002 - CONNECTING THE PRINTER

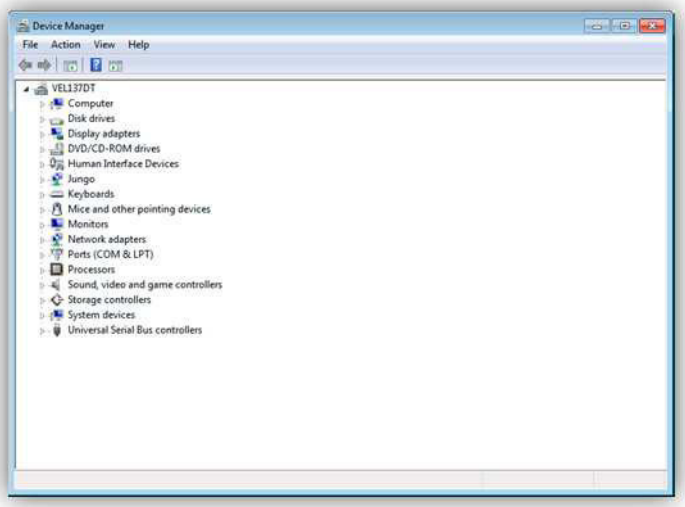
Now that you have an idea what 3D printing entails, we can continue and connect the printer to your computer. First make sure you have a computer with a decent amount of RAM (min. 2-4 GB) as working with 3D print files can be taxing on your system. Secondly you will need an available USB 2.0 port to connect the printer to, but before connecting the printer you should download the driver suitable for your system.

- FTDI VCP DRIVER (free) (WIN/MAC/LINUX) http://www.ftdichip.com/Drivers/VCP.htm

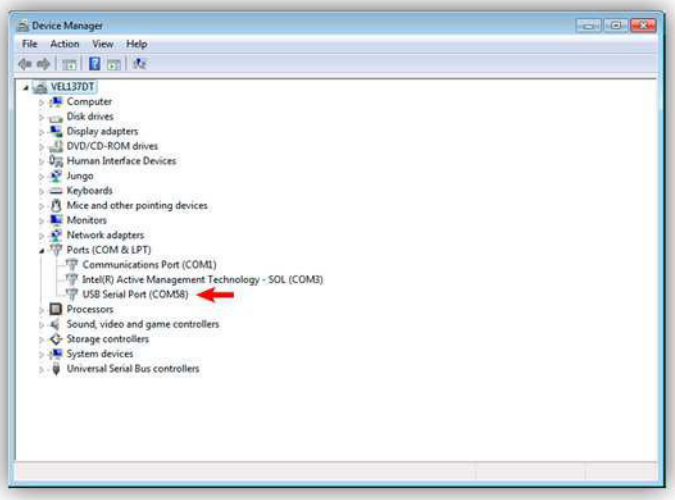
After installing this driver you can connect the USB cable with a free USB port on your computer (do not connect the power cable of the printer, we will do this in a later stadium). And follow the steps for your operating system:

- PC (WIN 7)

The PC will continue and install the driver for the printer and you will have to check the number of the COM port to use in the configuration of Repetier later. To check this number, go to: “Start”, type: “Device Manager” and press Enter. You should see something similar to this:



Under “Ports (COM&LPT)” you should find an entry with the name: USB Serial Port and a COM Port number between brackets. (The number you see on your computer can be totally different from the one you see here.) Remember this number as you will need it later.



- MAC

UNDER CONSTRUCTION

- LINUX

UNDER CONSTRUCTION

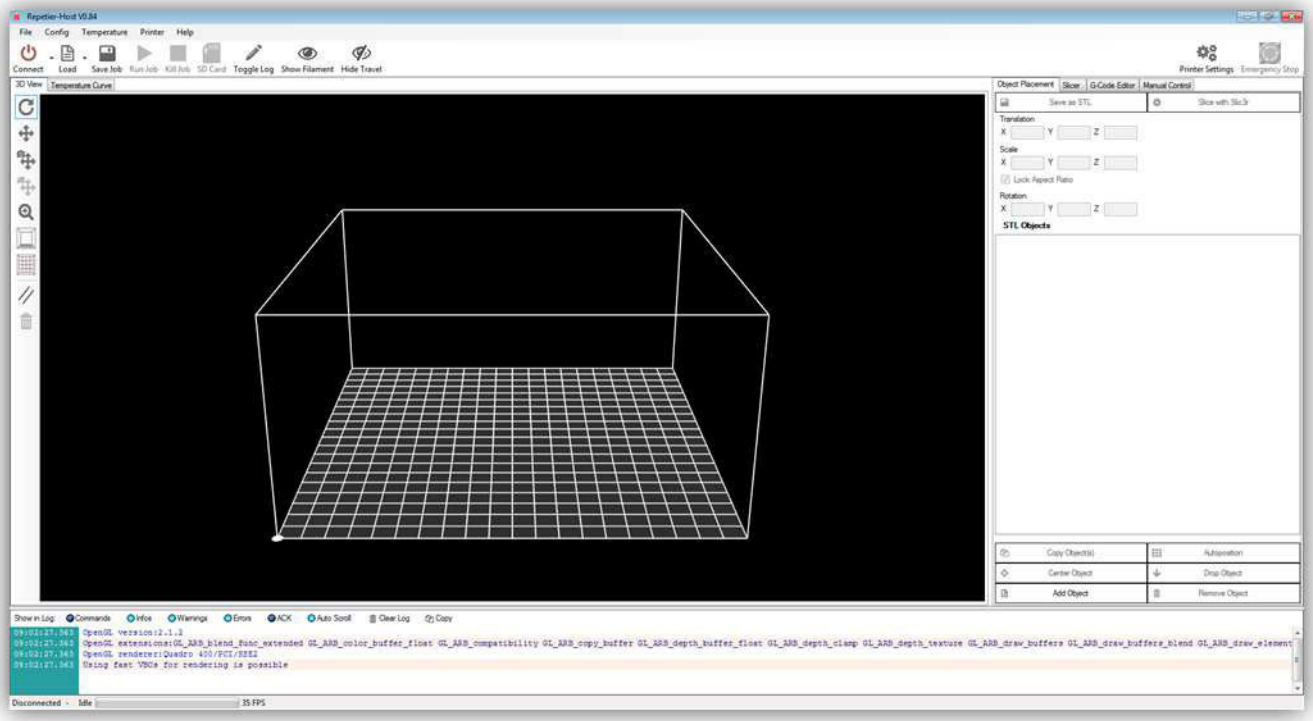
Now we can configure Repetier so it knows what printer it will be talking to. First, if you haven't already downloaded the Repetier software, you can download it here (this explanation will be done with the 0.84 (WIN) version of the software, this version is perfect for the printer for all intends and purposes, newer versions are not yet fully supported and you are recommended to download an equivalent of this version depending on which operating system you are using):

- Repetier (free) (WIN/MAC/LINUX) http://www.repetier.com/

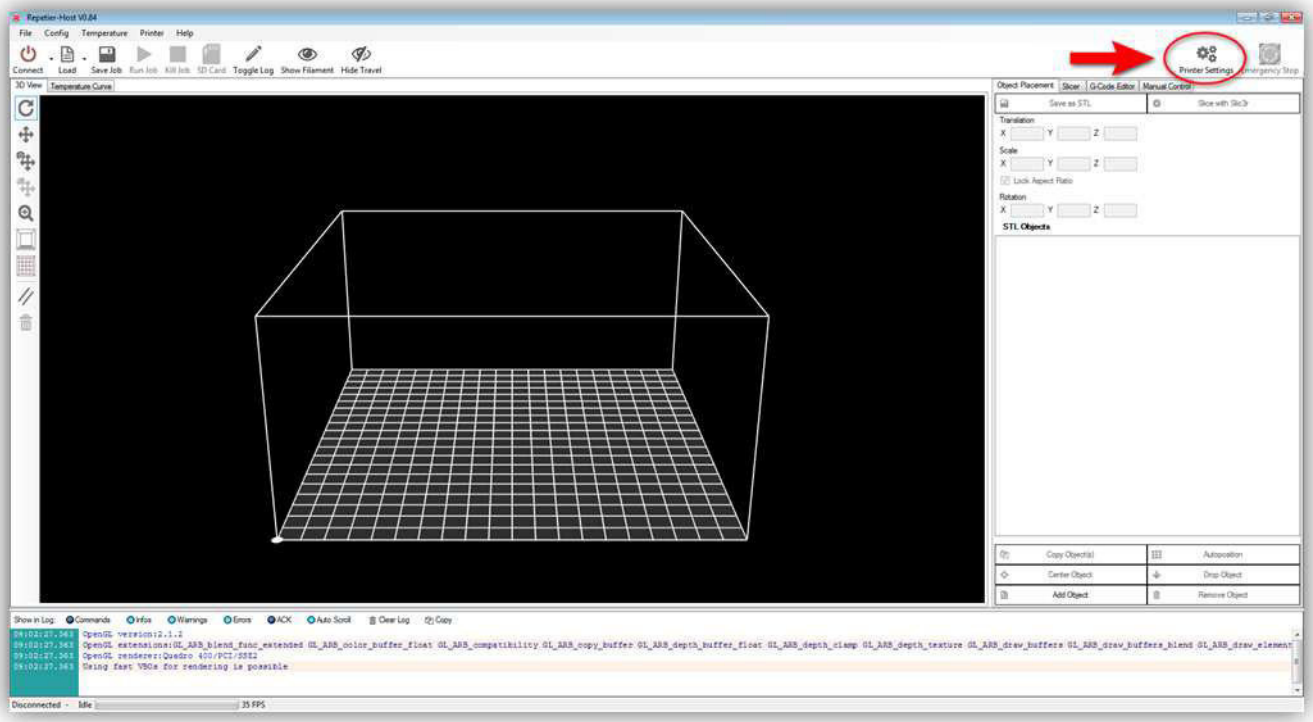
V0.84 (WIN)

There are newer versions of this program but we are working on the compatibility for the newer versions. This manual focusses only on this version of the software.

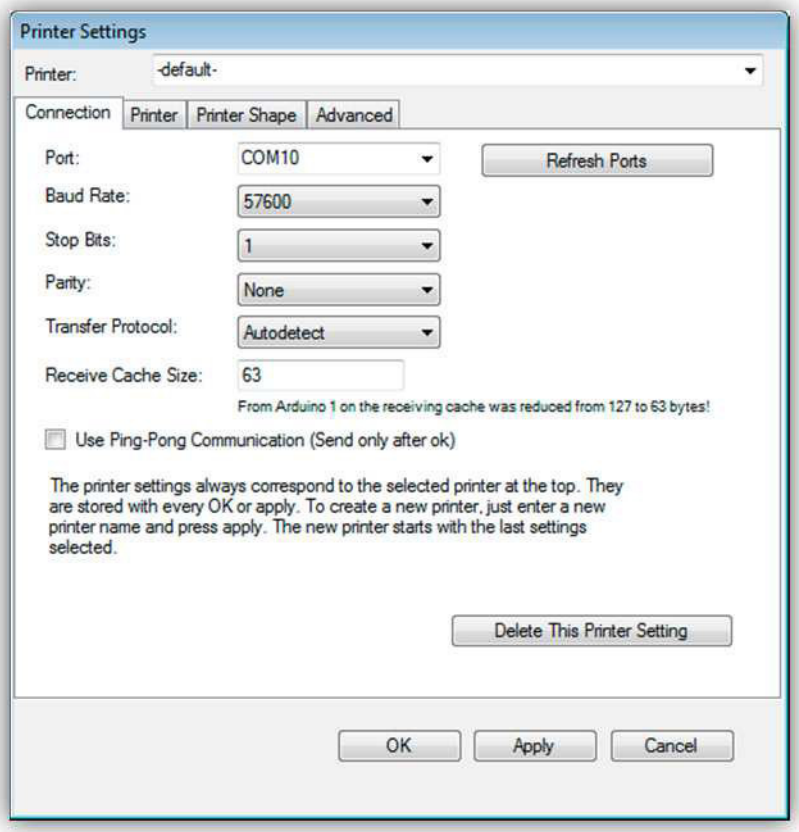
Once installed you can start Repetier and you should see something like this:



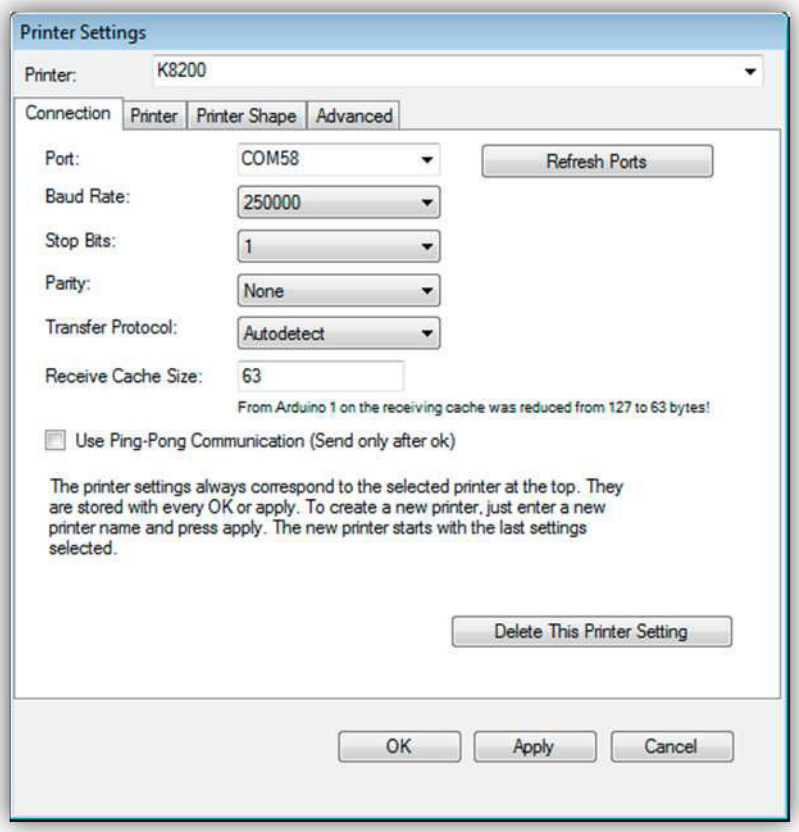
Now click on the "Printer Settings" button:



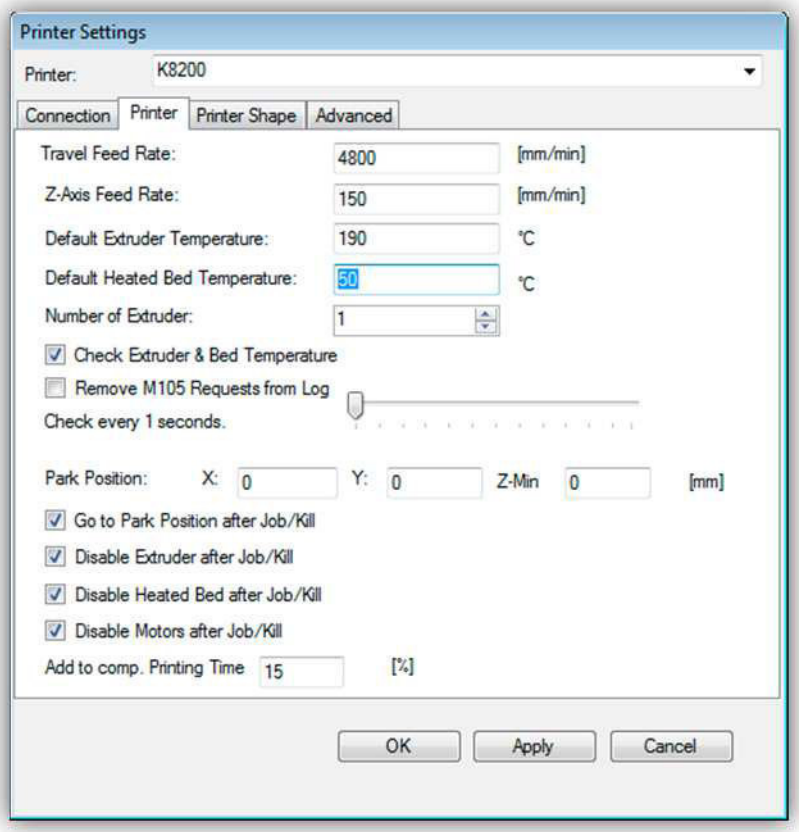
You should see the following dialog window:



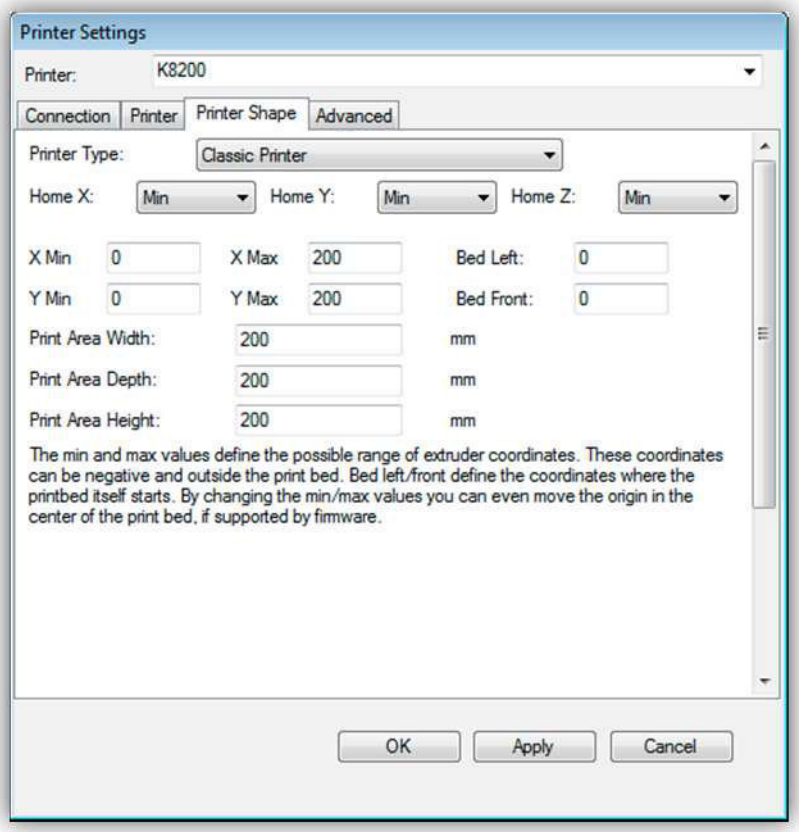
Change the settings on this tab to the ones below (for the “Port” setting you should use the Virtual COM Port on which your computer is communicating with the K8200. See the section about driver installation at the beginning of this chapter for more information.)



For the “Printer” tab you should use the following settings:

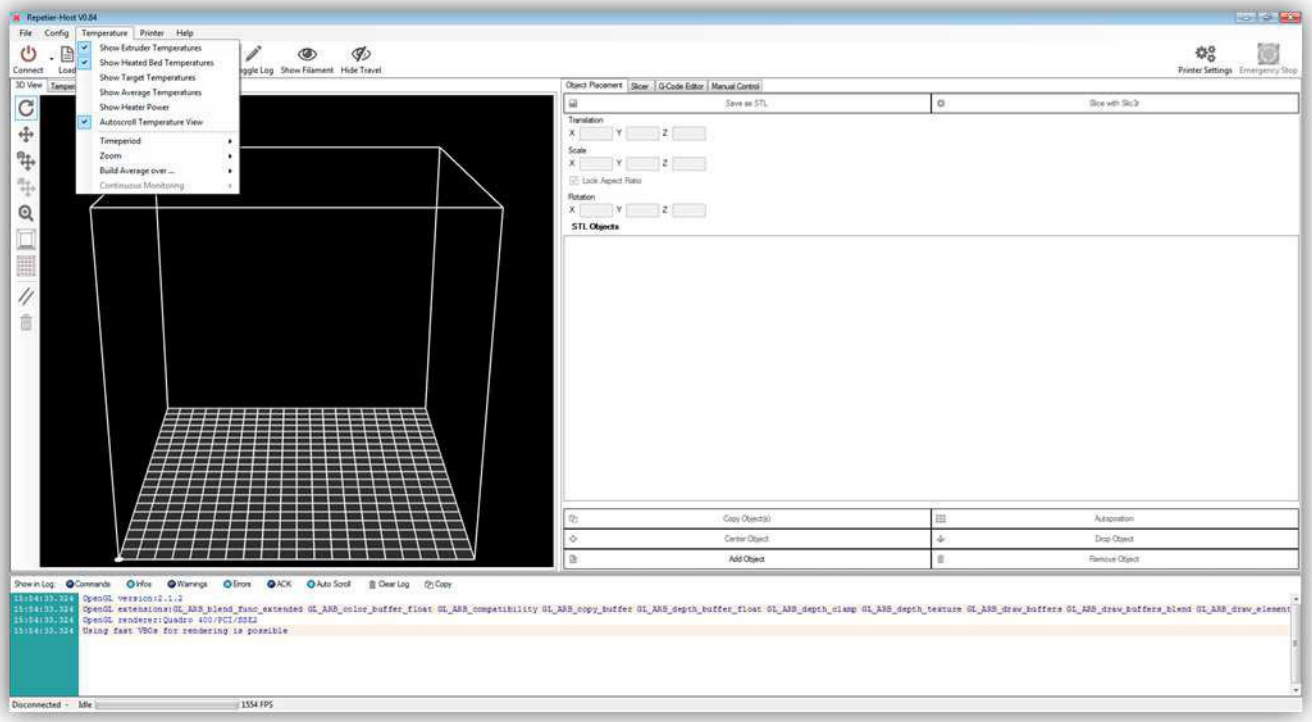


For the “Printer Shape” tab you should use the following settings:



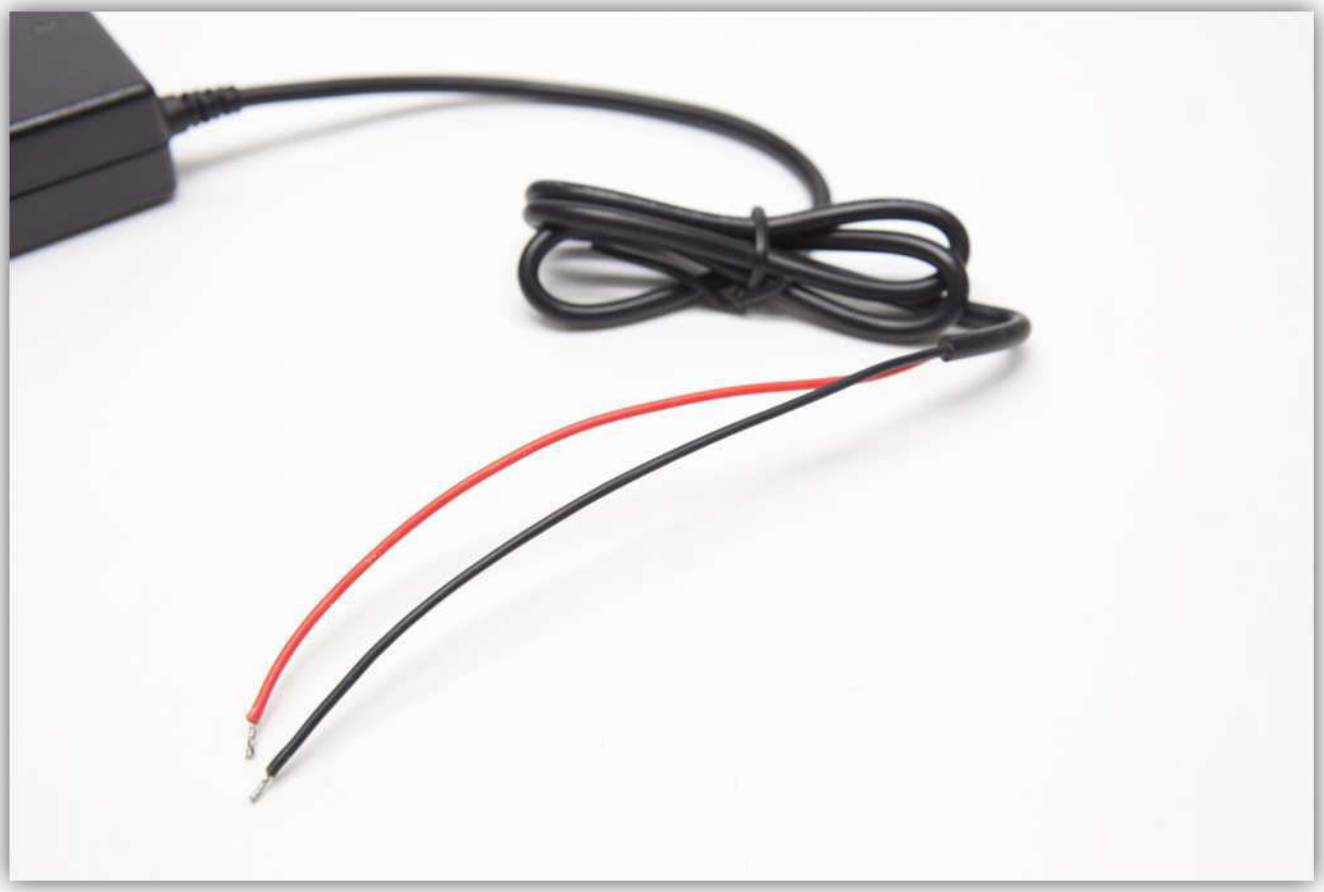
For the “Advanced” tab you shouldn’t change anything. Press “OK” to save your changes.

