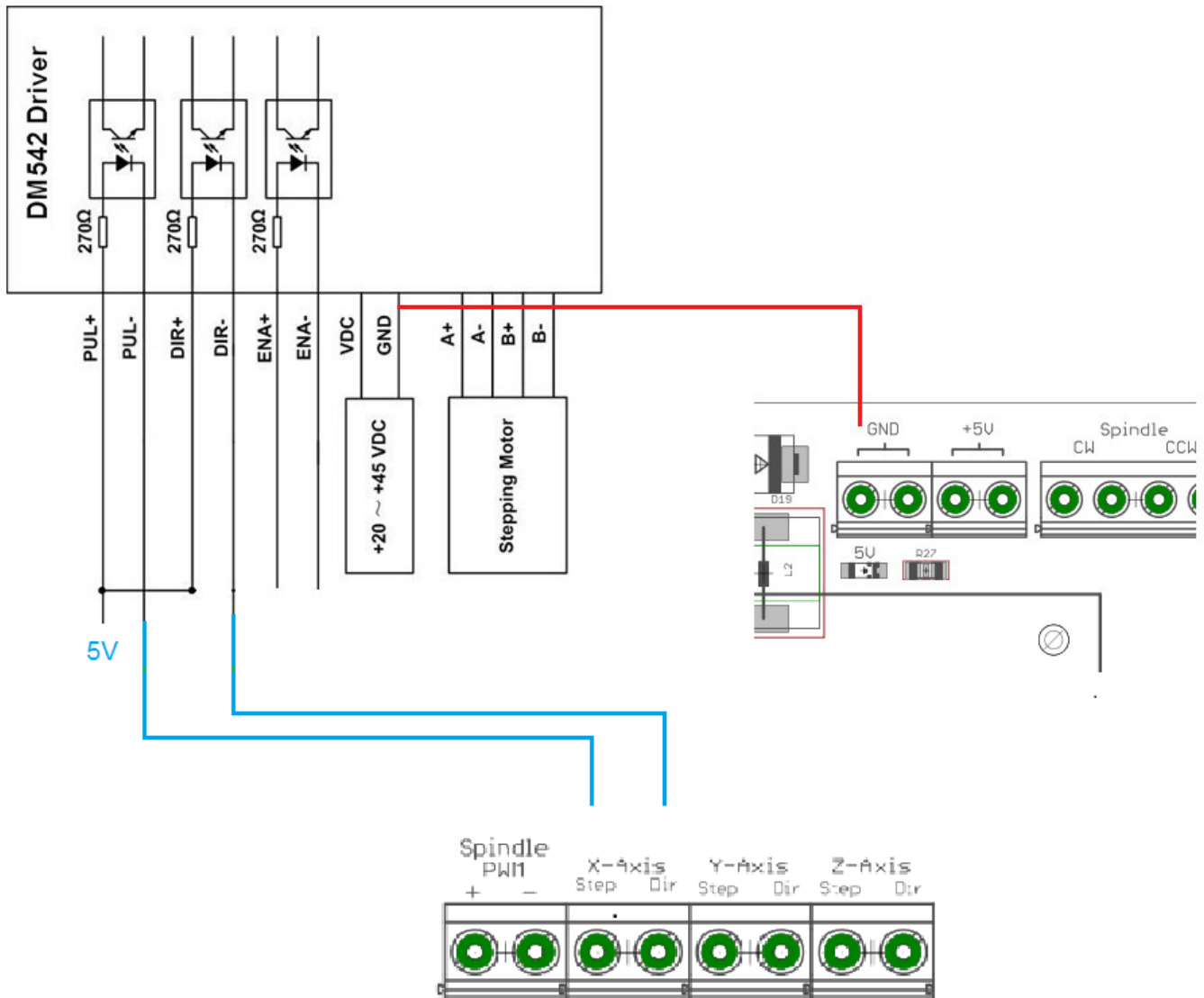
SINGLE LINE

FEED HOLD

CYCLE STOP

RESET

# Driver Connection

