Connect a AMB Kress or Mafell spindle with digital control

Adding a spindle to the duet board that is able to run/stop/pause via gcode. AMB kress Mafell Digital control

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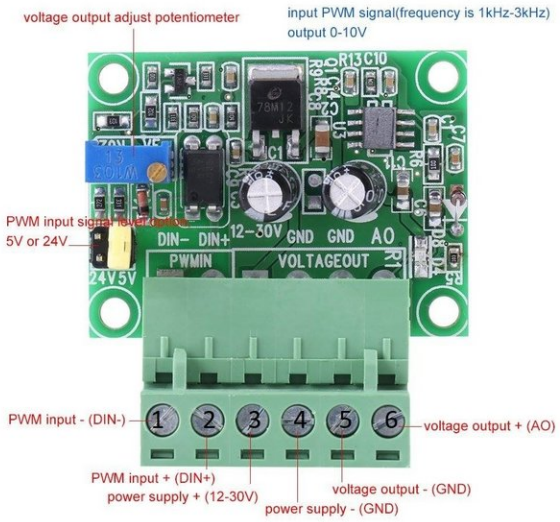
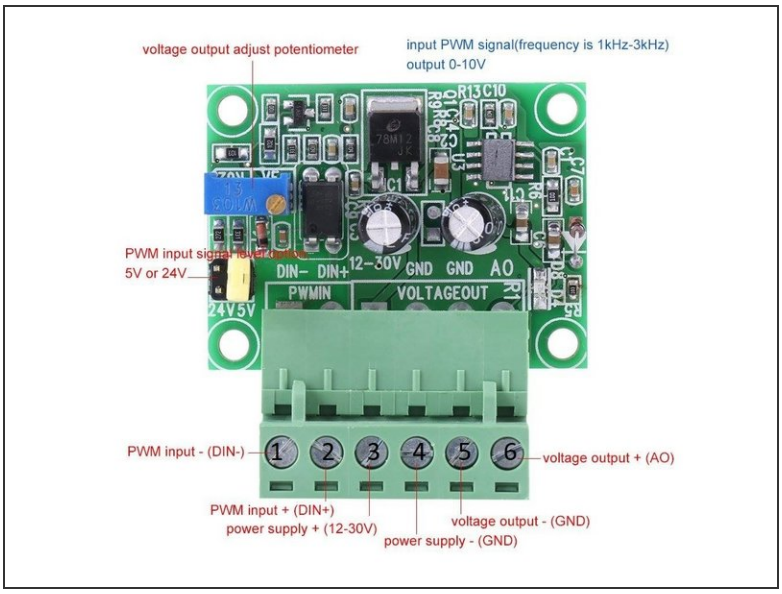
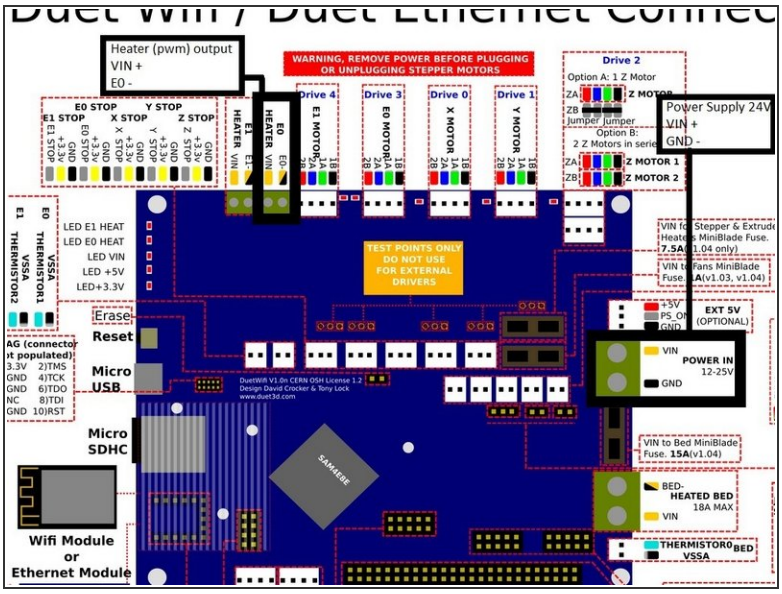
Step 1 — Needed parts



- AMB Kress or Mafell spindle with digital control
- PWM to voltage 0-10V converter (see links)
- Small wiring cables suitable for 24V

Step 2 — Installing the PWM converter

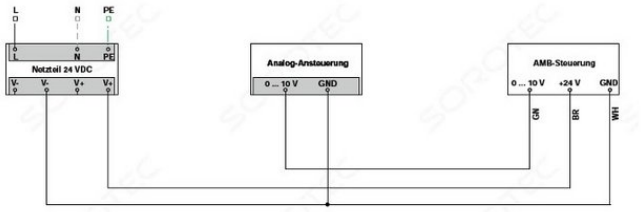




⚠ ***'Disconnect the power supply of the duet controller first!'***

- PWM converter has 4 inputs (2 power + 2 pwm input signals) and 2 outputs (0-10V voltage). Make sure the yellow jumper is on the 24V pins as we are using the duet pwm signal output which is 12/24V.
- Power wiring to the PWM converter
  - Connect the “VIN” power pin on the duet board (see image) to port 3 on the pwm converter “power supply + (12-30V)”
  - Connect the “GND” power pin on the duet board to port 4 on the pwm converter “power supply – (GND)”
- Pwm signal wiring to the pwm converter using HEATER E0 of the duet board
  - Connect “VIN” from heater E0 to port 2 “PWM input + (din+)” on the pwm converter
  - Connect “E0-” from heater E0 to port 1 “PWM input – (DIN-)” on the pwm converter