In the main window under “Temperature” you should select the following.

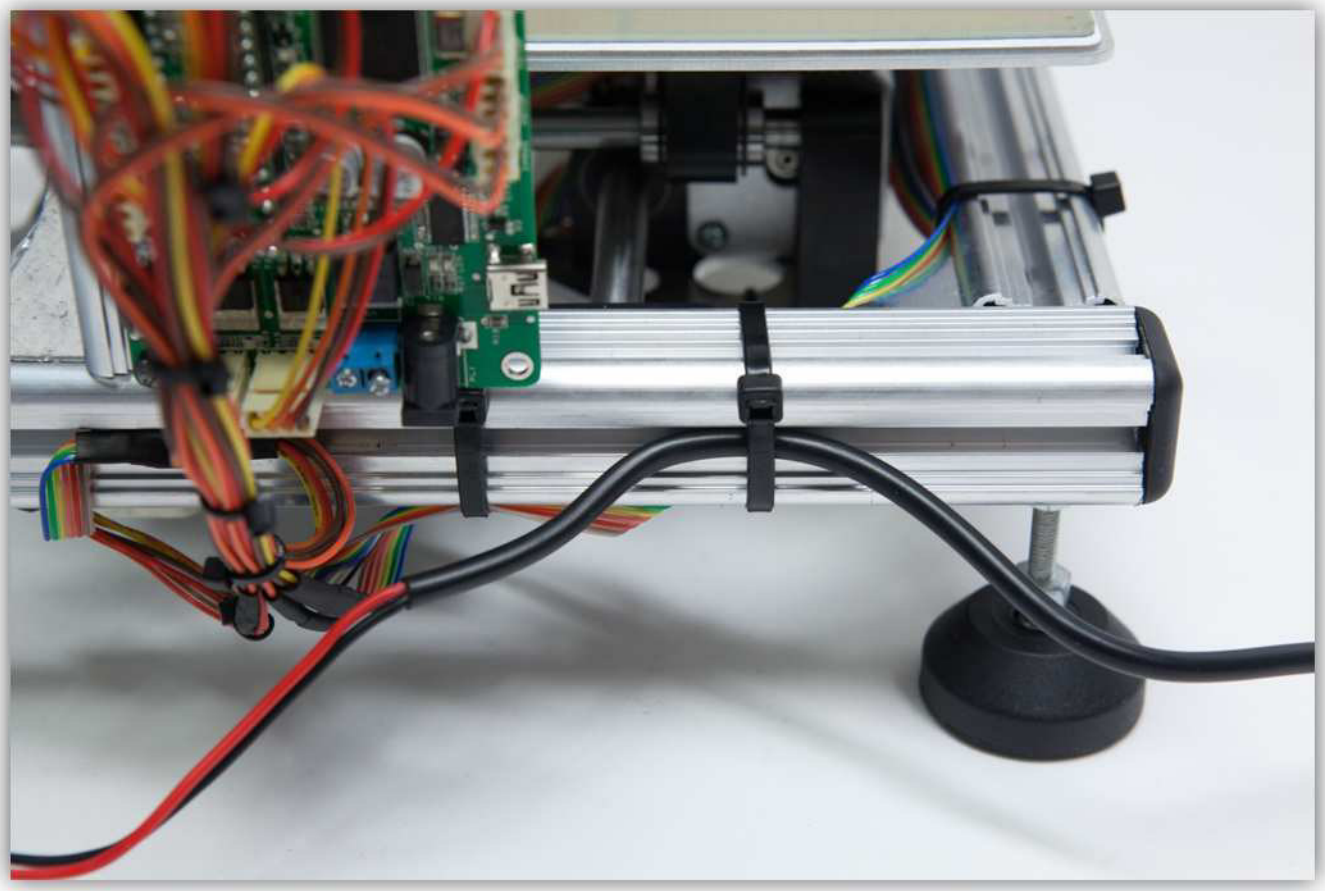


Now we will supply power to the printer. You will need the following items from the box.

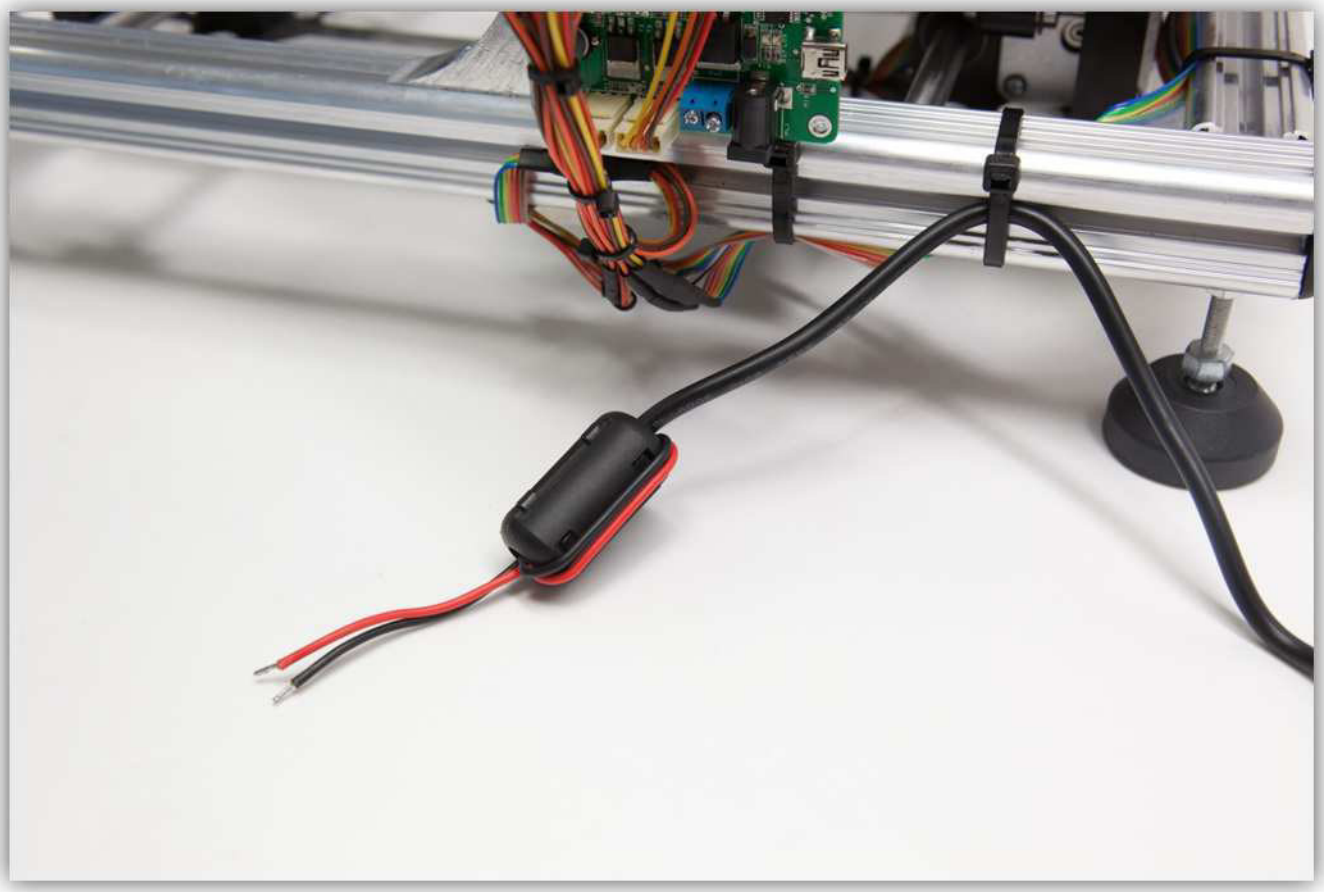
First strip the end of the cable so you have 15 cm (5.9") of free wire. **Be careful not to cut too deep while you are stripping the cable.**



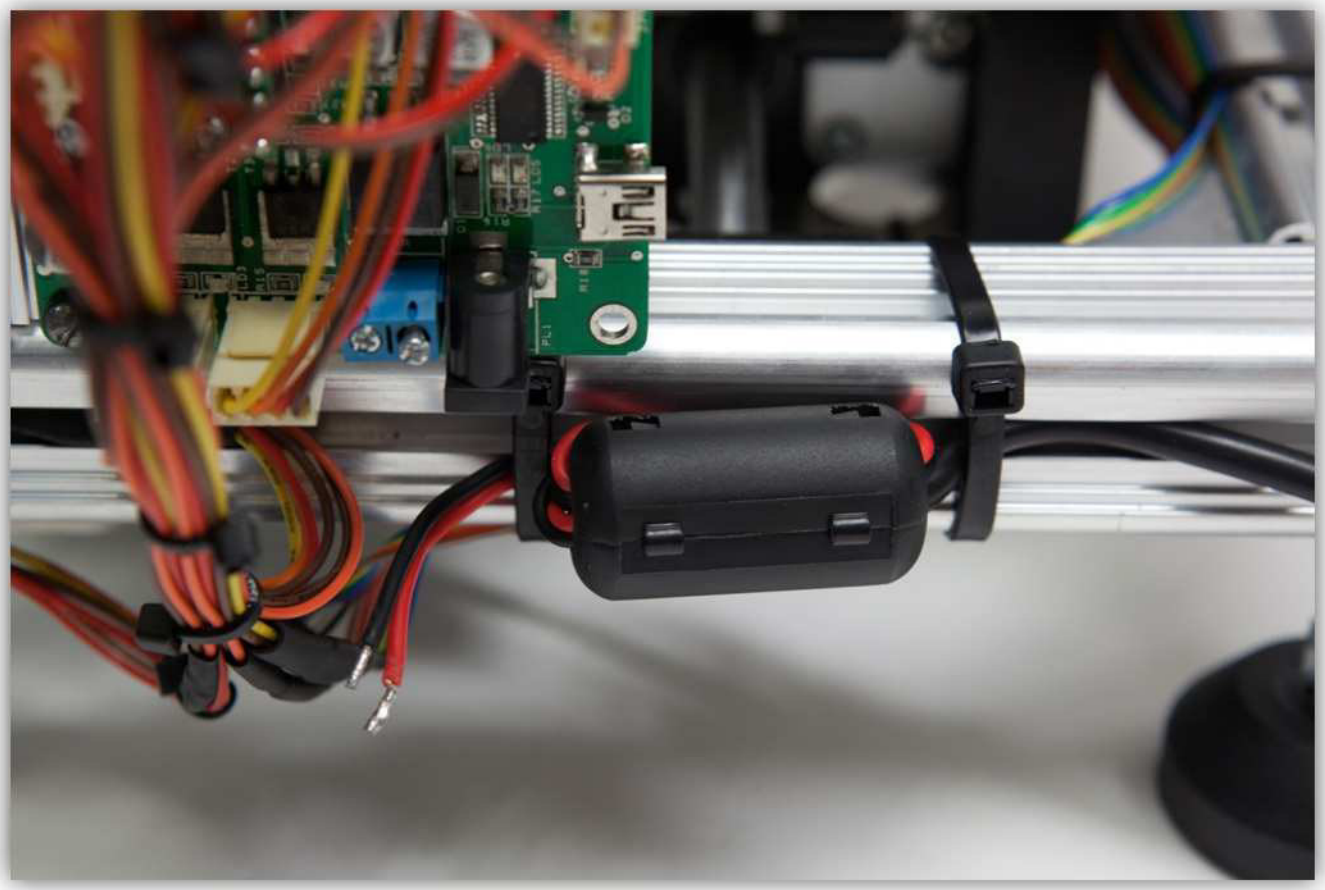
Loop the wire through the first tie wrap as shown in the picture.



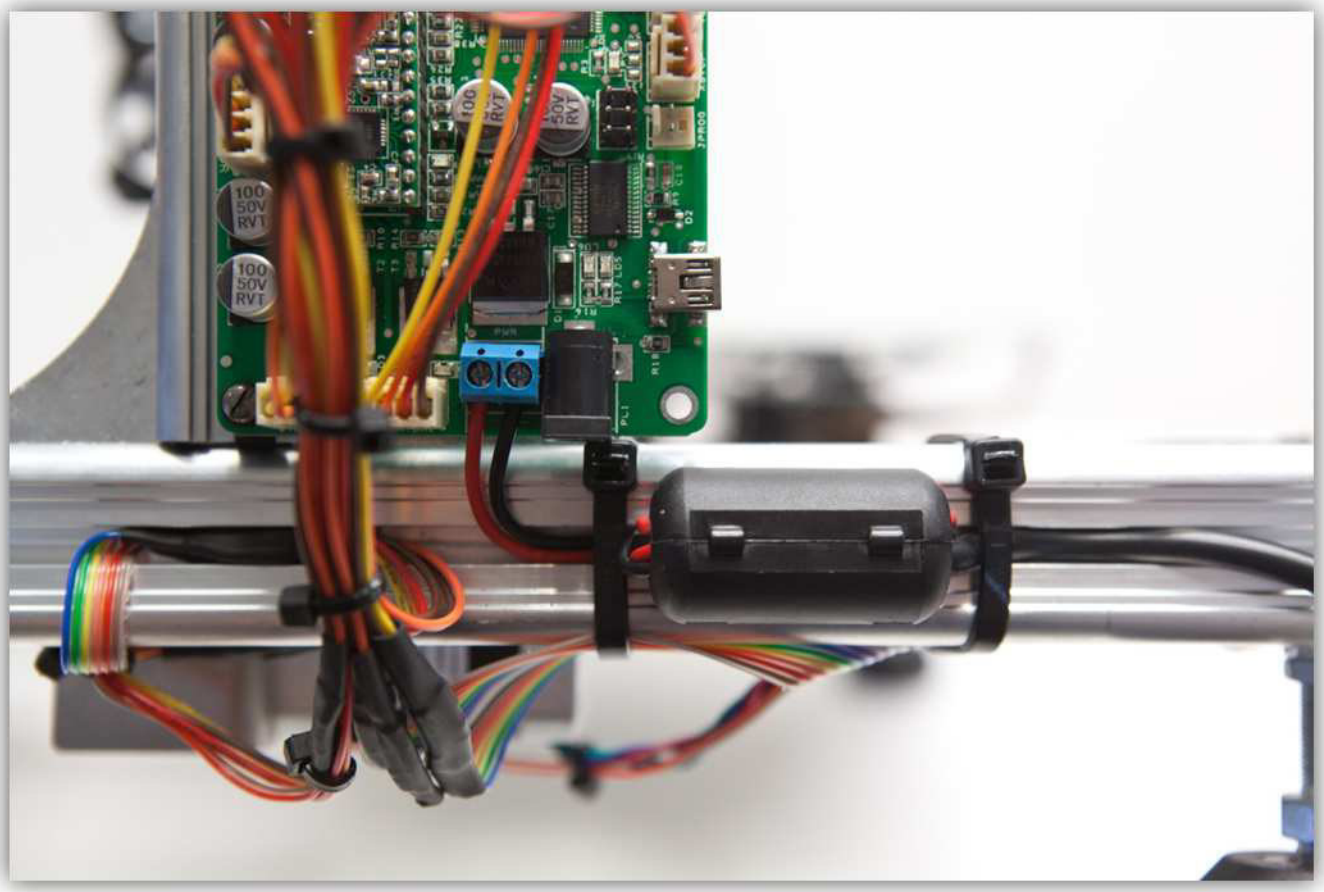
Use the clamp-on filter as shown in the pictures below.



Now loop the wire through the second tie-strip.