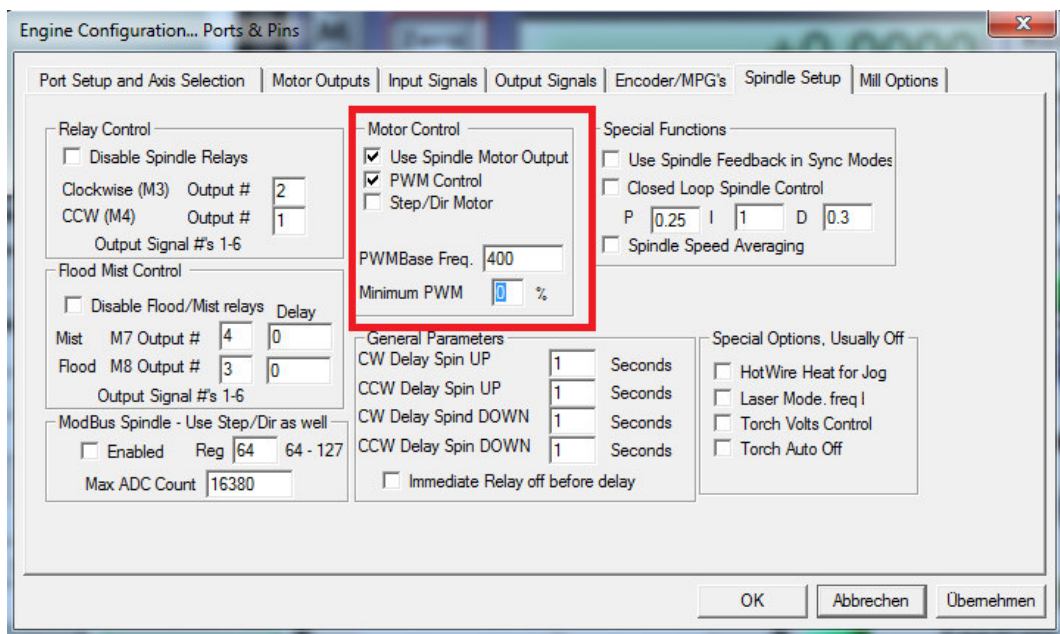
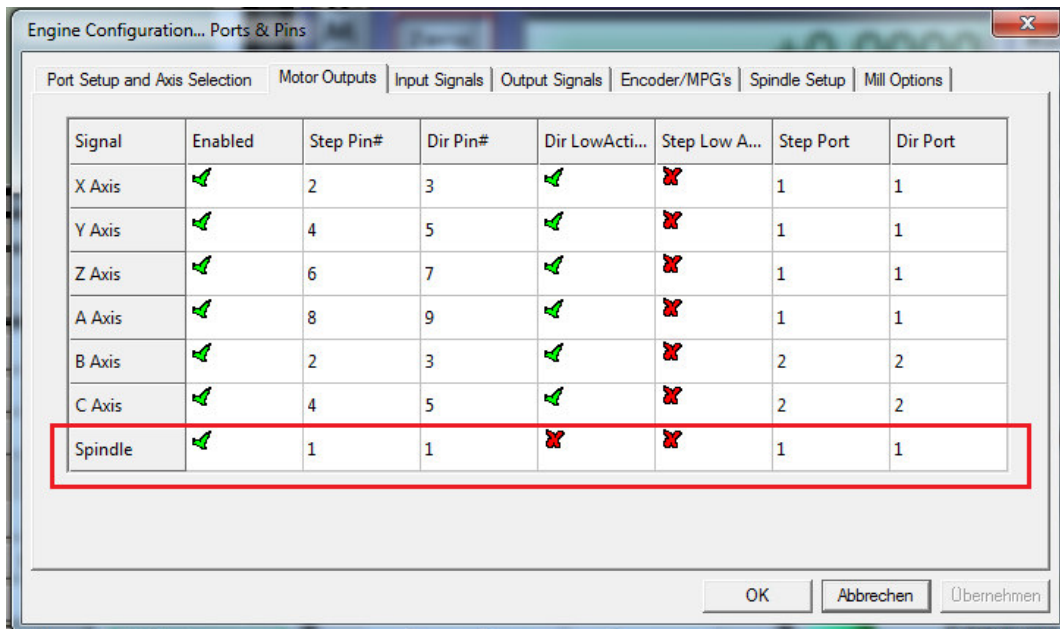
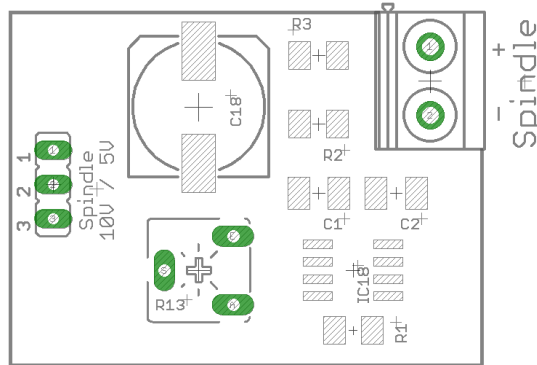