Step 3 — Installation diagram



- Other than the power supply cable 110V/220V, the spindle has 3 small cables:
  - BROWN 10-26V DC (for power supply)
  - GREEN 0-10V DC (for speed control)
  - WHITE 0 V (for ground/GND)

Step 4 — Wiring the spindle

- **Brown** to “VIN” connector of the duet power supply pin
- **Green** to port 6 “voltage output + (AO)” of the pwm converter
- **White** to port 5 “ voltage output – (GND)” of the pwm converter
- Connect port 5 “ voltage output – (GND)” of the pwm converter to the “GND” pin of the power supply on the duet board

⚠ **THE LAST STEP (port 5 to GND pin duet) IS REALLY IMPORTANT! You create a**

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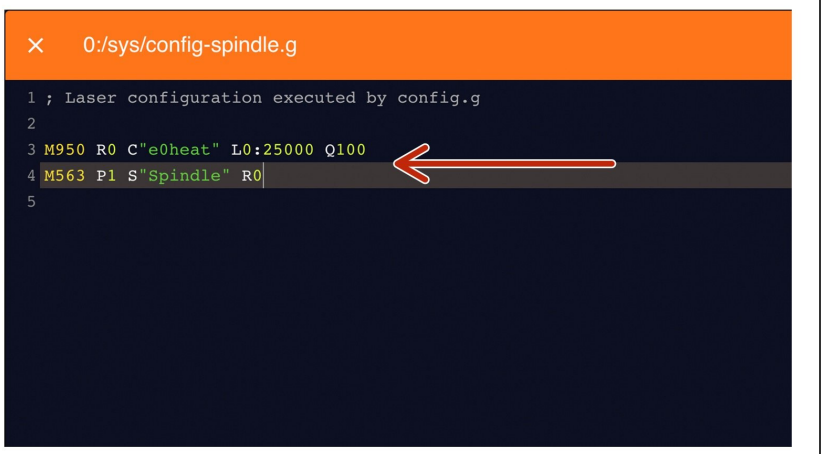
common ground between the spindle and pwm converter/power supply

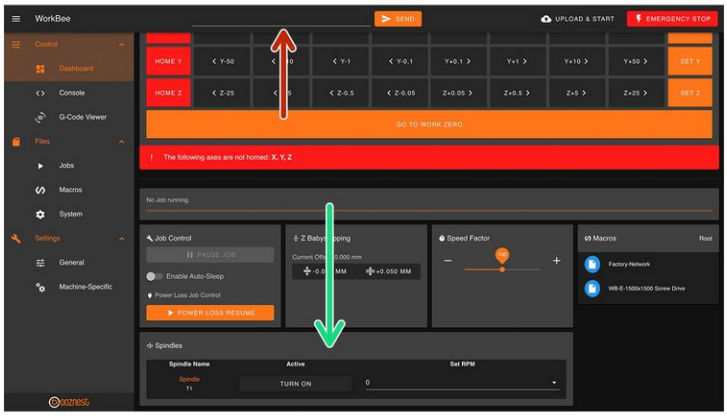
Step 5 — Programming



- Under File Management > System click on 'config-spindle.g'. Then add the following lines
  - M950 R0 C"e0heat" L0:25000 Q100
    - ⓘ L is the minimum and maximum RPM of your Spindle. Adjust accordingly.
    - ⓘ Q is the frequency. If your spindle keeps fluctuating at lower rpms, change the frequency to 300. If it still keeps fluctuating, change it to 320 or 350 and so on.
  - M563 P1 S"Spindle" R0

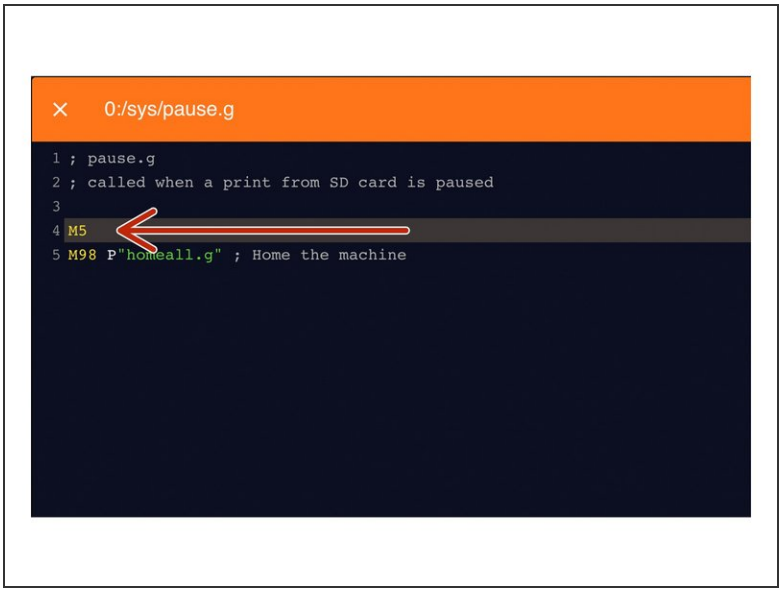
⚠ Press the software emergency stop in the top right corner to restart the controller.