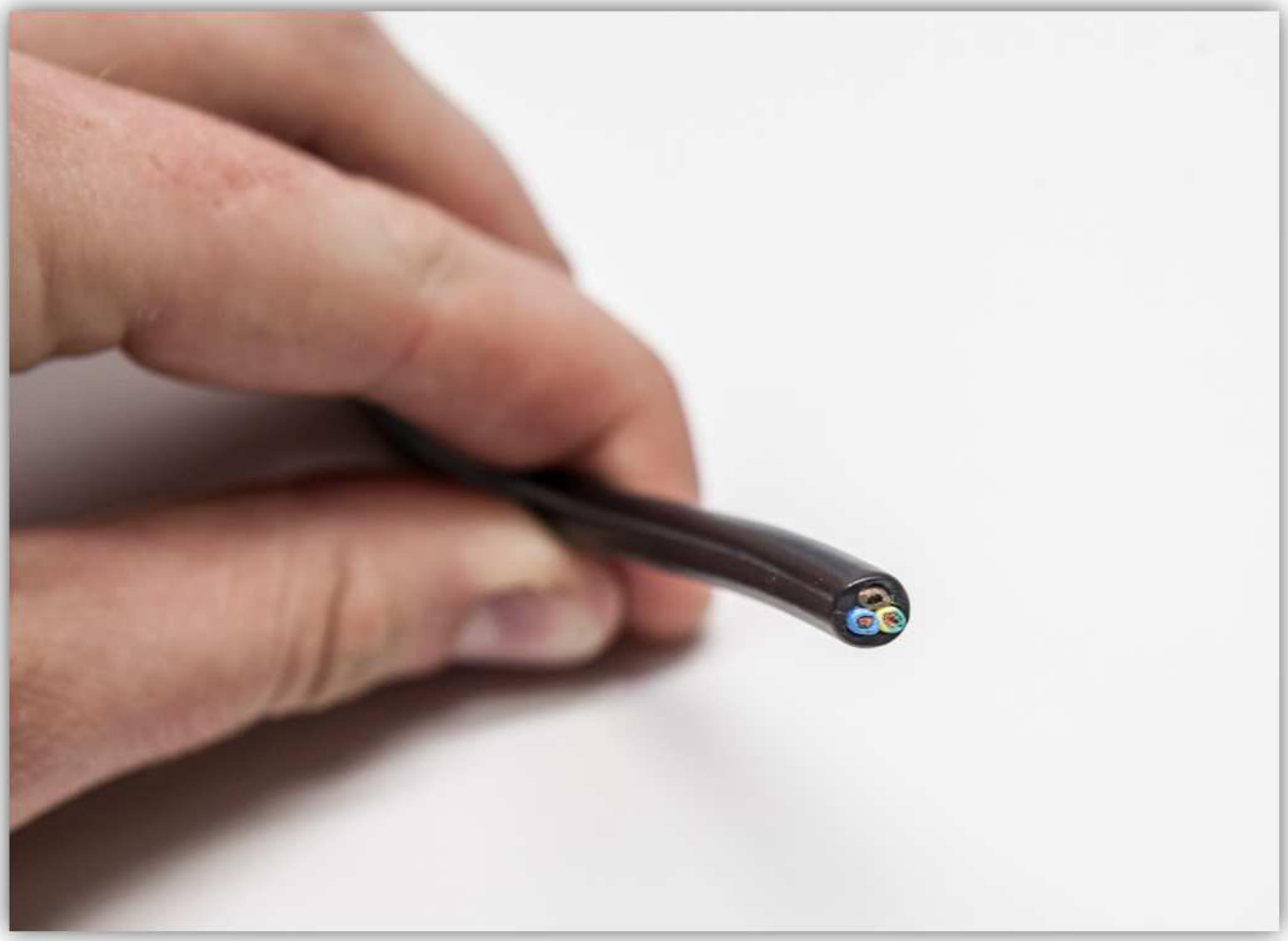


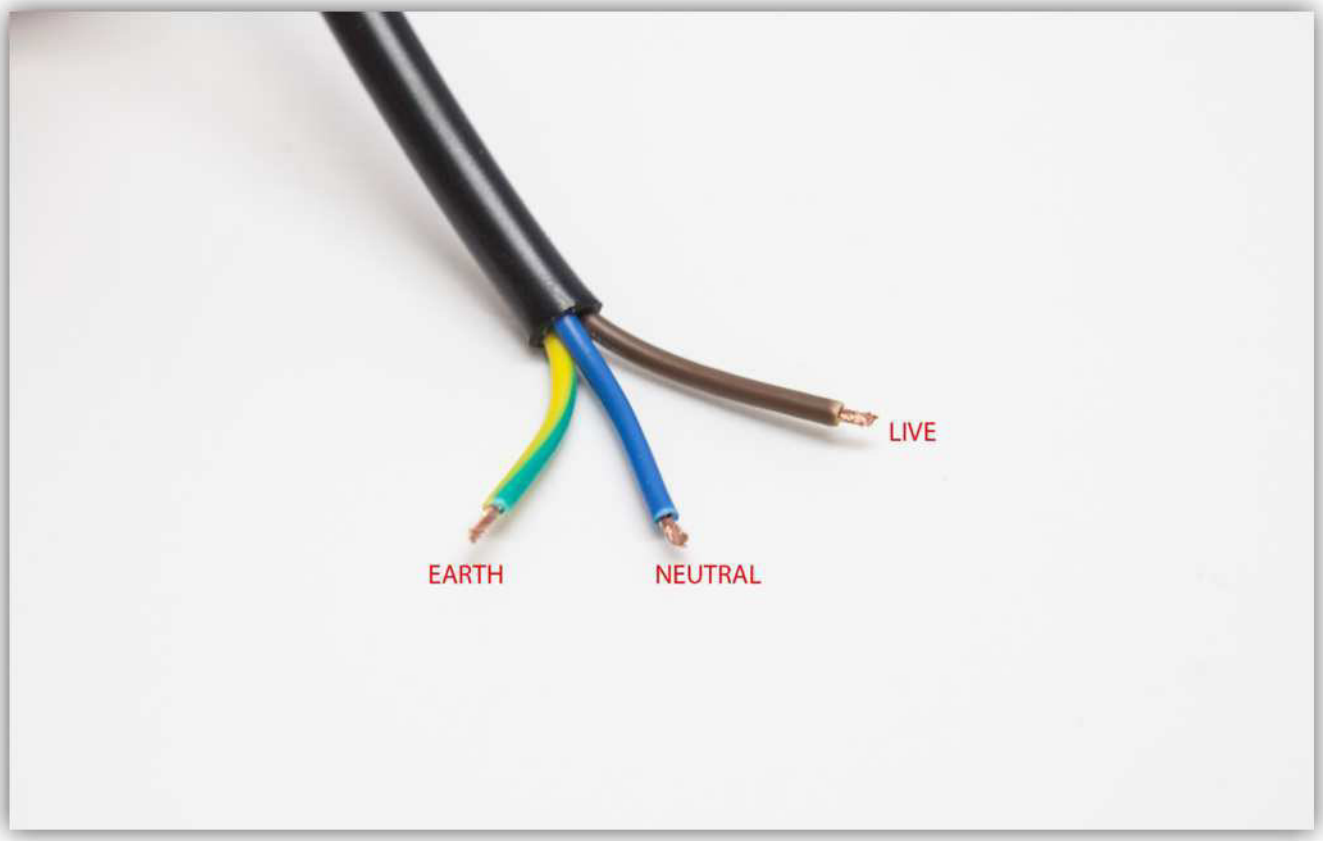
Connect the wires to the blue screw connector. **Notice the polarity. The red wire is positive and the black is negative.**



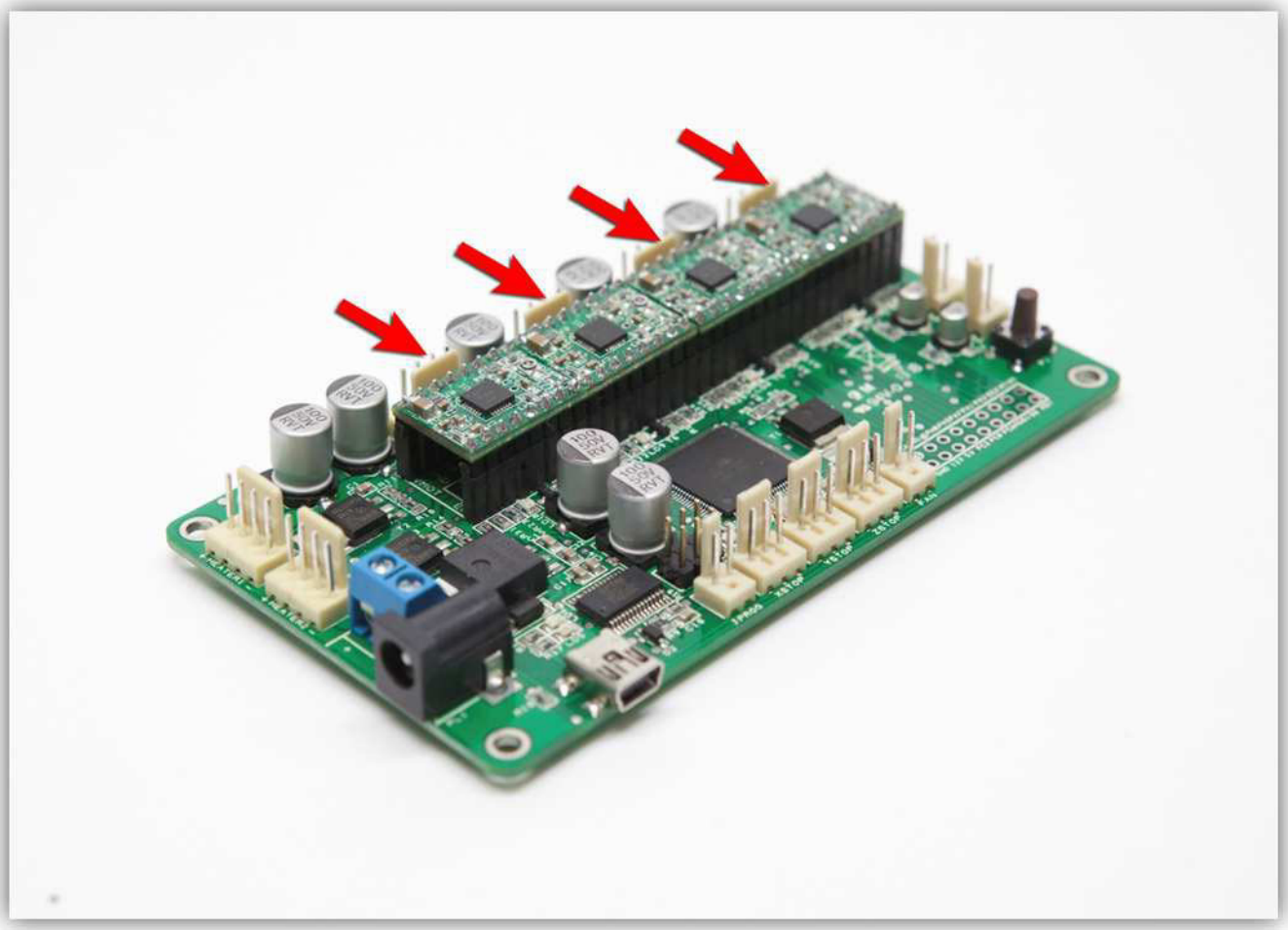
Now connect the adapter to the mains with the supplied cable. **If anything happens when you do this, disconnect the supply immediately. Check everything and correct any fault if necessary before connecting the power supply again.**

Since this is a DIY kit it is possible that the AC plug does not fit the sockets in your country. If this is the case please buy a correct plug at your distributor and use the pictures below to connect it to the power lead. The power block accepts the following voltages: 100-240V 50-60Hz.



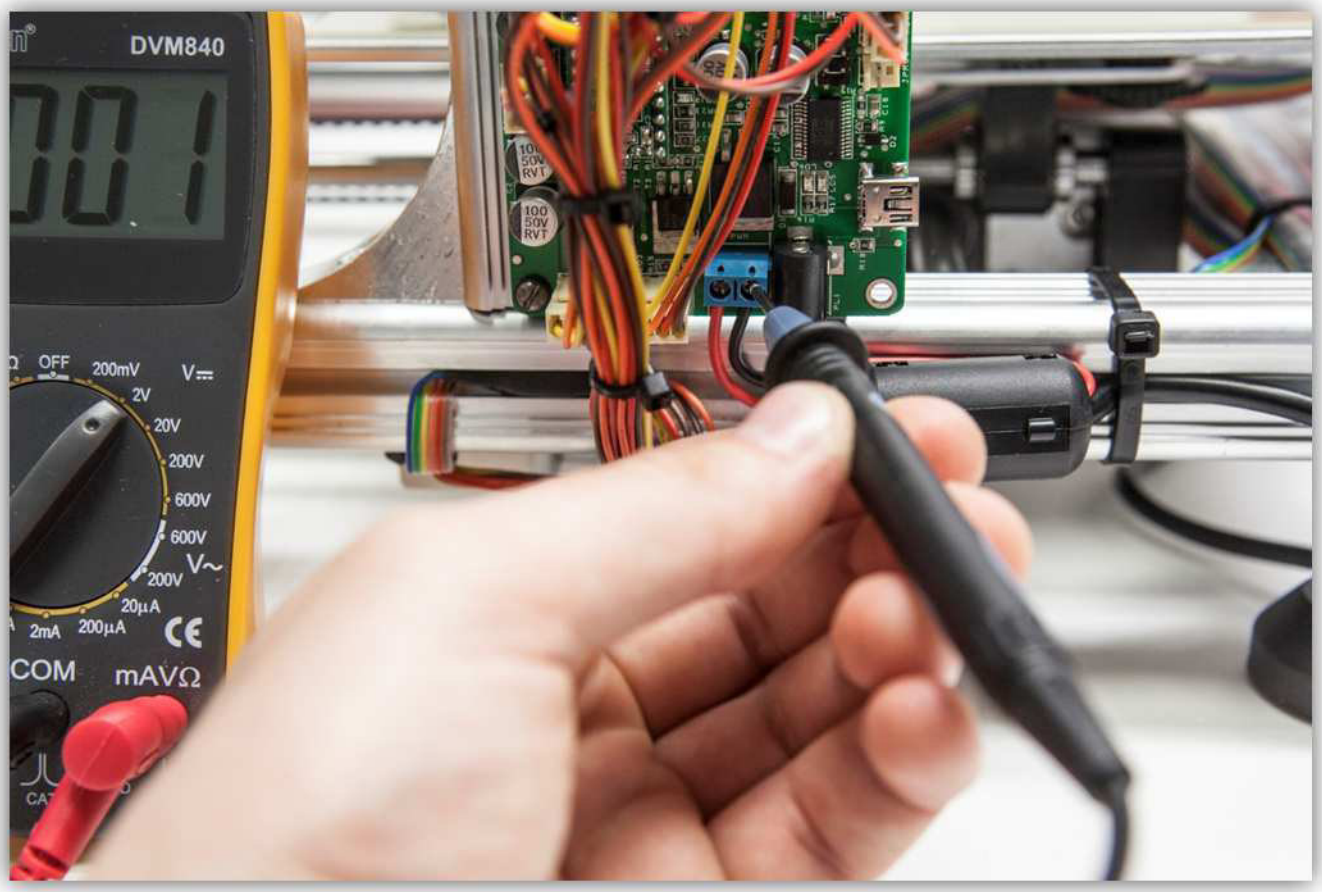


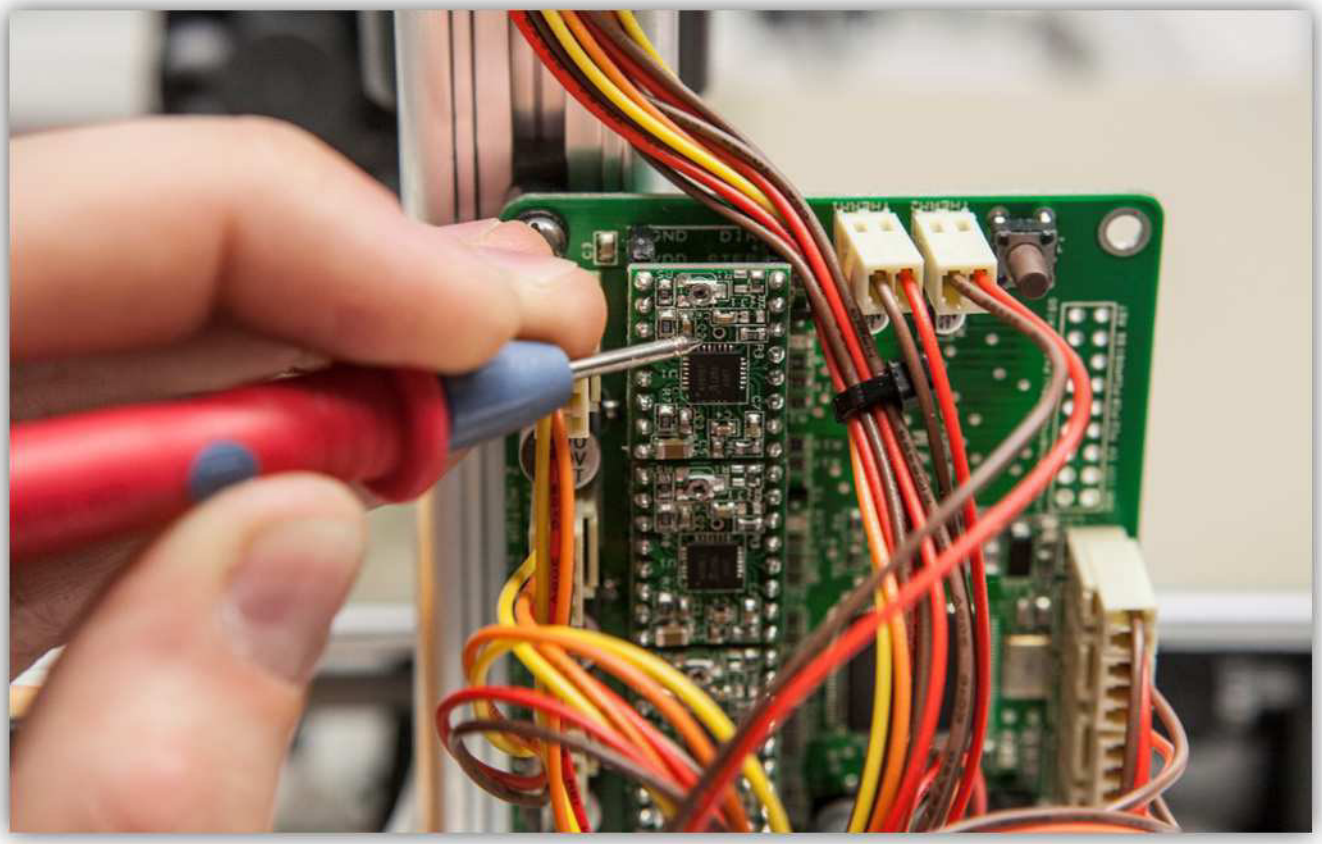
The controller board of the printer has 4 motor drivers, these are the 4 little PCBs that sit on top of the main board.

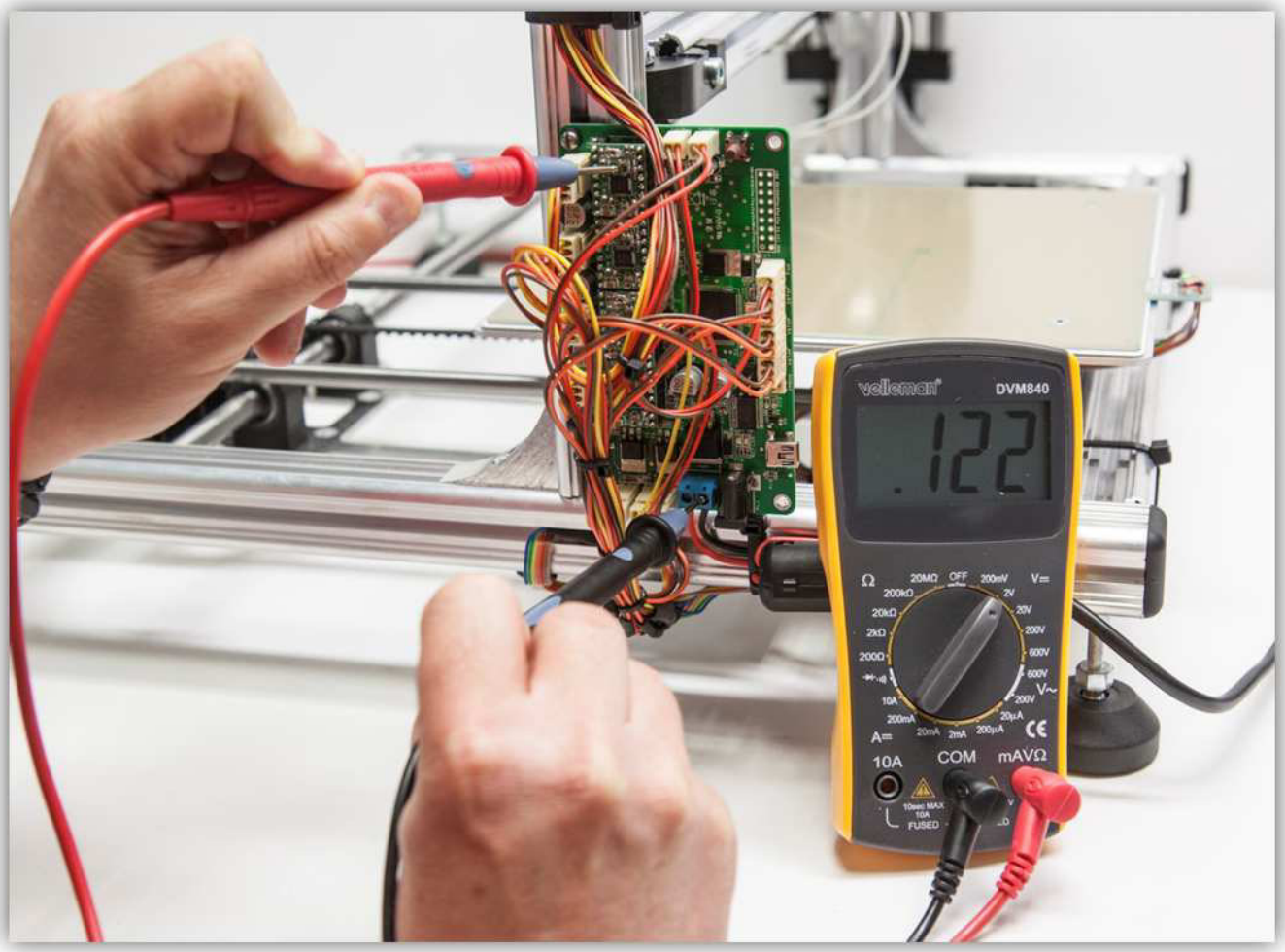


These drivers control the current that flows through each motor. To do that correctly each of them needs to be calibrated. Take your multimeter and a ceramic screwdriver **(a normal screwdriver will also work but be very careful not to touch anything else but the trimmer on the driver boards as you can cause a short circuit).**

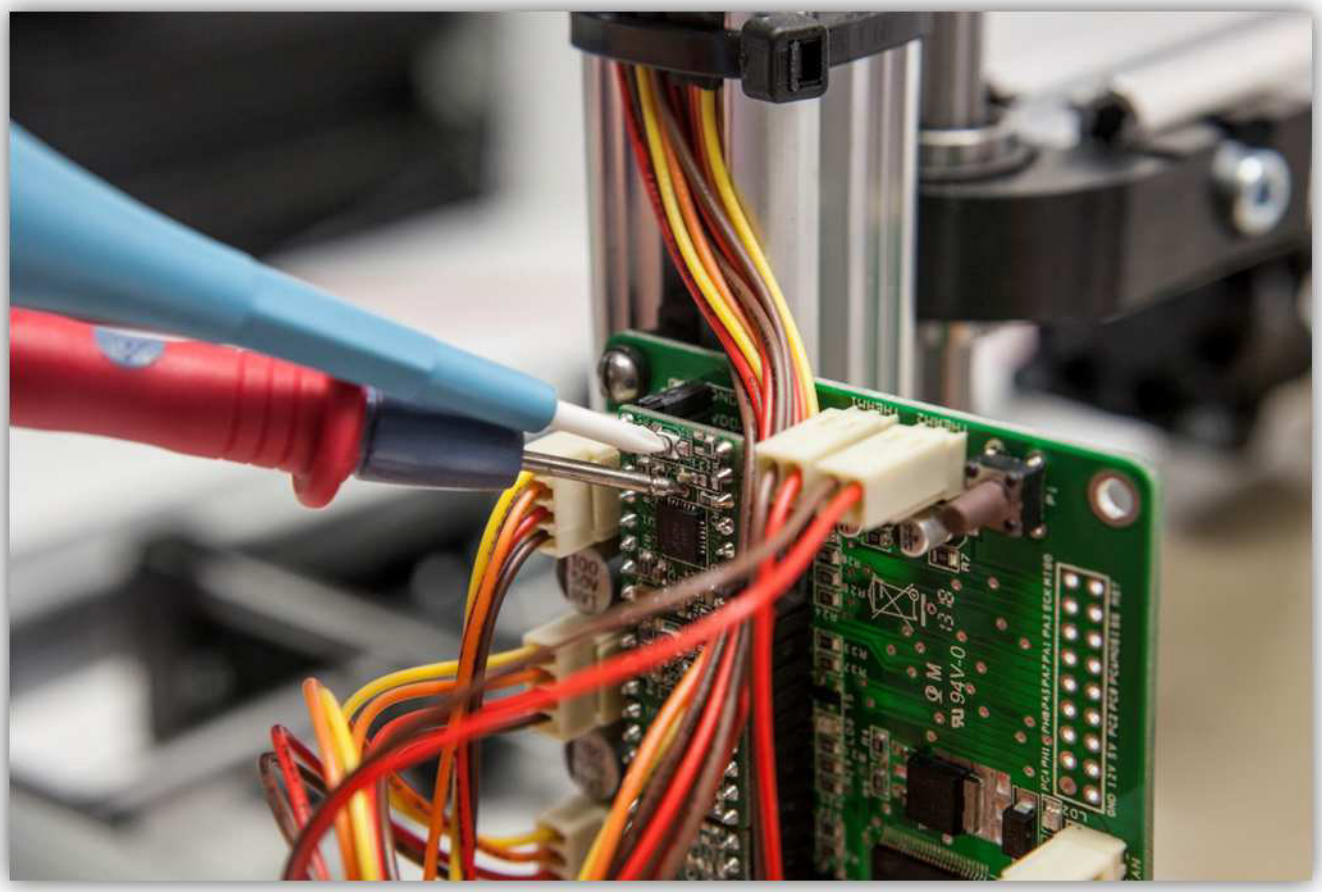
Put your multimeter on 2V DC and put the negative lead on the negative screw of the power connector. Put the positive lead on the large via of the first motor driver (for the extruder motor). **BE VERY CAREFUL NOT TO TOUCH ANYTHING ELSE WITH THE POSITIVE LEAD OF YOUR MULTIMETER.**