# Set spindle

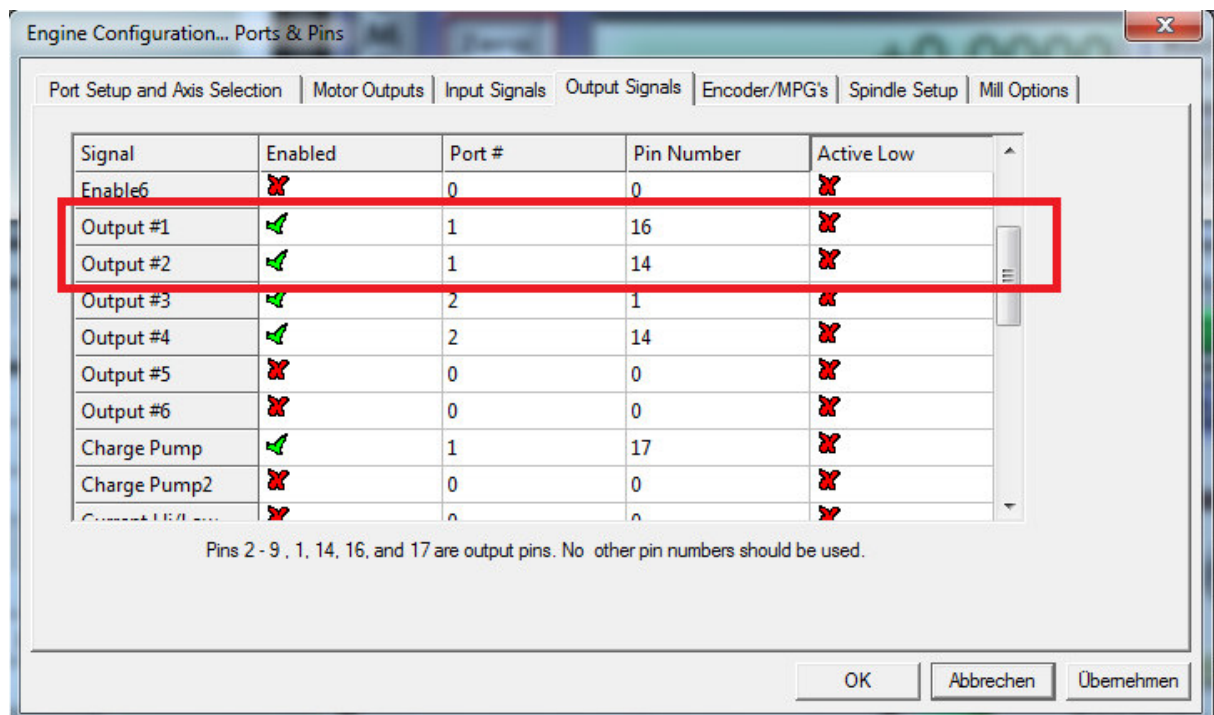
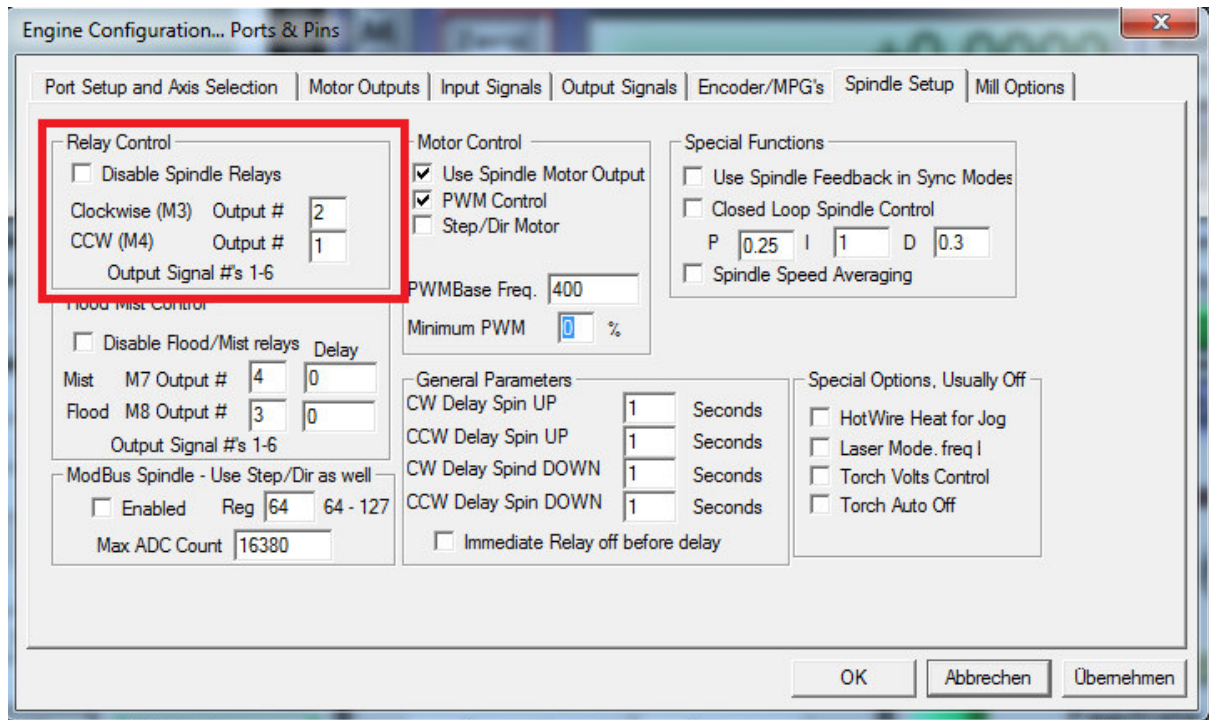
Port 1 / Pin 1 is the analog output for the spindle speed