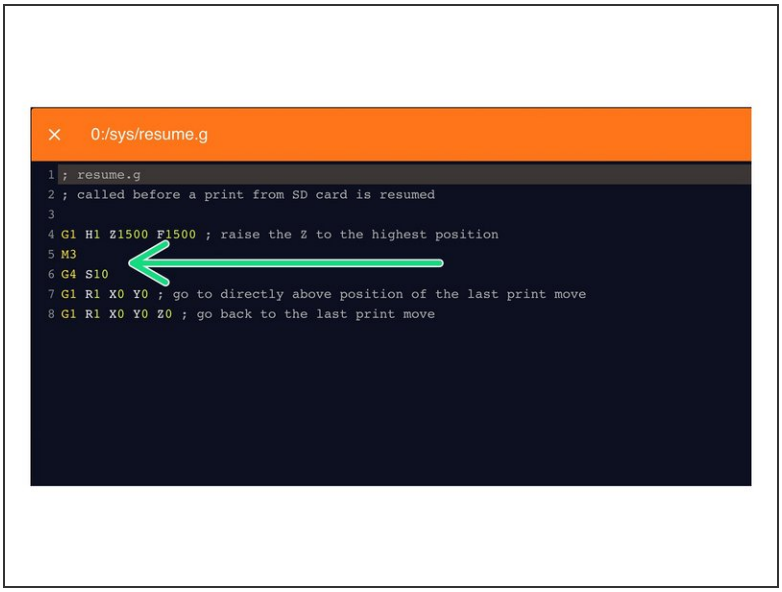
Step 6 — Speed Control



- You can control the spindle manually using G-Code.
  - ⓘ For example M3 S25000, turns the spindle on clockwise and sets the spindle speed at 25000rpm
  - ⓘ M5 Stops the Spindle.
- You can also control it in the 'Spindles' panel.
  - Press 'Turn On' will turn the spindle on clockwise at the RPM set.
  - You can change the preset RPMs under Settings > Machine Specific > Spindle RPM Presets.
- If you have a multimeter, try to read the output voltage of the pwm converter (port 5 and 6). If it says 10V, you are on the maximum spindle speed.
- You can also add a digital led voltmeter on port 5 and 6 of the pwm controller (see image 2)

Step 7 — Stop the spindle when pausing a job





- Under File Management > System click on 'pause.g'.
  - Add the command **M5** in the header, so the spindle stops when you pause a job while running
- Open the resume.g file and add the following lines
  - M3
    - ⓘ The Spindle RPM is not needed. It will go back to the RPM when the M5 command was sent.
  - G4 S10
    - ⓘ Dwell for 10 seconds to let the Spindle get up to speed.

Step 8 — Modify post processor in Vectric

- Modify the vectric's post processor to autmatically use spindle speed.
  - Go to the installation directory of the Vectric software, search for “grbl_mm.pp” and make a copy in the same directory and open the copy
- Change the POST_NAME to something else, I did “GRBL (mm) (SPEED)
- In the header, change “M3” to “M3[S]” to add speed to the M3 command
- After your "M3[S]" line, add a new line "G4S15". This code tells the machine to wait 15 seconds to achieve full spindle speed before starting a job

ⓘ Save your file in the post processor directory, make sure it ends with .pp or Vectric does not recognise it!

ⓘ Next time you open the Vectric software, your new post processor will be added to the PP list

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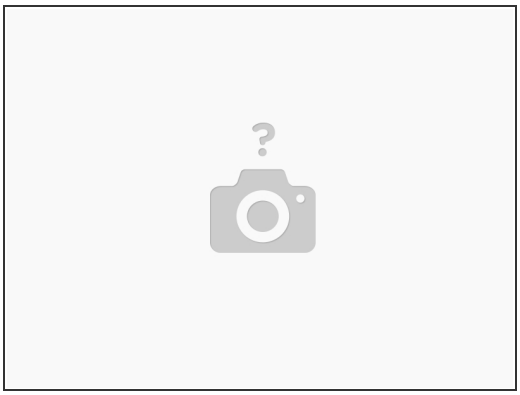
Step 9 — Links and references



- Many many thanks to user “Tubal” from the Openbuilds forum, who describes part of the process [Openbuilds forum link]
- PWM converter [Amazon link]
- AMB Kress wiring diagram from SOROTEC [PDF wiring diagram]

Thanks for following the guide. Any issues, please contact us!