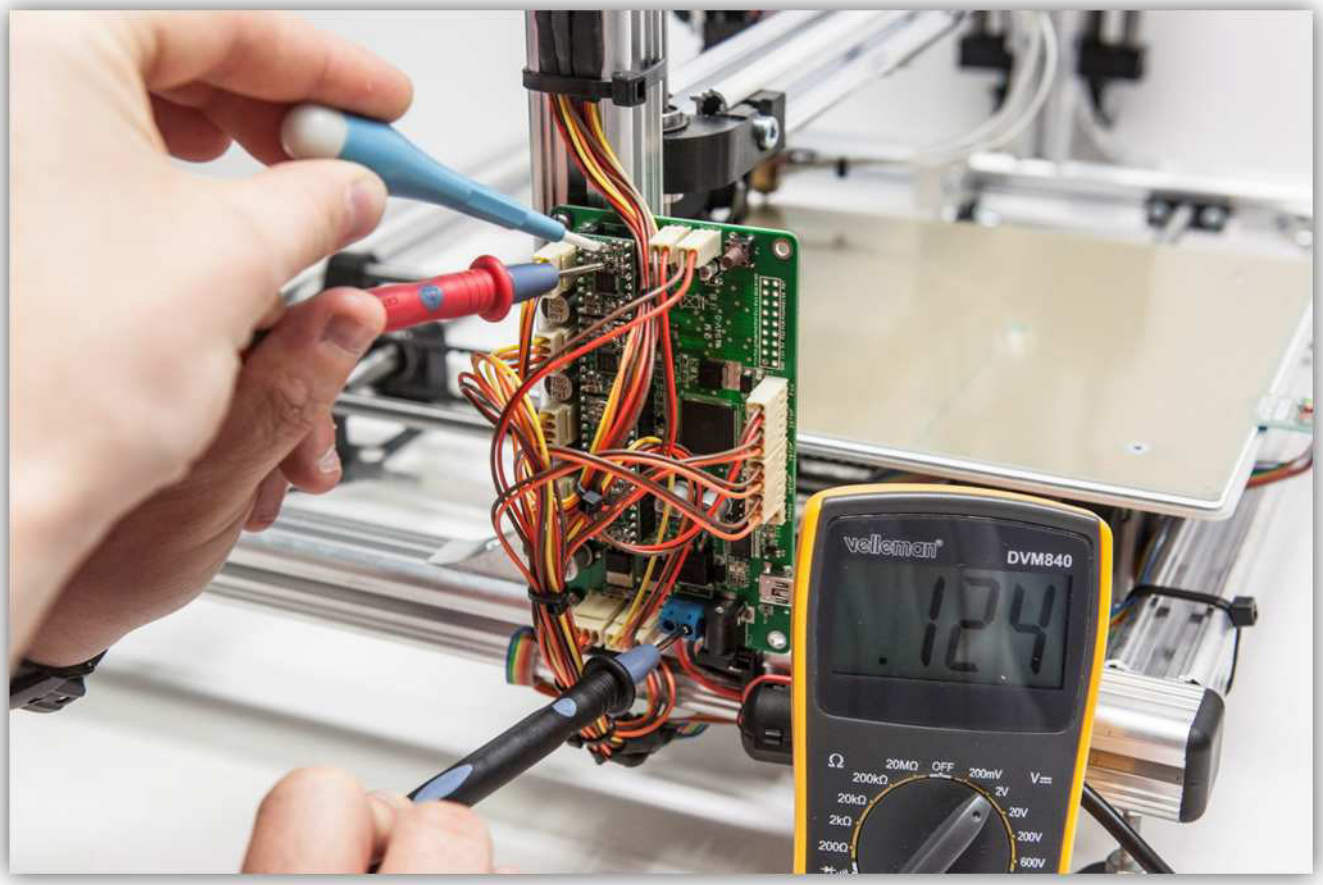

DVM840
OFF
200mV
2V
20V
200V
600V
600V
200V
20µA
2mA
200µA
COM
mAVΩ

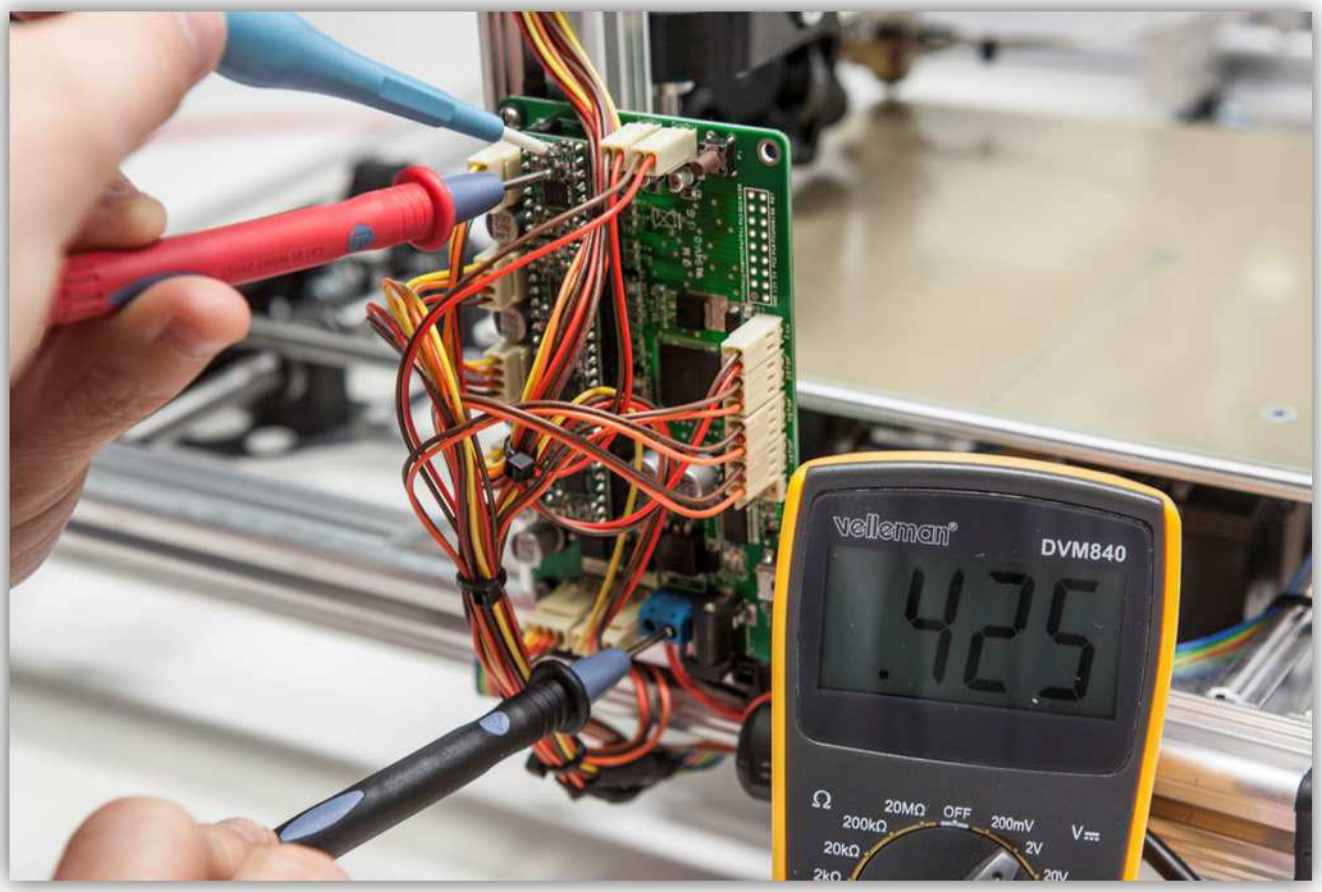




Adjust the little trimmer on the driver with the ceramic screwdriver until you measure **0.425V.**




velleman
DVM840
.124
Ω
20MΩ
OFF
200mV
V⎓
200kΩ
2V
20kΩ
20V
2kΩ
200V
200Ω
600V

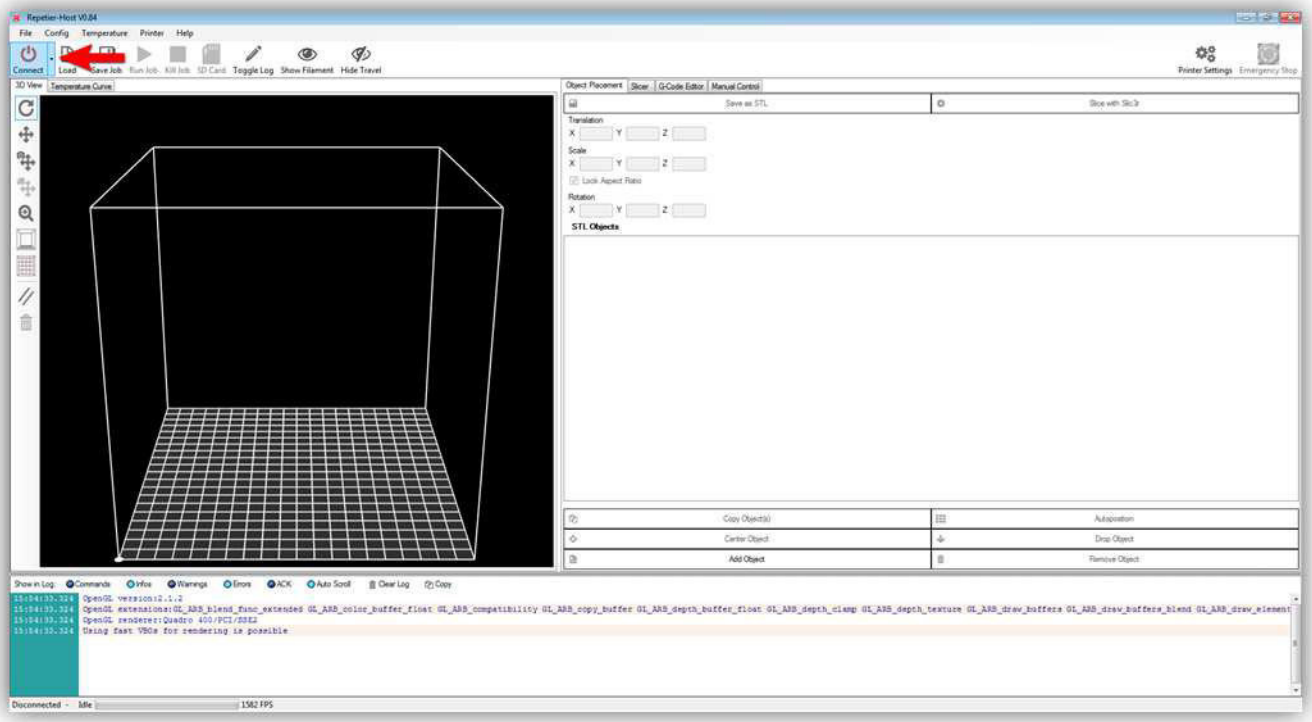


Repeat this process for the other 3 motor drivers.

In the following steps we will test all the motors of the printer, it is possible due to stiff mechanical movement that motors will skip steps (this means that when a motor is driven it wants to turn but the forces on it are too great and it returns to its original position). When this happens it could have several causes. Check for mechanical stiffness and add a bit of lubricant to the threaded rod and the smooth rods. If this does not help and a motor keeps skipping steps you can raise the calibration voltage for that particular motor to 0.55V.

Now we can attempt to control the printer with Repetier. Move the HEATED BED PCB into the middle of the printer by hand and make sure the extruder arm is at about 20 cm (7.87") from the heated bed.

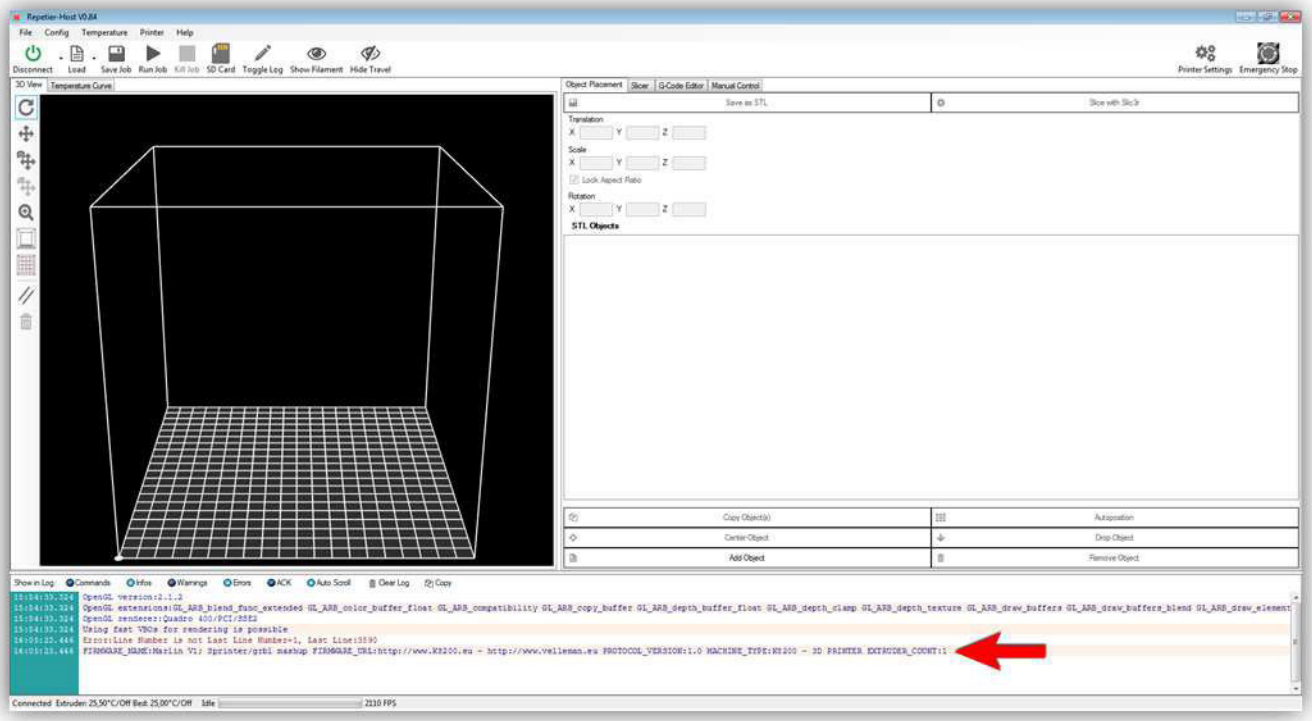
Click this button in the Repetier software:



The text on the button should change from “**Connect**” to “**Disconnect**”.

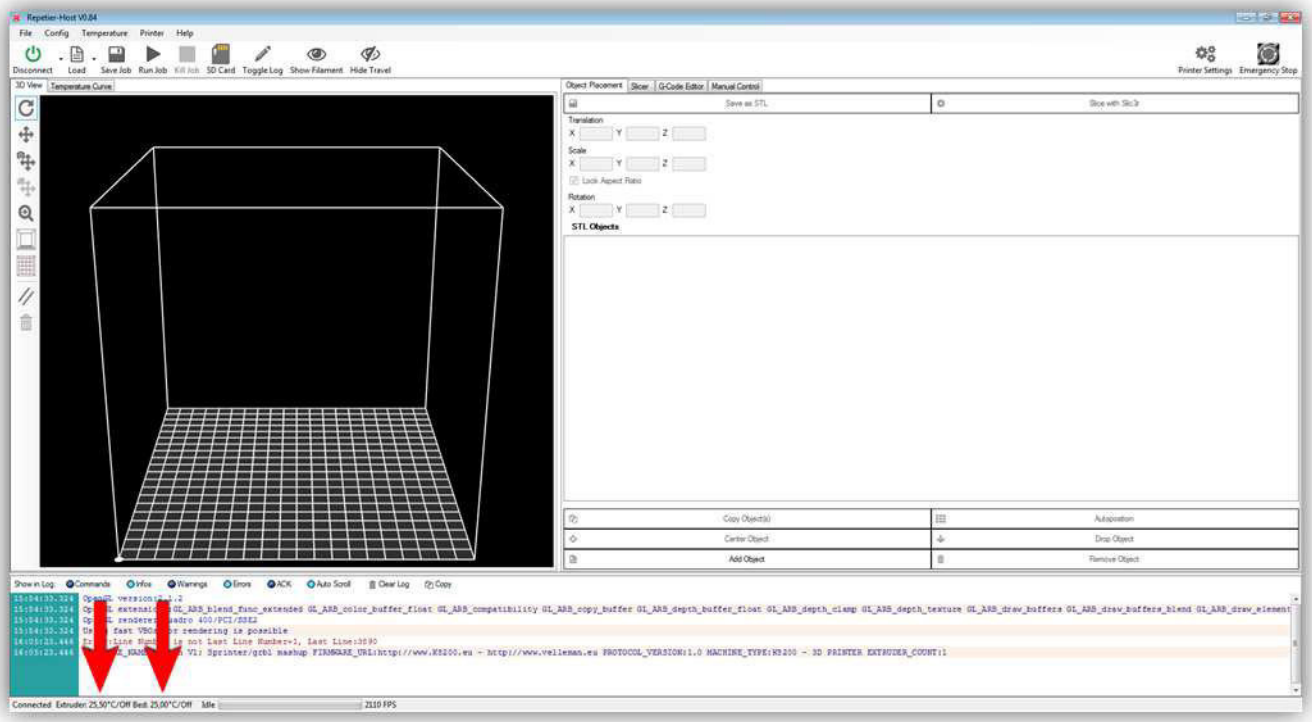
In the log view on the bottom of Repetier you should see the printer showing the following data:

FIRMWARE_NAME:Marlin V1; Sprinter/grbl mashup FIRMWARE_URL:http://www.K8200.eu - http://www.velleman.eu PROTOCOL_VERSION:1.0 MACHINE_TYPE:K8200 - 3D PRINTER EXTRUDER_COUNT:1

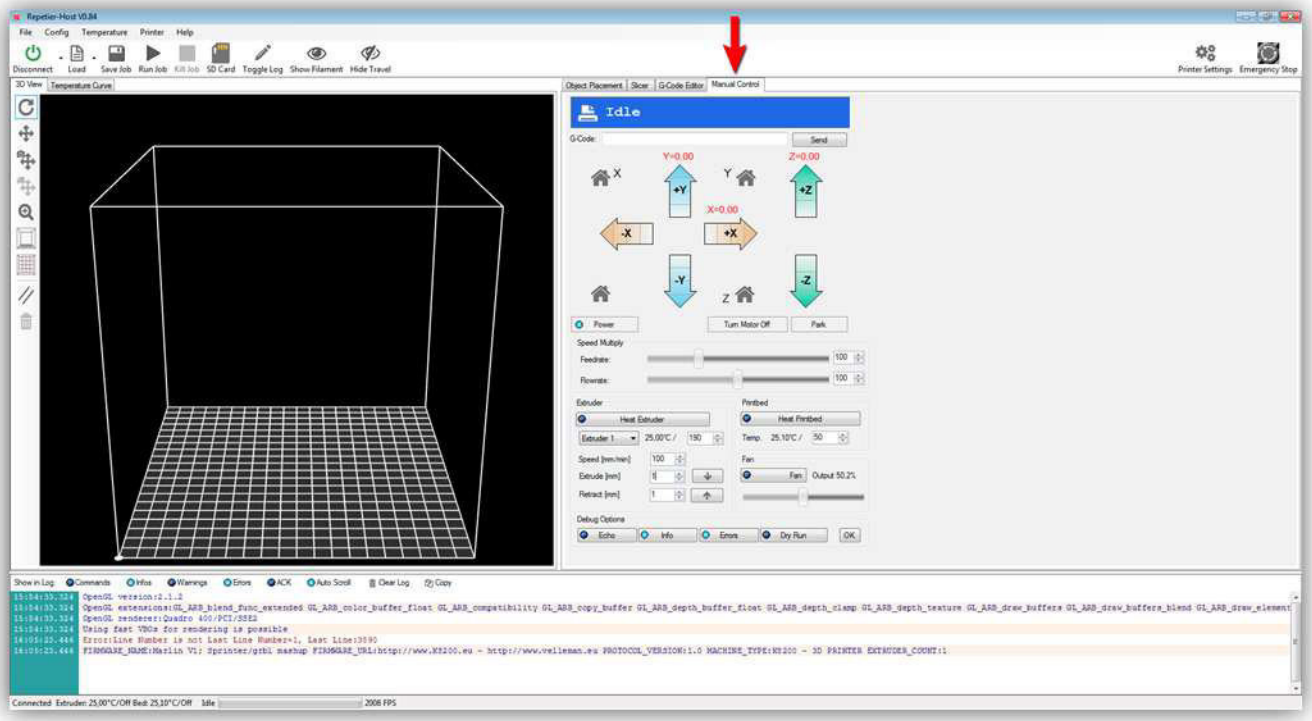


This means that there is a successful connection between the computer and printer.

You should also see the Extruder and Bed temperature. They should show a value close to room temperature.