A VFD frequency inverter for the analogue signal can be connected to the spindle output. Via jumper 1-2 = 5V or bridge 2-3 = 10V output signal at bridge

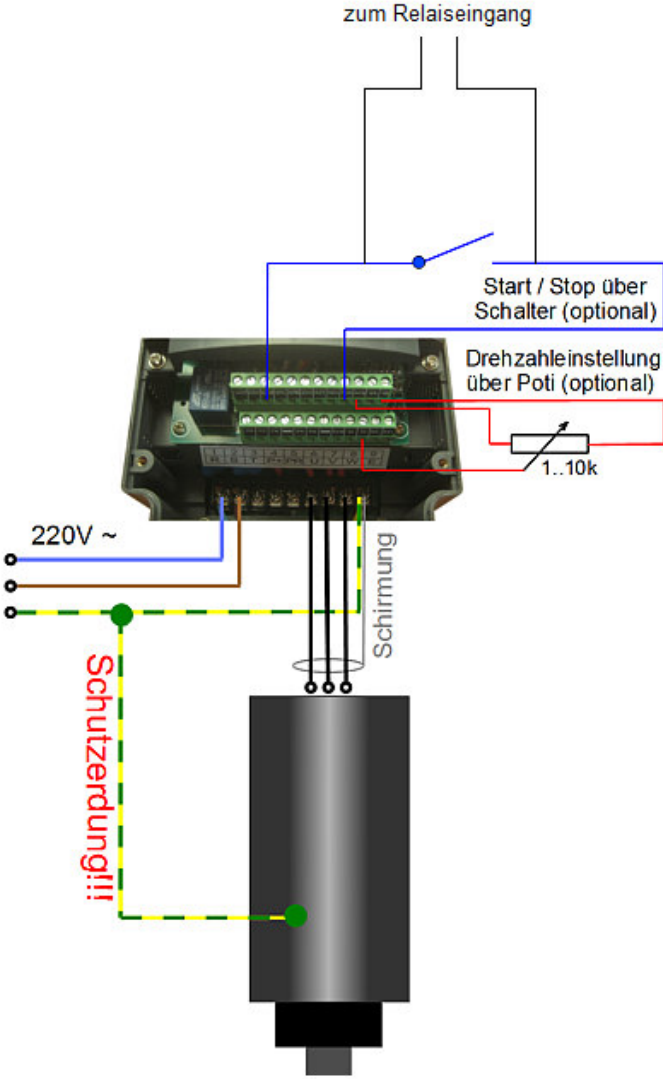
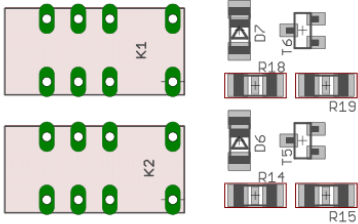
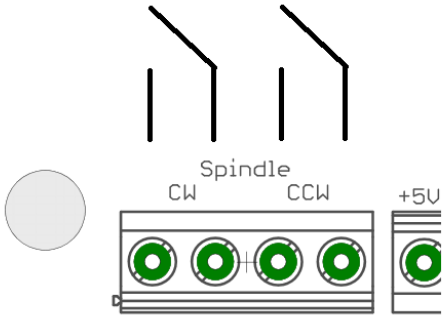
The Potentiometer R13 should not be adjusted he is set so that at 5V PWM output from the PC comes a 10V analog signal



# Spindle direction




CW (clockwise) or CCW (counterclockwise) are switchable relay outputs.



# Spindle in UCCNC

RUN	TOOLPATH	OFFSETS	TOOLS	<b>CONFIGURATION</b>	DIAGNOSTICS	CAM	HELP
<b>AXIS SETUP</b>	I/O SETUP	I/O TRIGGER	GENERAL SETTINGS	APPEARANCE	PROFILES		
X-AXIS	Y-AXIS	Z-AXIS	A-AXIS	B-AXIS	C-AXIS	<b>SPINDLE</b>	AUX ENC.