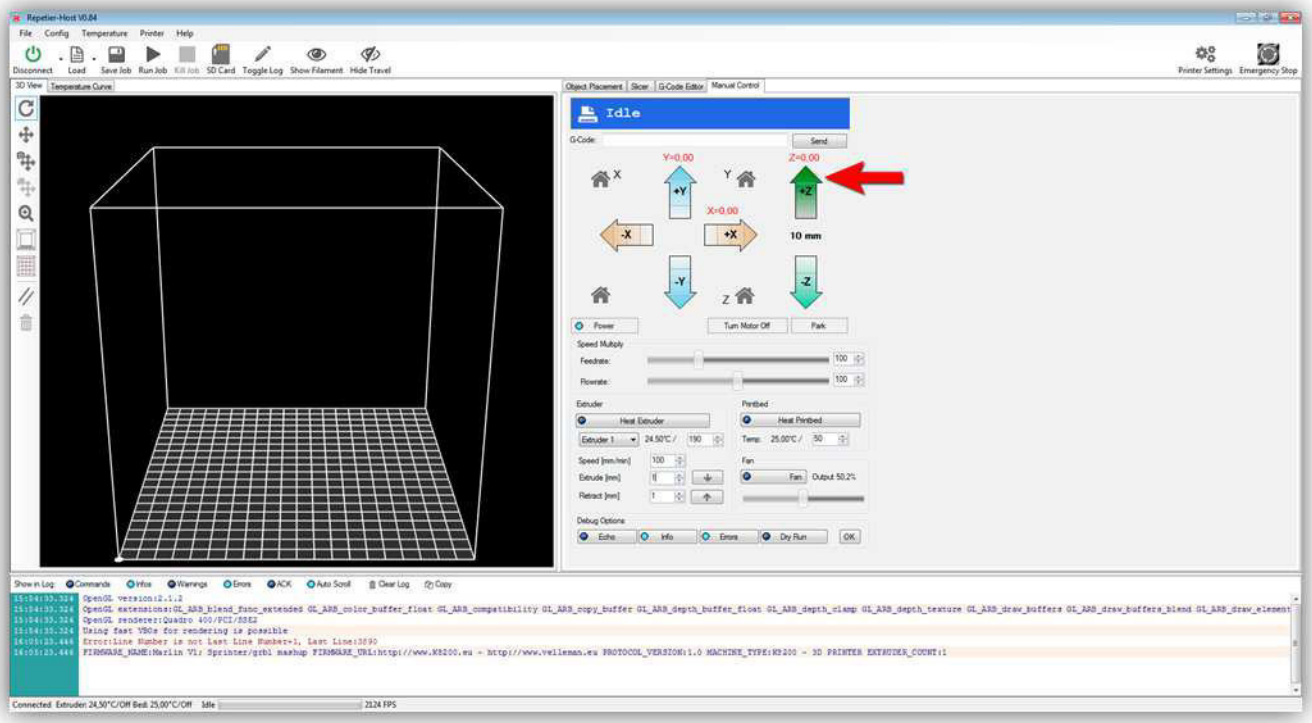


Now select the “Manual Control” tab.



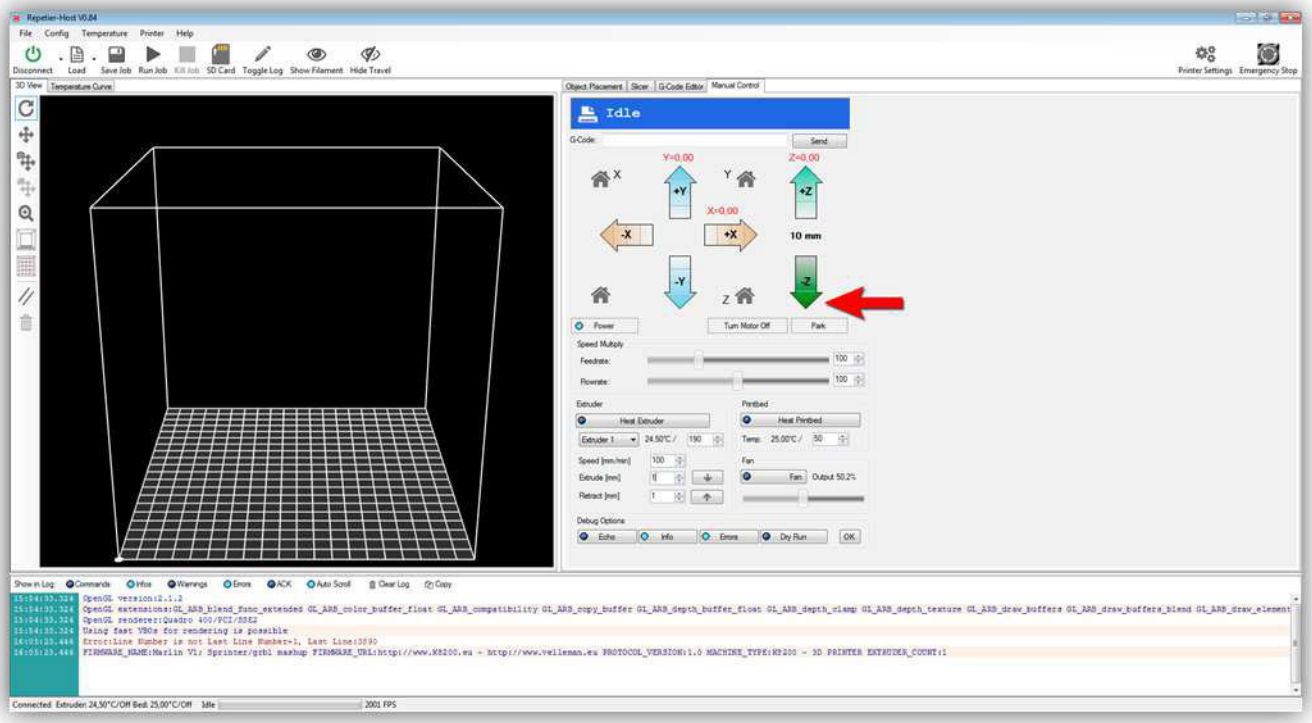
Now we will test each function of the printer separately.

Press the Z + arrow for 10 mm **(The arrow has 3 active areas where you can click, choose the one that shows 10mm).**

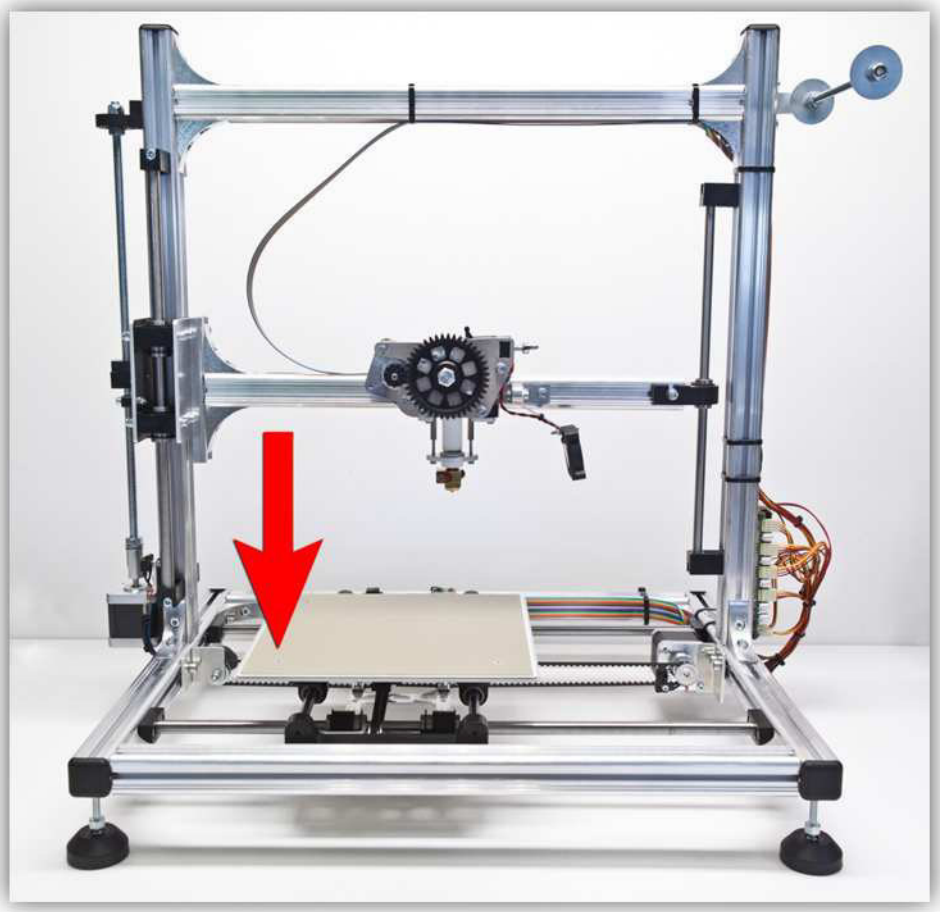


The Z AXIS should go **UP** 10 mm, everything should go smoothly. If the Z AXIS does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.

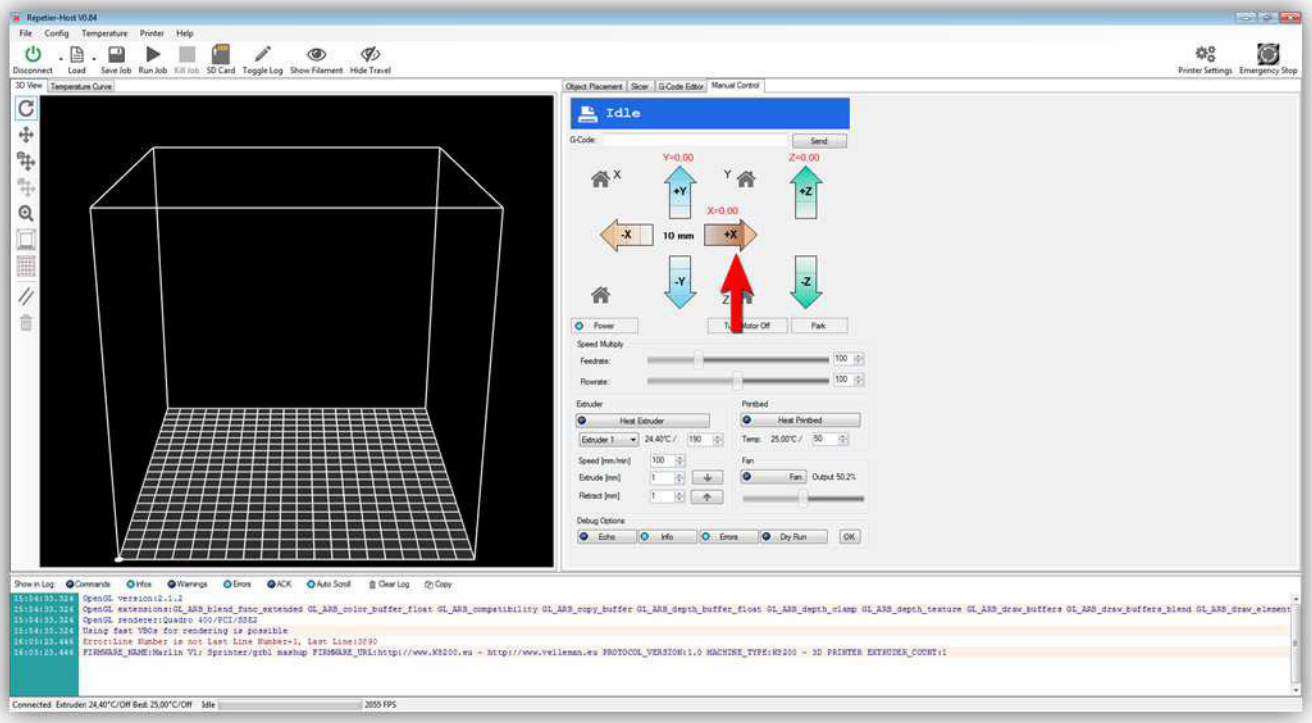
Press the Z - arrow for 10 mm **(The arrow has 3 active areas where you can click, choose the one that shows 10mm).**



The Z AXIS should go **DOWN** 10 mm, everything should go smoothly. If the Z AXIS does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.

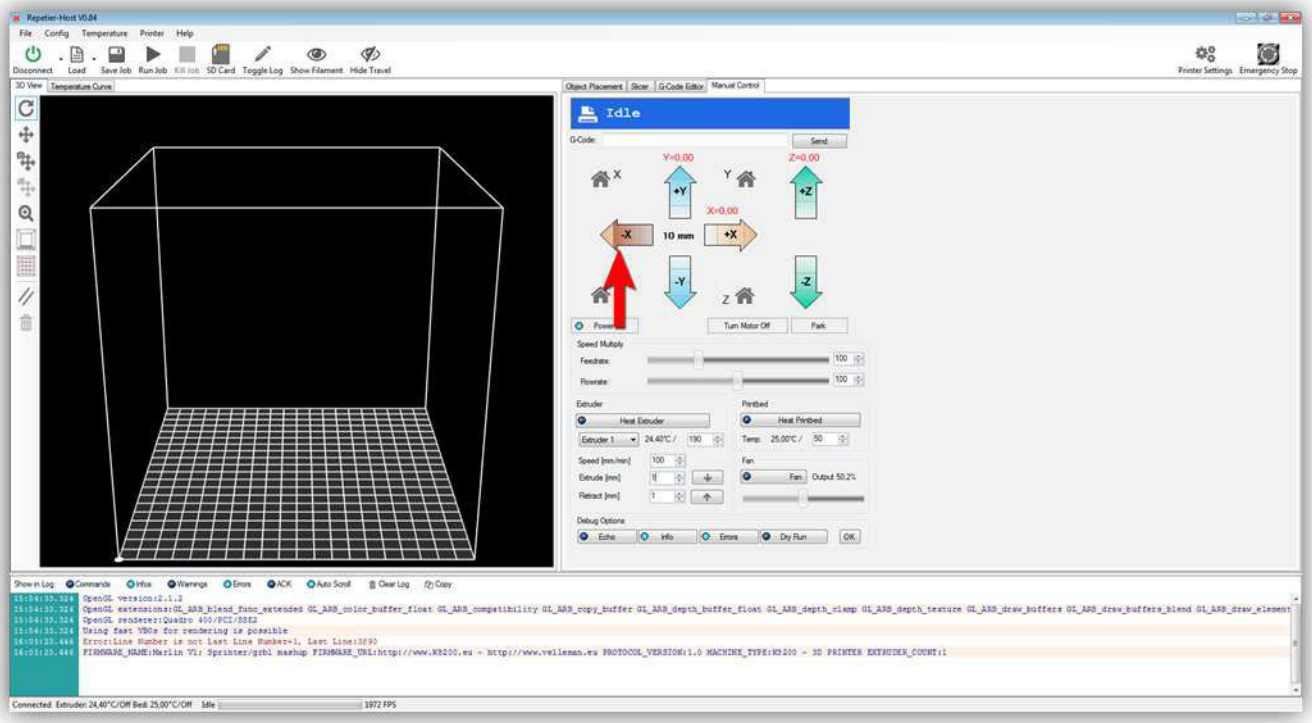


Press the X + arrow for 10 mm **(The arrow has 3 active areas where you can click, choose the one that shows 10mm).**

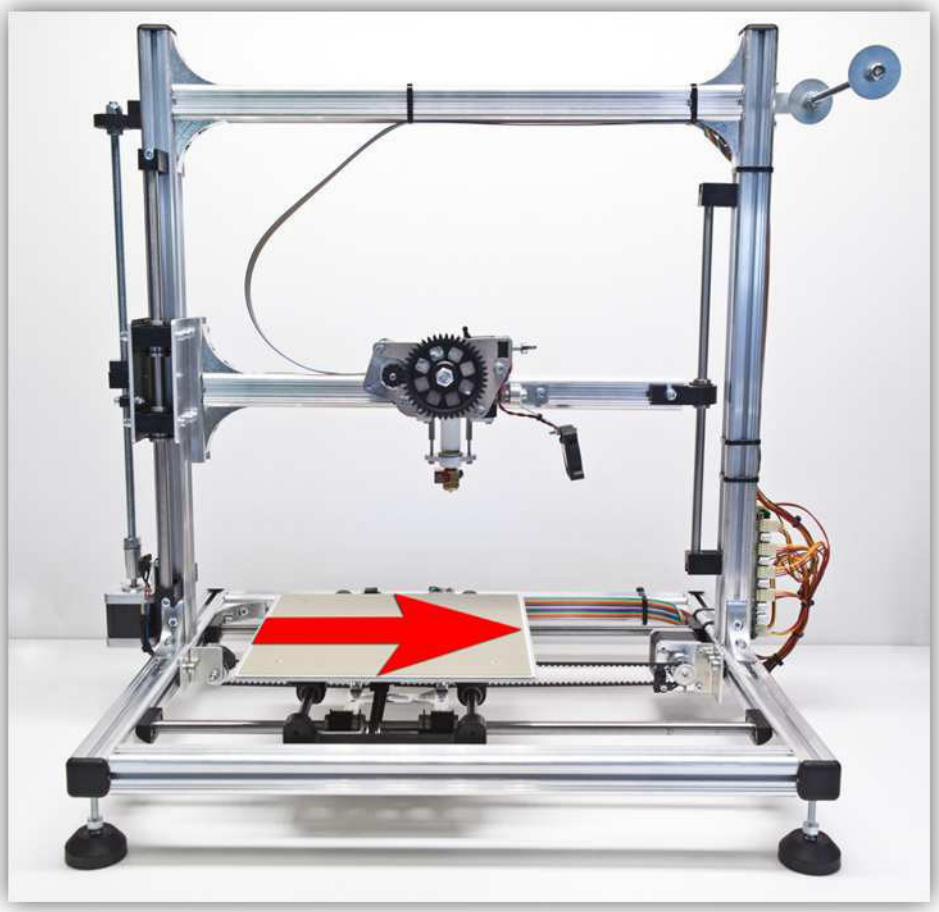


The X AXIS should go **LEFT** 10 mm, everything should go smoothly. If the X AXIS does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.

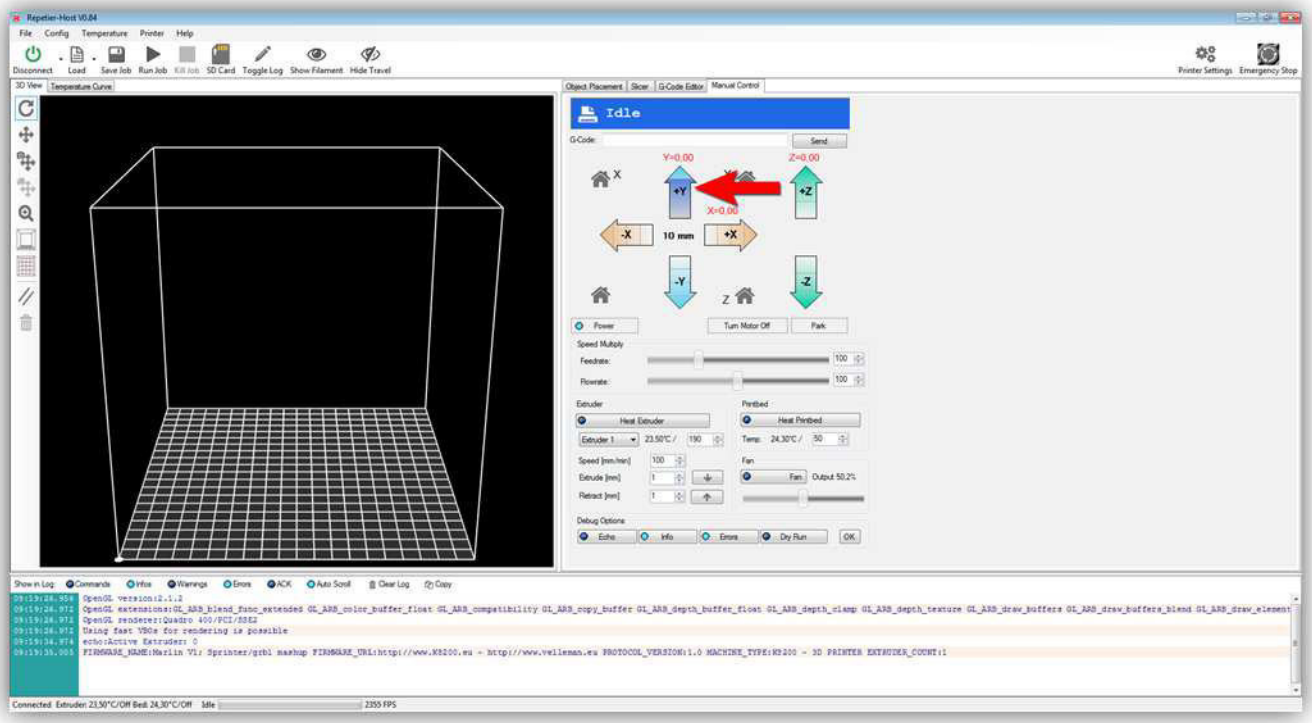
Press the X - arrow for 10 mm **(The arrow has 3 active areas where you can click, choose the one that shows 10mm).**



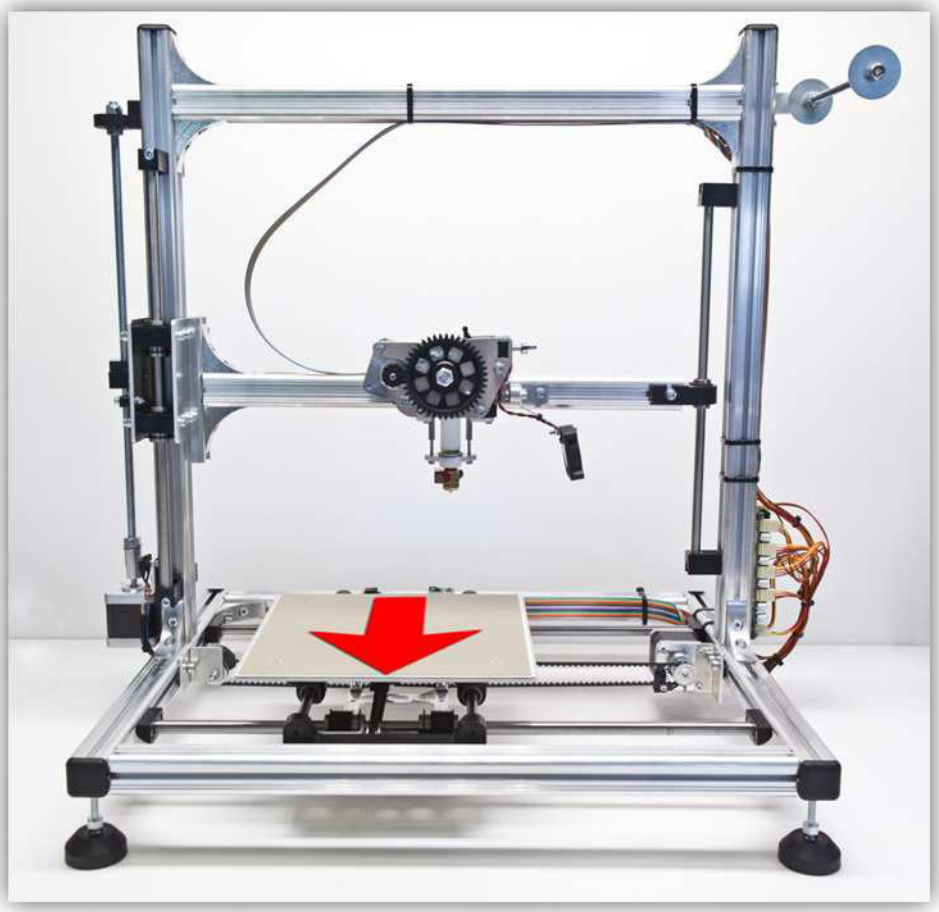
The X AXIS should go **RIGHT** 10 mm, everything should go smoothly. If the X AXIS does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.