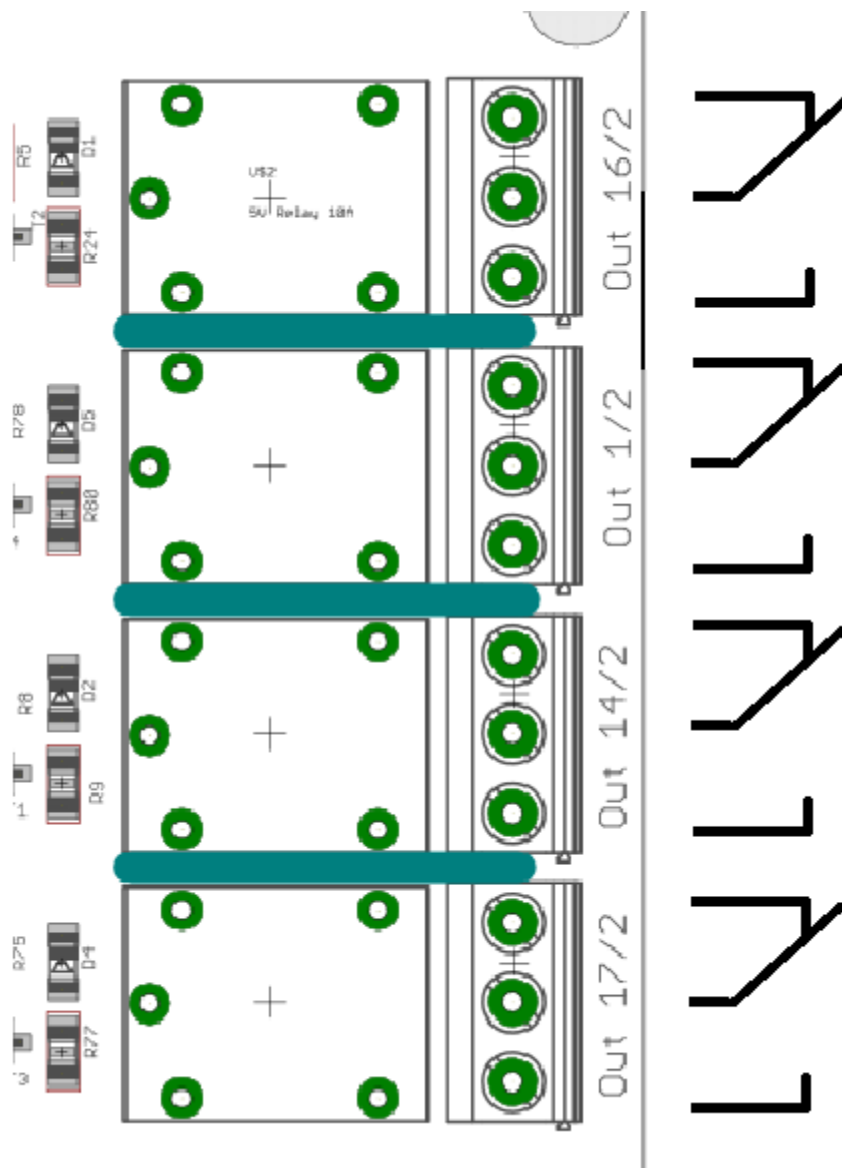


<input checked="" type="checkbox"/> PWM spindle PWM pin: <input type="text" value="1"/> port: <input type="text" value="1"/> <input type="checkbox"/> Active low Dir pin: <input type="text" value="0"/> port: <input type="text" value="0"/> <input type="checkbox"/> Active low PWM frequency (Hz): <input type="text" value="400"/> PWM min duty (%): <input type="text" value="0"/> max (%): <input type="text" value="100"/>	<input type="checkbox"/> Step/direction spindle Step pin: <input type="text" value="0"/> port: <input type="text" value="0"/> <input type="checkbox"/> Active low Dir pin: <input type="text" value="0"/> port: <input type="text" value="0"/> <input type="checkbox"/> Active low Step per rotation: <input type="text" value="500"/> Acceleration (step/s <sup>2</sup> ): <input type="text" value="200"/>
Spindle PID control <input type="button" value="Set"/> Index pin: <input type="text" value="0"/> port: <input type="text" value="0"/> Index prescaler: <input type="text" value="1"/>	Encoder PPR: <input type="text" value="400"/> <input type="checkbox"/> Reverse Enc. dir. Encoder A pin: <input type="text" value="0"/> port: <input type="text" value="0"/> Encoder B pin: <input type="text" value="0"/> port: <input type="text" value="0"/>
Spindle velocity (1/min): Min. <input type="text" value="10"/> Max. <input type="text" value="5000"/> <input type="button" value="Spindle pulleys"/> <input type="checkbox"/> Use pulleys Pulley no.: <input type="text" value="1"/>	
<input checked="" type="checkbox"/> Spindle relay output enabled M3 relay pin: <input type="text" value="16"/> port: <input type="text" value="1"/> <input type="checkbox"/> Active low M4 relay pin: <input type="text" value="14"/> port: <input type="text" value="1"/> <input type="checkbox"/> Active low M3 delay after on (ms): <input type="text" value="1000"/> M3 delay after off (ms): <input type="text" value="1000"/> M4 delay after on (ms): <input type="text" value="1000"/> M4 delay after off (ms): <input type="text" value="1000"/>	<input checked="" type="checkbox"/> Flood/Mist relay outputs enabled M7 relay pin: <input type="text" value="0"/> port: <input type="text" value="0"/> <input type="checkbox"/> Active low M8 relay pin: <input type="text" value="0"/> port: <input type="text" value="0"/> <input type="checkbox"/> Active low M7 delay after on (ms): <input type="text" value="1000"/> M8 delay after off (ms): <input type="text" value="1000"/> M9 delay (ms): <input type="text" value="0"/>