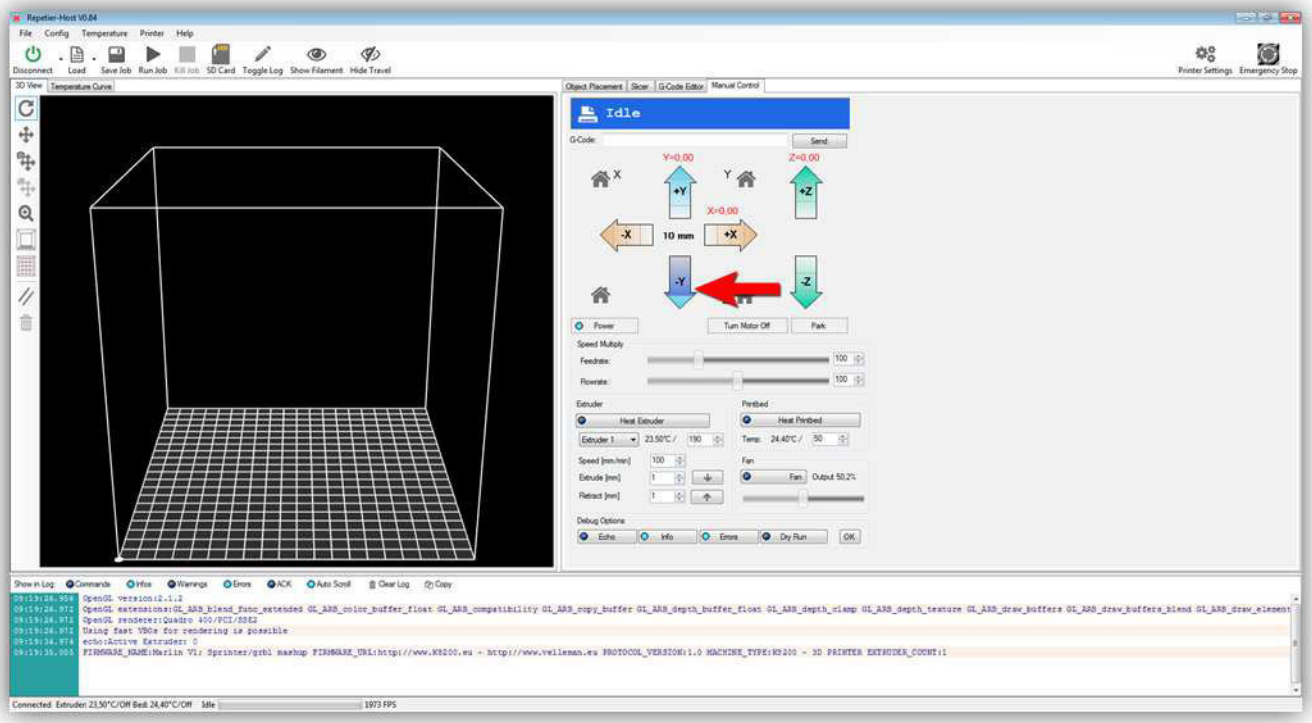
Press the Y + arrow for 10 mm **(The arrow has 3 active areas where you can click, choose the one that shows 10mm).**



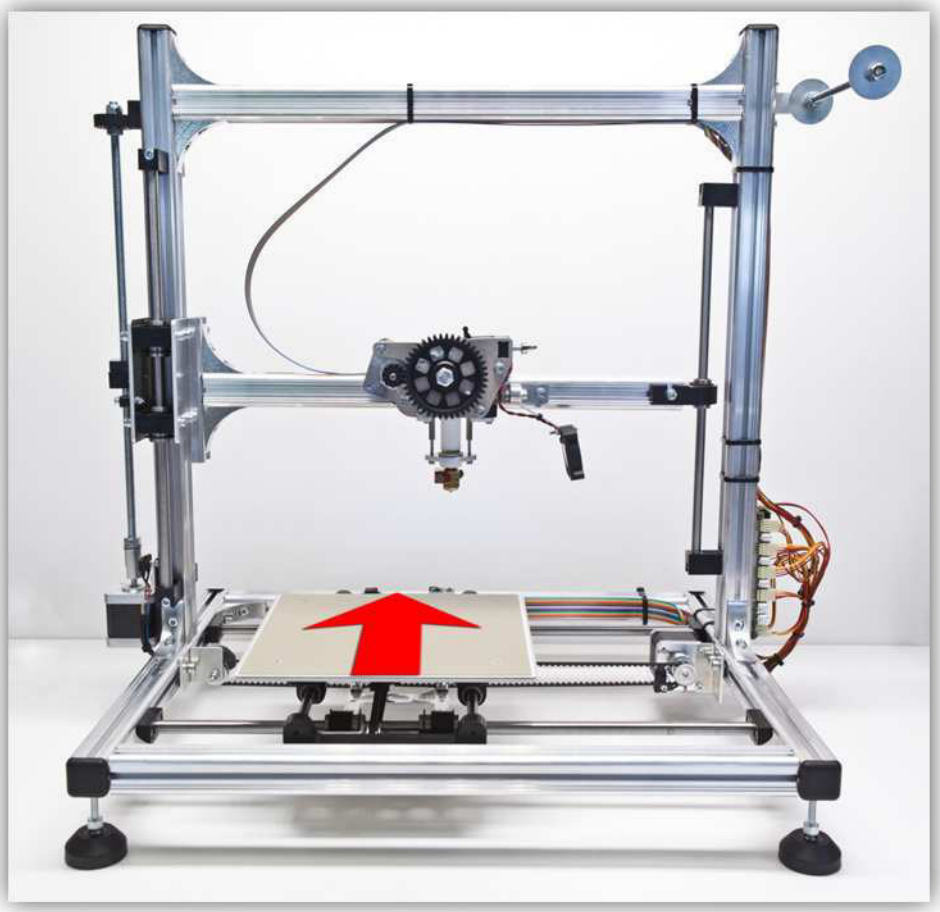
The Y AXIS should go **FORWARD** 10 mm, everything should go smoothly. If the Y AXIS does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.



Press the Y - arrow for 10 mm **(The arrow has 3 active areas where you can click, choose the one that shows 10mm).**



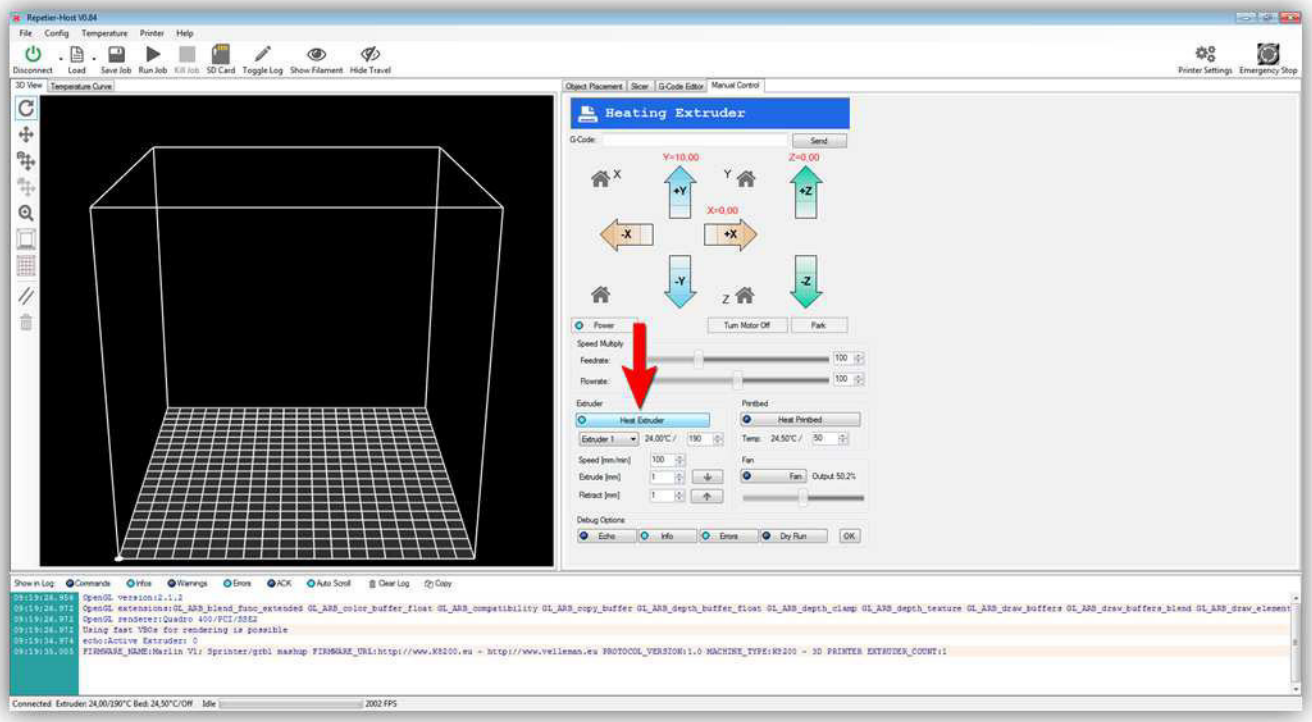
The Y AXIS should go **BACK** 10 mm, everything should go smoothly. If the Y AXIS does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.



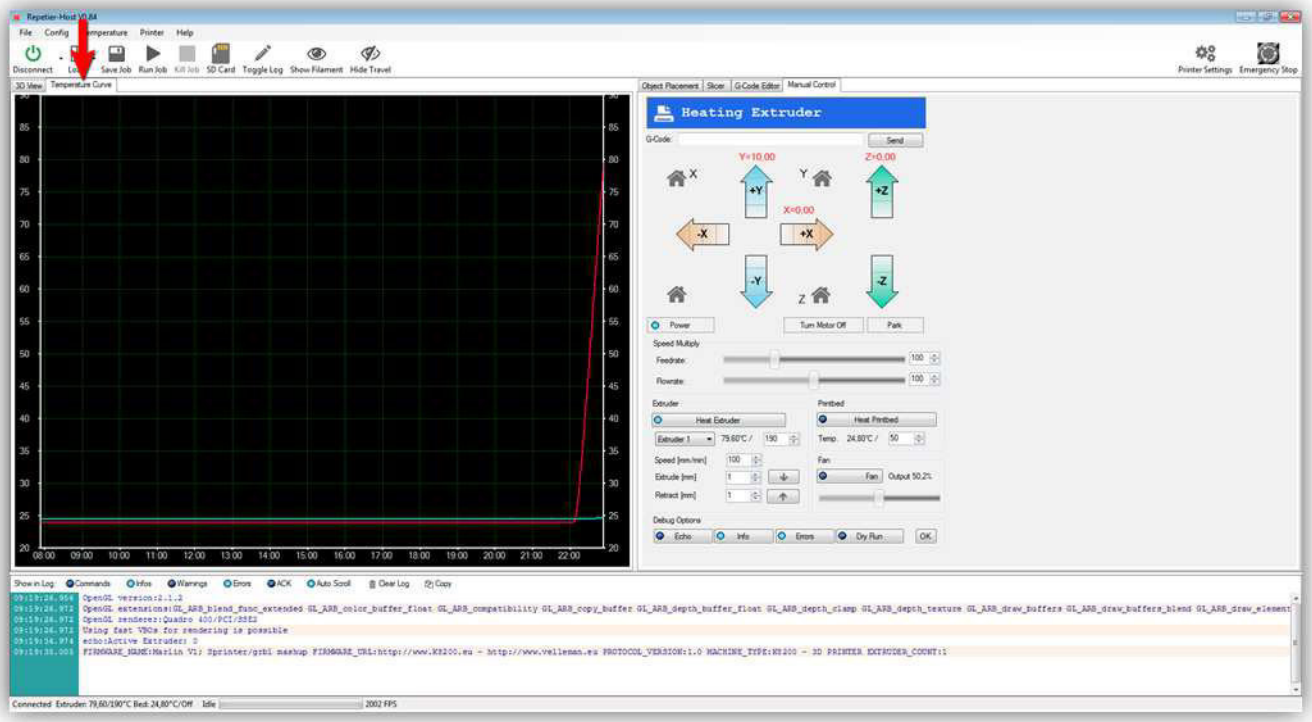
If everything went right so far you know that each motor is wired correctly. Now we will test if the extruder works.

Press on the “Heat Extruder” button. Make sure the value in the box is 190°C.

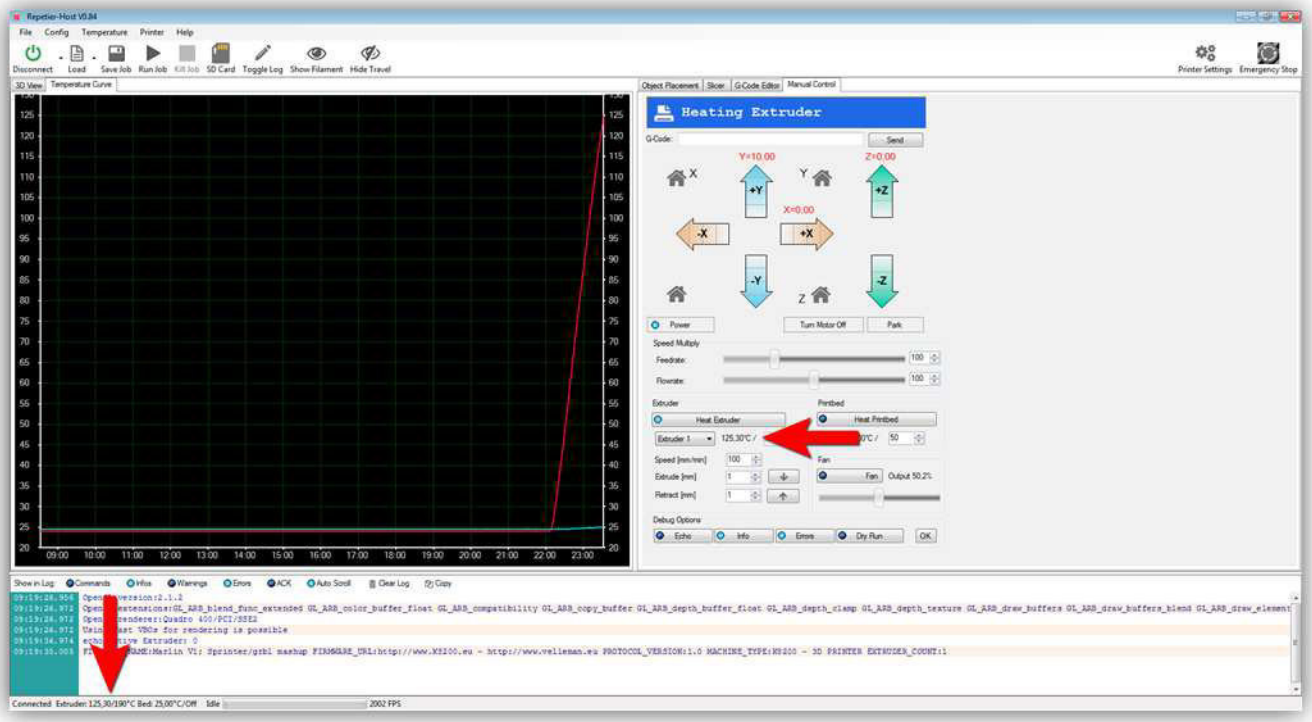
(When you do this you can also see an indicator light on the controller board lighting up, showing that HEATER 1 is powered).



With the “Heat Extruder” button active, press the “Temperature Curve” tab.

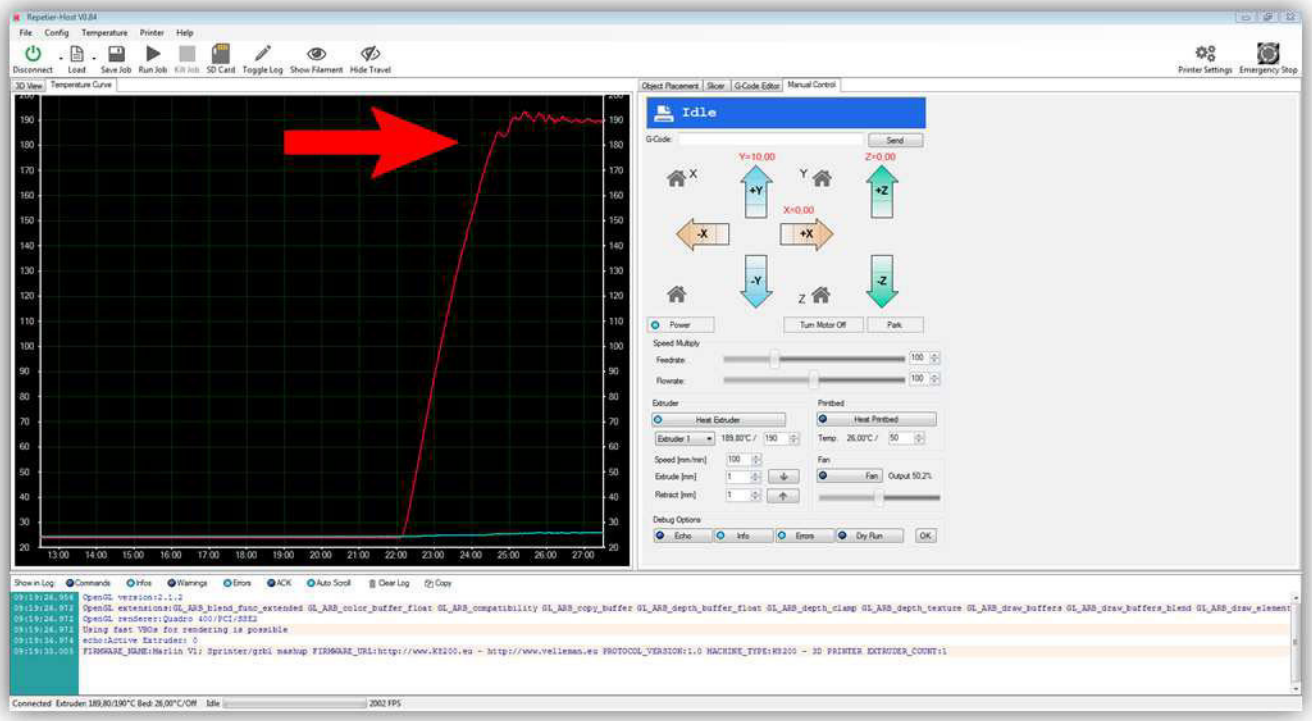


There you should see a graph indicating the temperature of the extruder (RED) and the temperature of the heated bed (BLUE). The red line should rise to the temperature that was specified in the box (190°C). You can also check the current temperature in the following places:



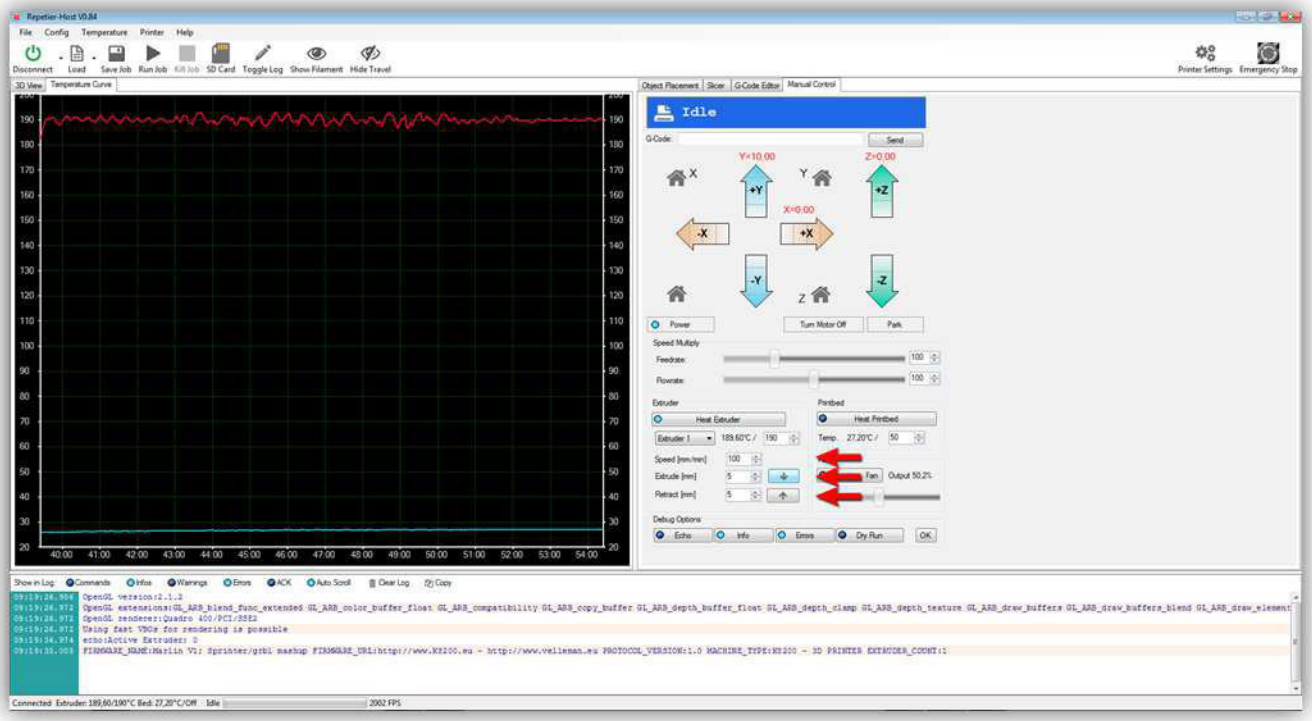
Once the temperature has reached 190°C the graph should start looking like this:

(Be careful because the extruder is now extremely hot. Do not touch it.)

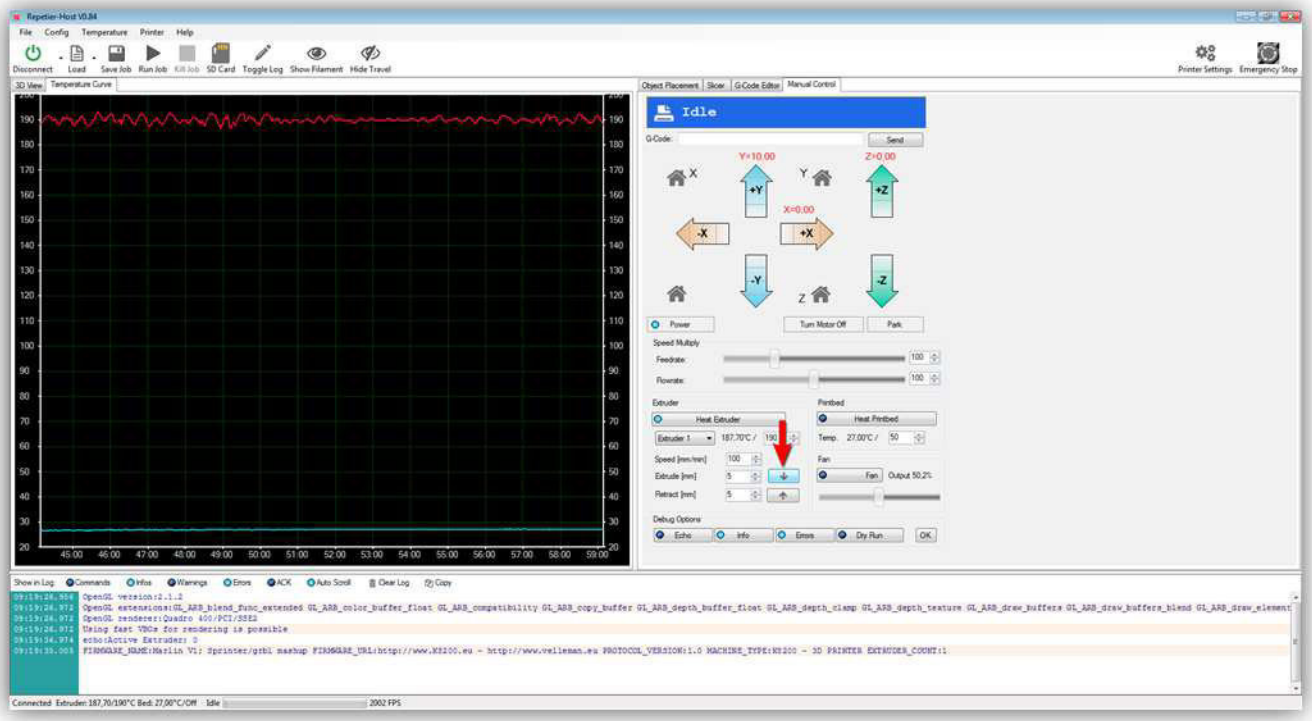


While the extruder is hot we can test the extruder motor. For safety reasons, the motor cannot turn when the extruder is cold. First check the values in the following boxes.

- Speed = 100
- Extract = 5
- Retract = 5



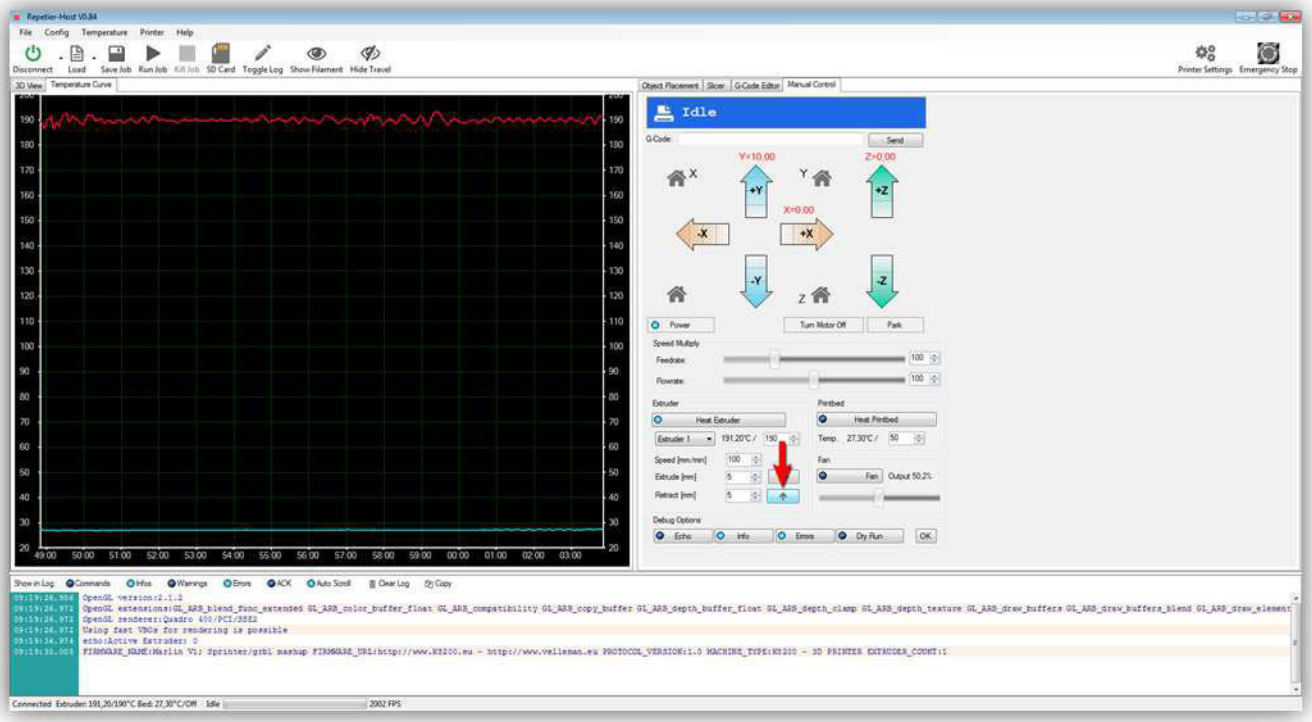
Then press the following button:



The extruder motor should turn a bit and make the large gear turn to the **RIGHT**.

The extruder motor should turn smoothly. If the LARGE GEAR does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing.

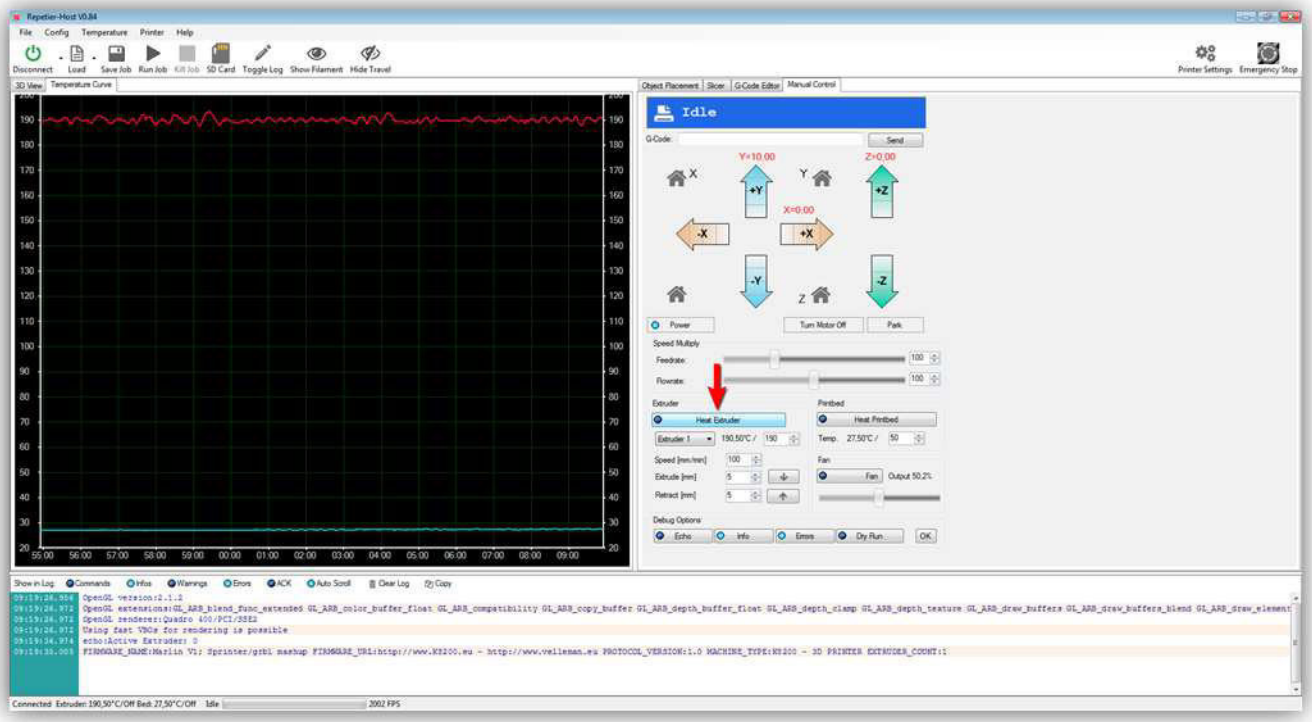
Then press the following button:



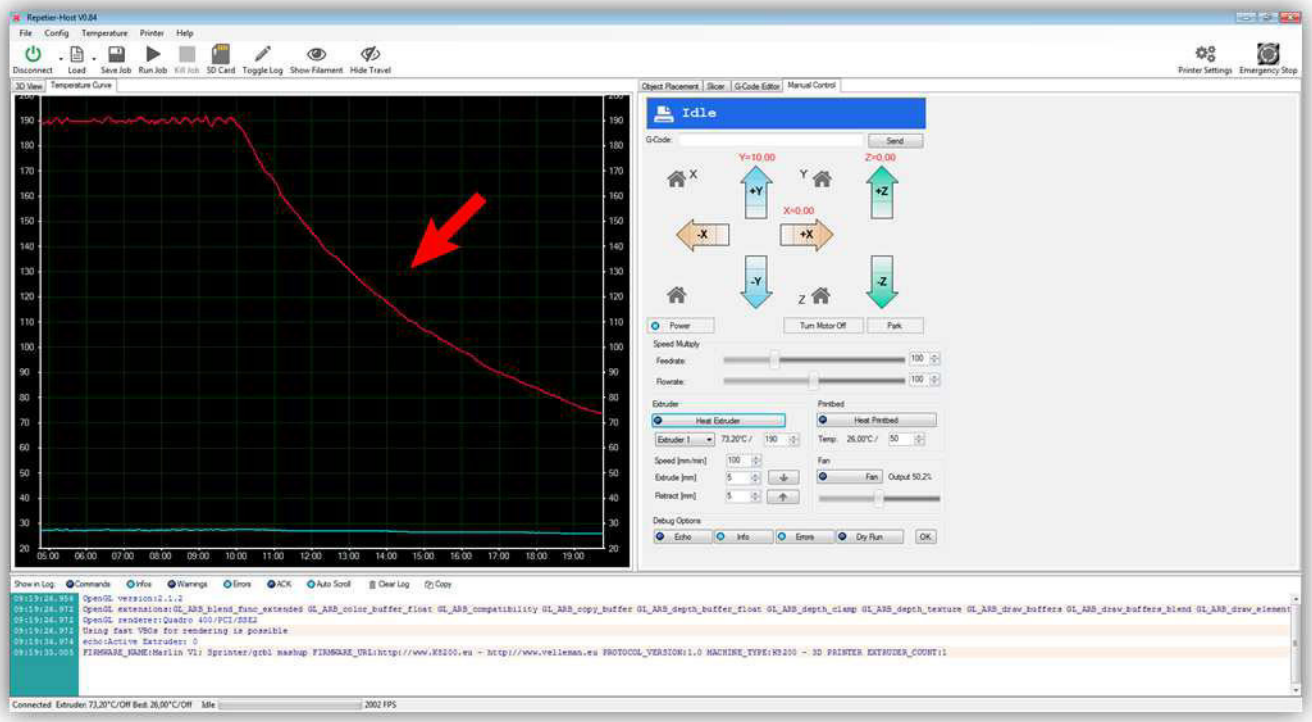
The extruder motor should turn a bit and make the large gear turn to the **LEFT**.

The extruder motor should turn smoothly. If the LARGE GEAR does not move or moves in the opposite direction you wired something wrong. Find and correct the fault before continuing

Now you can shut down the heater of the extruder by pressing the “Heat Extruder” button again.

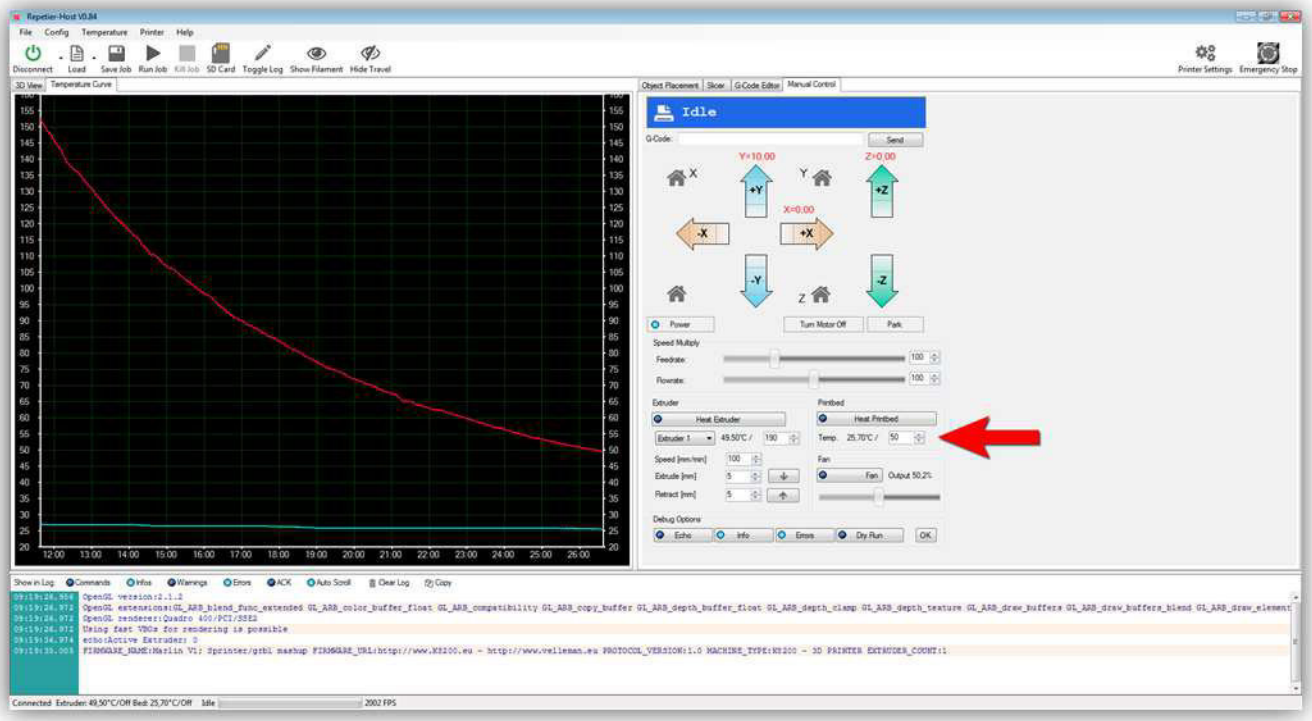


You should see the temperature graph drop to room temperature over time.



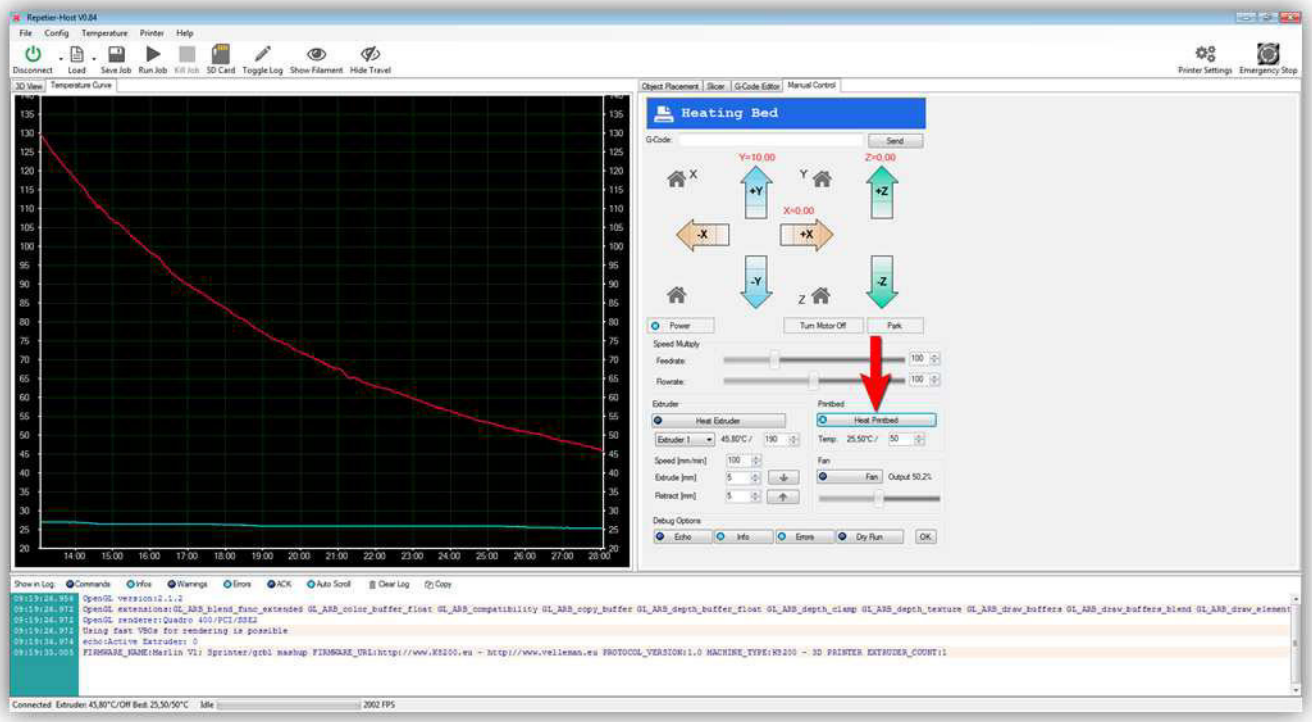
If everything went right so far you know that the extruder will work, now we will test the HEATED BED PCB.

Make sure the temperature for the HEATED BED PCB is set at 50°C.



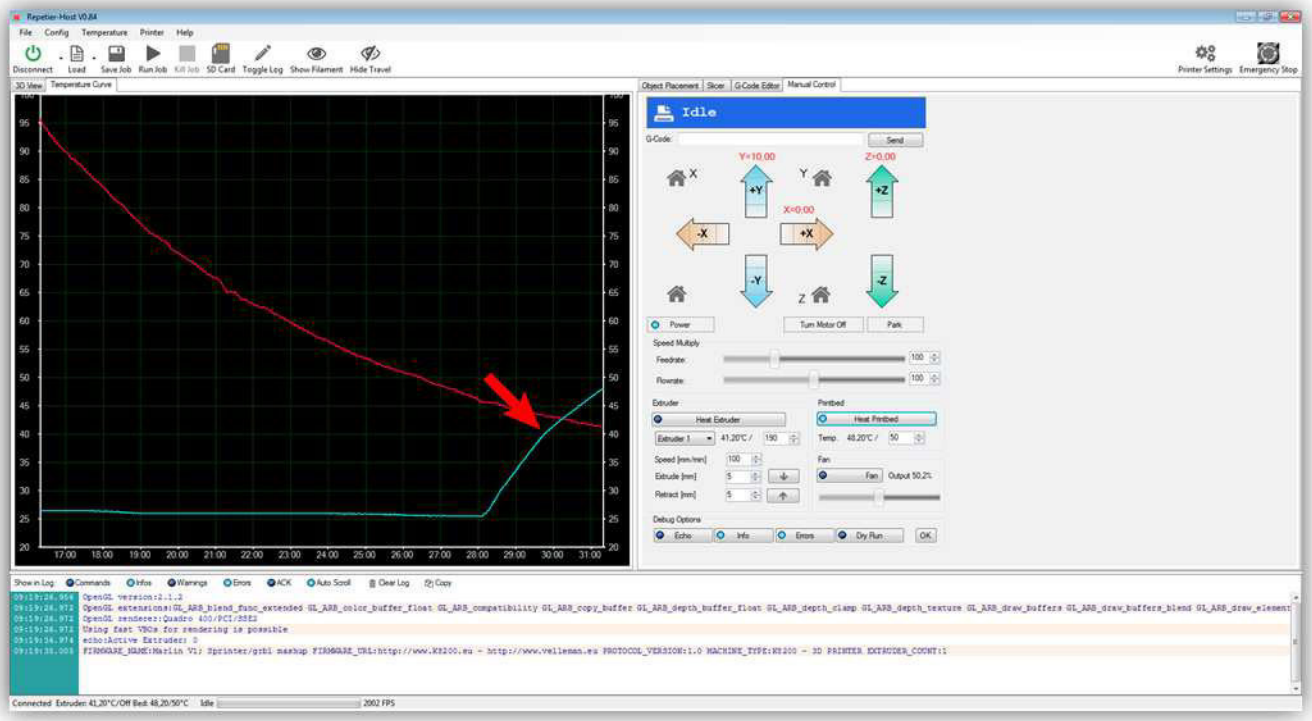
Now press the button “Heat Printbed”.