# Relaisoutput

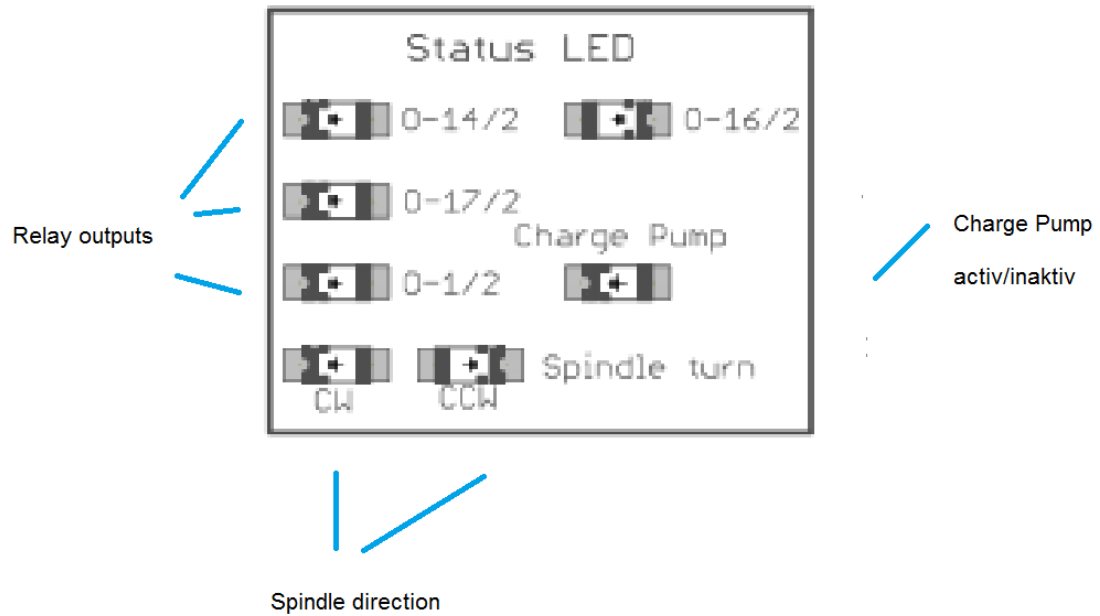
There are 4 Relay Outputs up to 230V / max 10A (2,2KW at 230V) available  
PORT 2 → Pin 1,14,16 oder 17

Attention: do not connect switching power supplies because they have a very high inrush current, the relay contacts may be defective



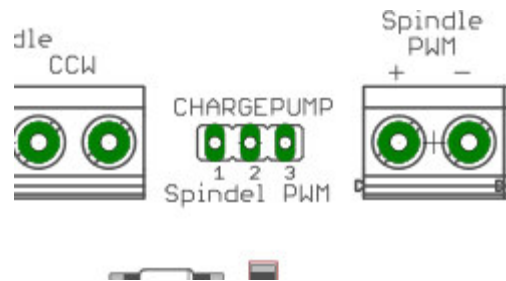


# Statusdisplay



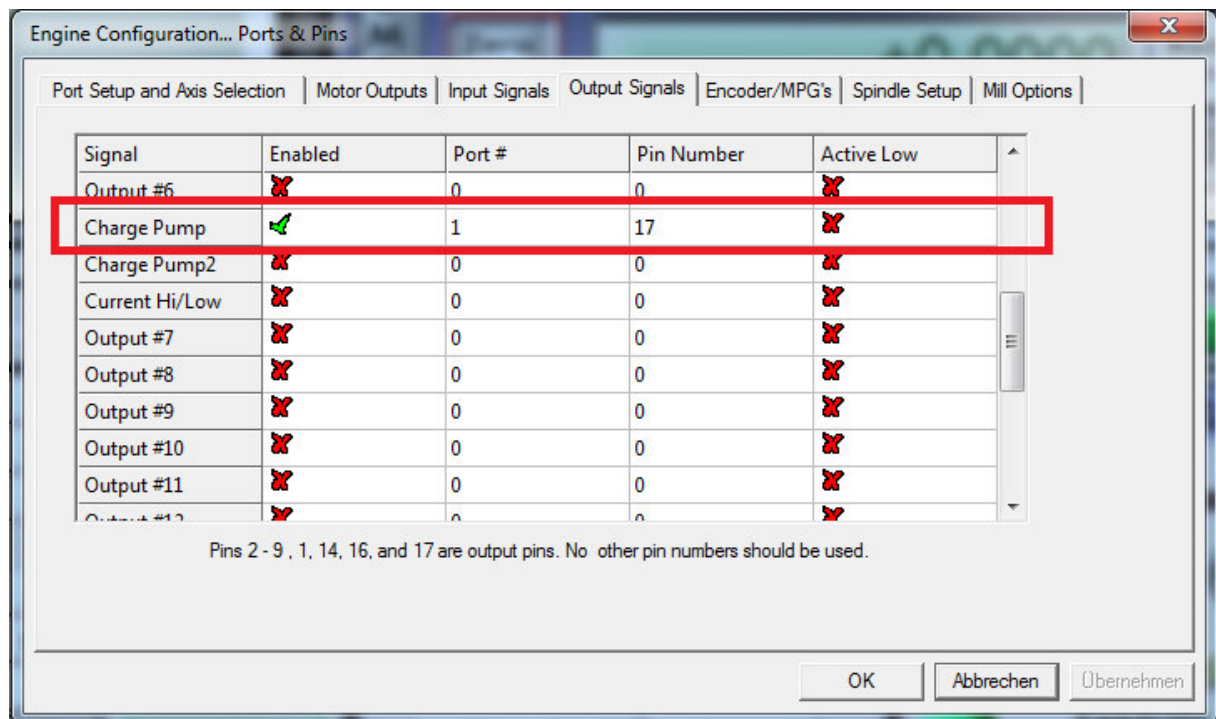
# Charge Pump

This setting can be enabled or disabled



If the **jumper** is set to **1/2** the board will be activated without protection and all will remain Tensions and controls are maintained even if Mach3 makes a reset.

If the **jumper** is set to **2/3**, the breakout board will be controlled by Mach3 via the 12.5Khz signal. That is, only after the reset of Mach3 is deactivated, the board is active. All components are supplied with 5V or 12V. For this you have to make the following settings in Mach3:




RUN TOOLPATH OFFSETS TOOLS **CONFIGURATION** DIAGNOSTICS CAM HELP  
 AXIS SETUP **I/O SETUP** I/O TRIGGER GENERAL SETTINGS APPEARANCE PROFILES

E-stop pin: 0 port: 0  Active low  
 Probe1 pin: 0 port: 0  Active low  
 Probe2 pin: 0 port: 0  Active low  
**Charge1 p. pin: 17 port: 1  Active low**  
 Charge2 p. pin: 0 port: 0  Active low  
 Charge pump always on  
 Current hi/low: 0 port: 0  Active low  
 Laser output: 0 port: 0  Active low

MPG A pin: 0 port: 0  
 MPG B pin: 0 port: 0  
 MPG prescaler: 1 MPG filter const.: 10  
 MPG speed multiplier: 10  
 Attach JRO to MPG

Enable THC control  
 Arc on pin: 0 port: 0  Active low  
 THC up pin: 0 port: 0  Active low  
 THC down pin: 0 port: 0  Active low  
 Min. height: 0 Max. height: 10  
 THC feedrate (Units/min): 1000  
 Control THC even if the THC on signal is not active  
 Enable THC Delay Delay (sec): 0  
 Enable THC anti dive Threshold (%): 0  
 Enable THC anti down  
 THC en. out pin: 0 port: 0  Active low  
 An. dive out pin: 0 port: 0  Active low  
 An. down out pin: 0 port: 0  Active low

Apply settings Save settings

  
 OFFLINE MODE  
 CYCLE START  
 SINGLE LINE  
 FEED HOLD  
 CYCLE STOP  
 RESET