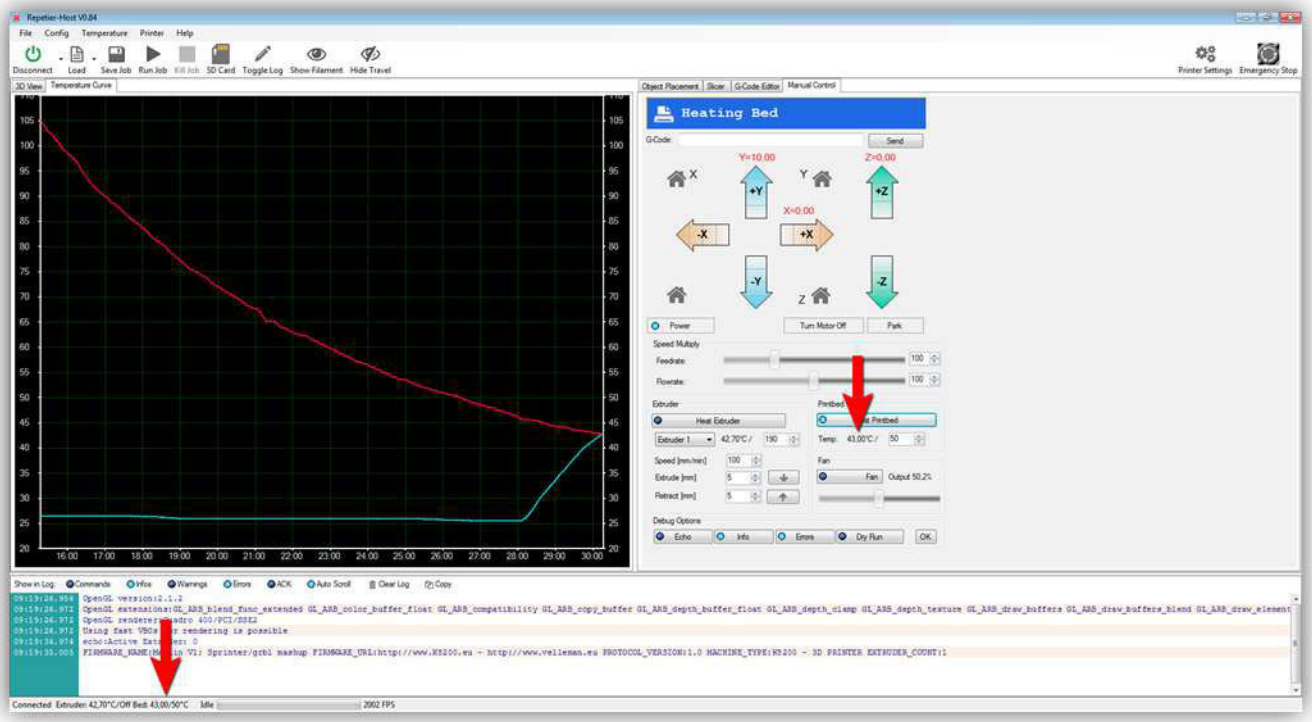
(When you do this you can also see an indicator light on the controller board lighting up, showing that HEATER 2 is powered).



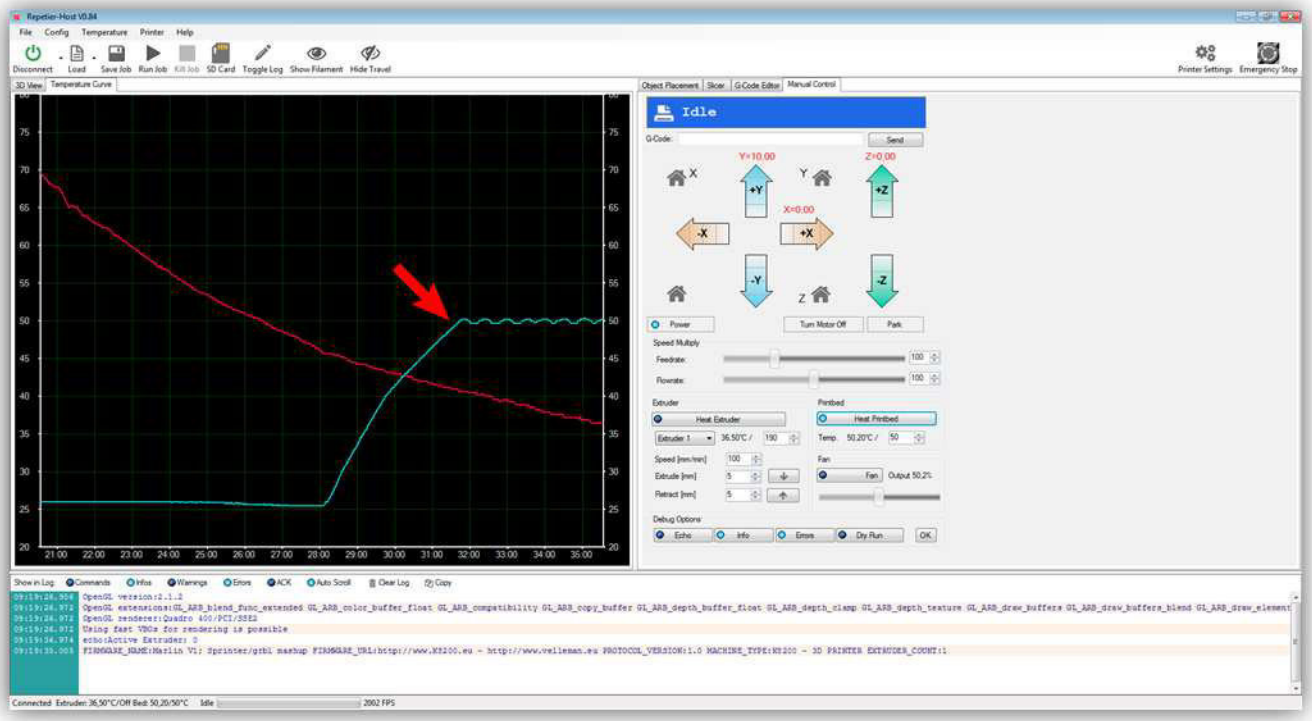
The BLUE line in the temperature graph should start to rise, and you should see the current temperature of the HEATED BED PCB rise.

(Be careful because the HEATED BED PCB is now hot!)

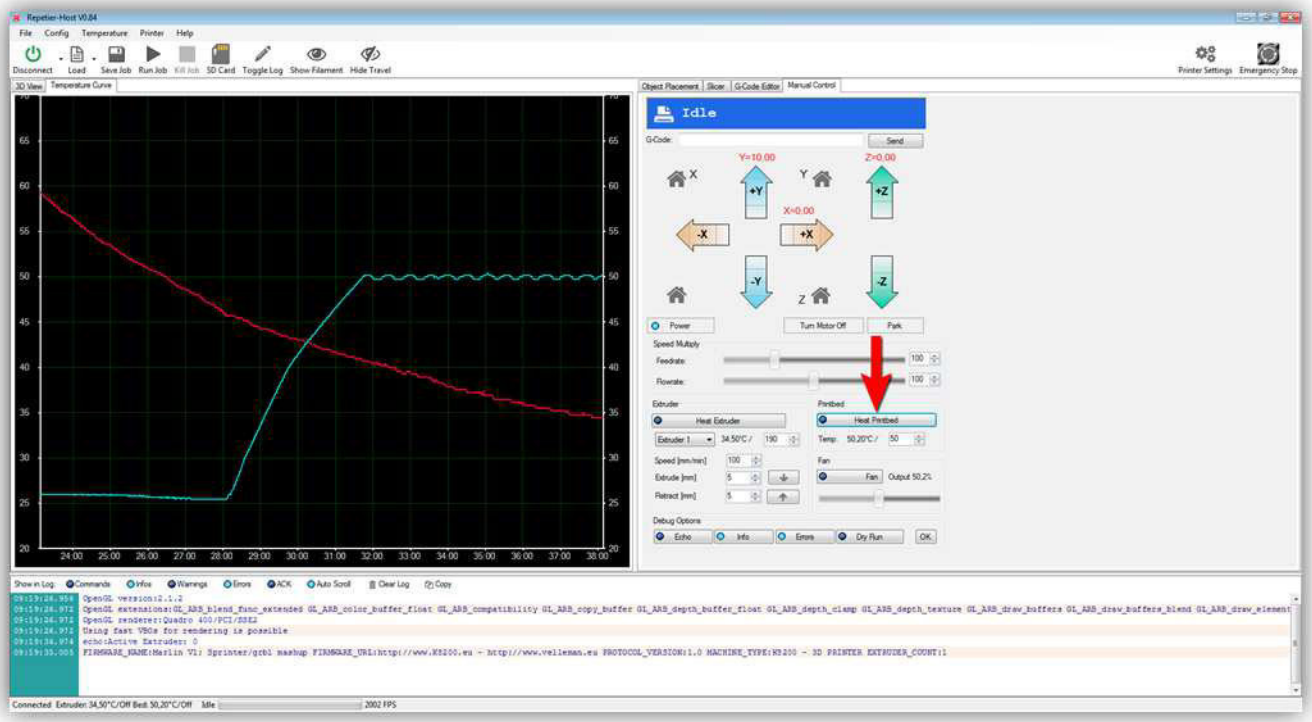




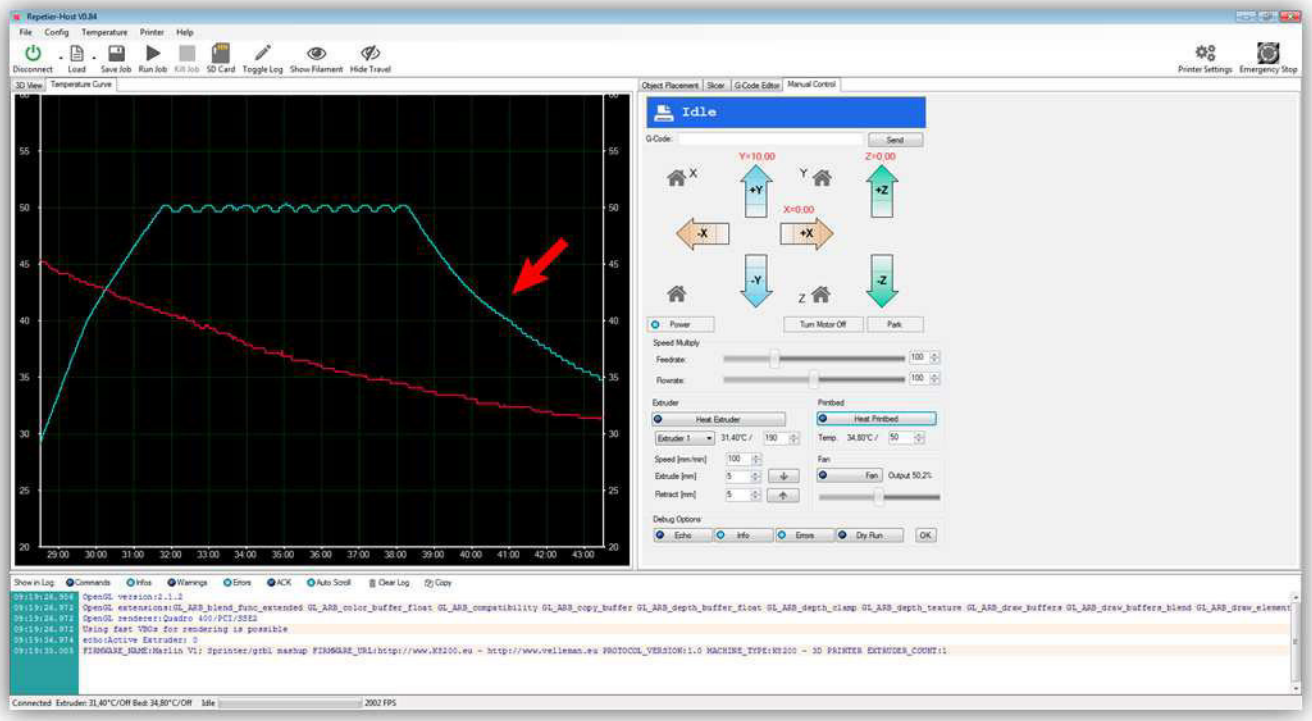
Once it has reached 50 °C the graph should look like this:



Now you can turn of the HEATED BED PCB by clicking on the “Heat Printbed” button again.



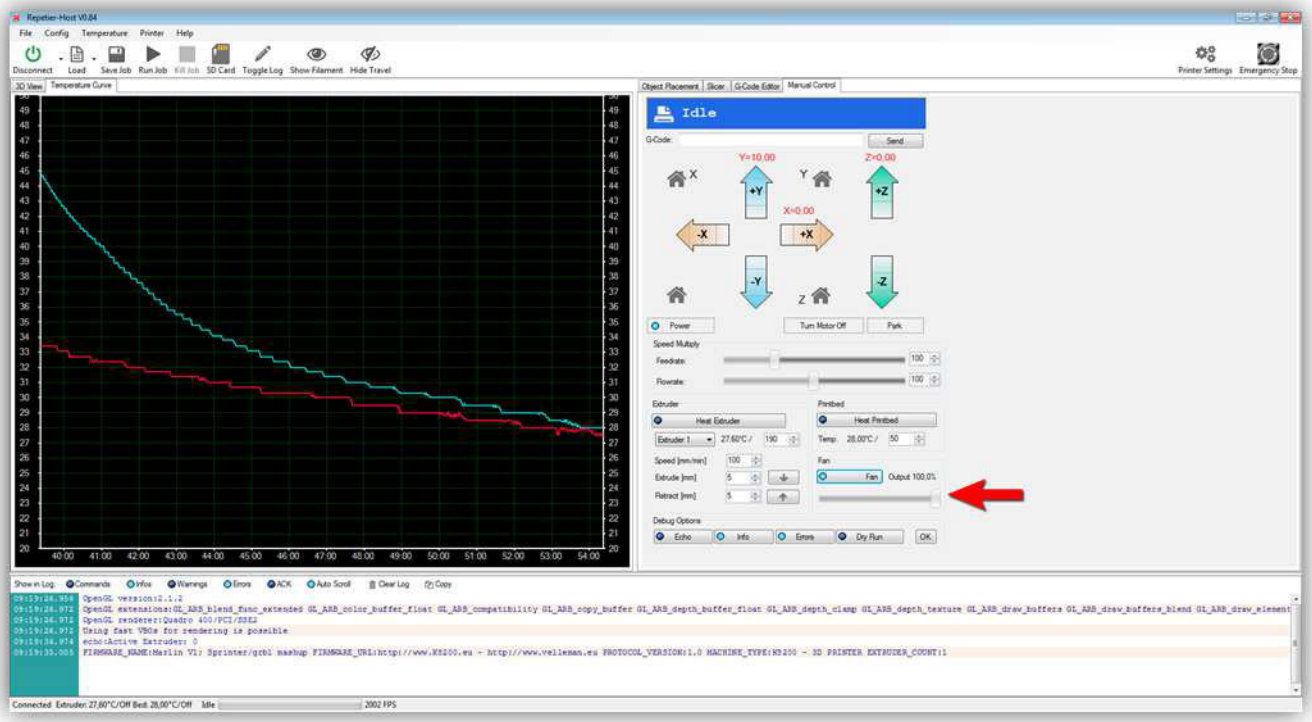
You should see the temperature graph drop to room temperature over time.



Now we will test the fan.

Slide the slider for the fan to 100% and click on the “Fan” button.

(When you do this you can also see an indicator light on the controller board lighting up, showing that FAN is powered).



The fan should begin to blow air in the direction of the extruder.

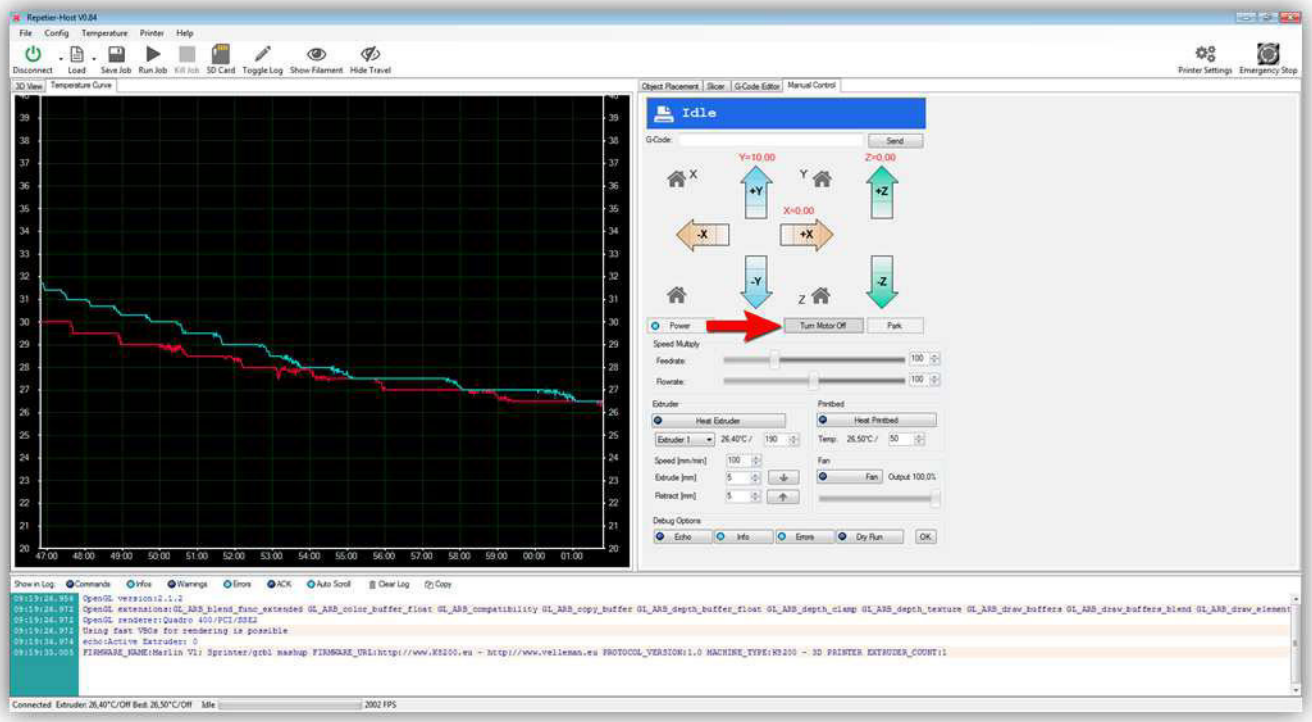
If the fan does not turn, make sure the slider is at 100% and check your wiring. If the fan blows in the wrong direction, mount it the other way around.

Now you can move the slider around, the fan should blow more or less according the position of the slider.

Turn off the fan by clicking on the “Fan” button again.

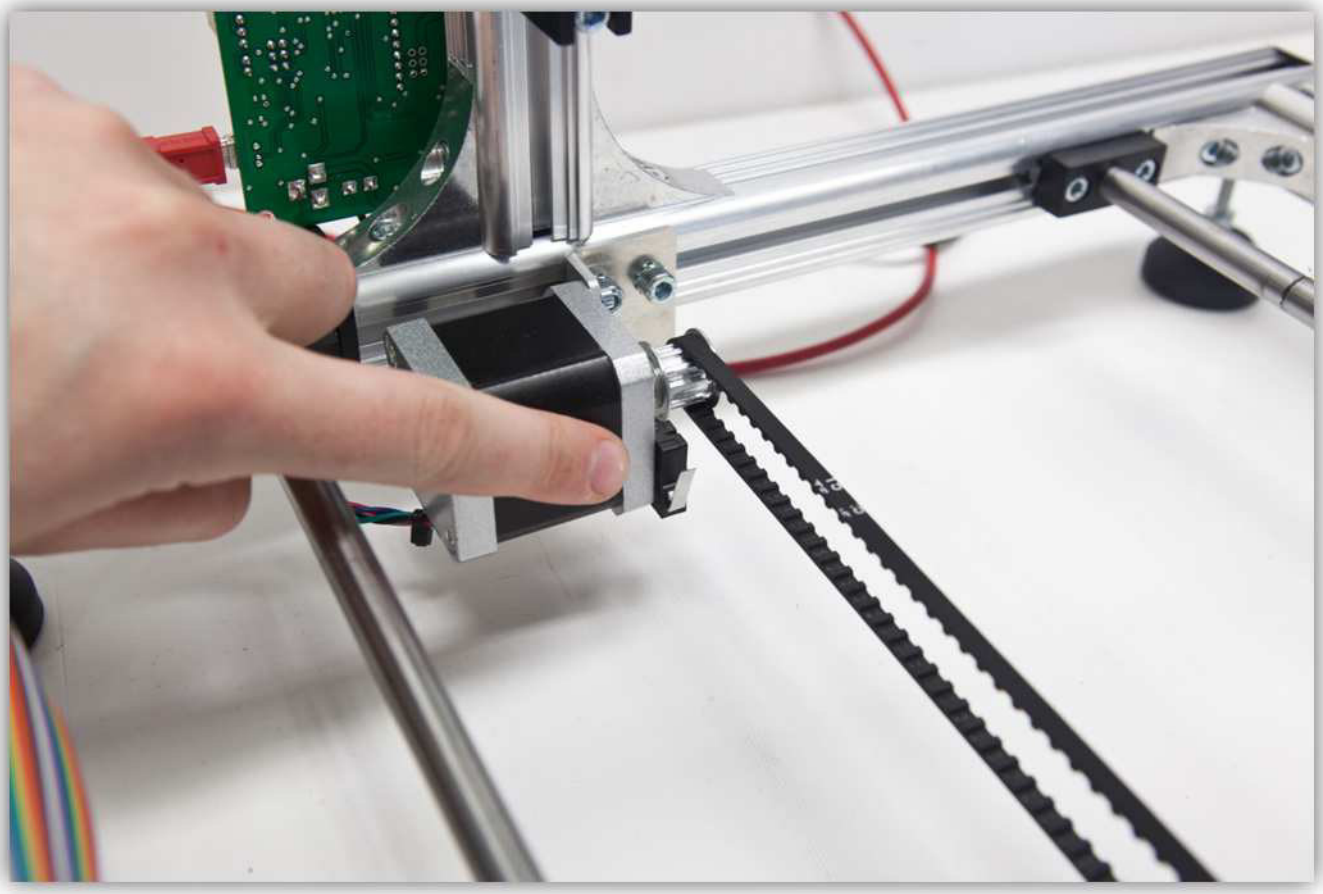
Now we need to test all the micro switches. These are critical for the machine to find its home position. Each axis has its own micro switch and its corresponding adjust bolt. **Before continuing you must be sure the printer moved in the right directions when you previously tested all the motors.**

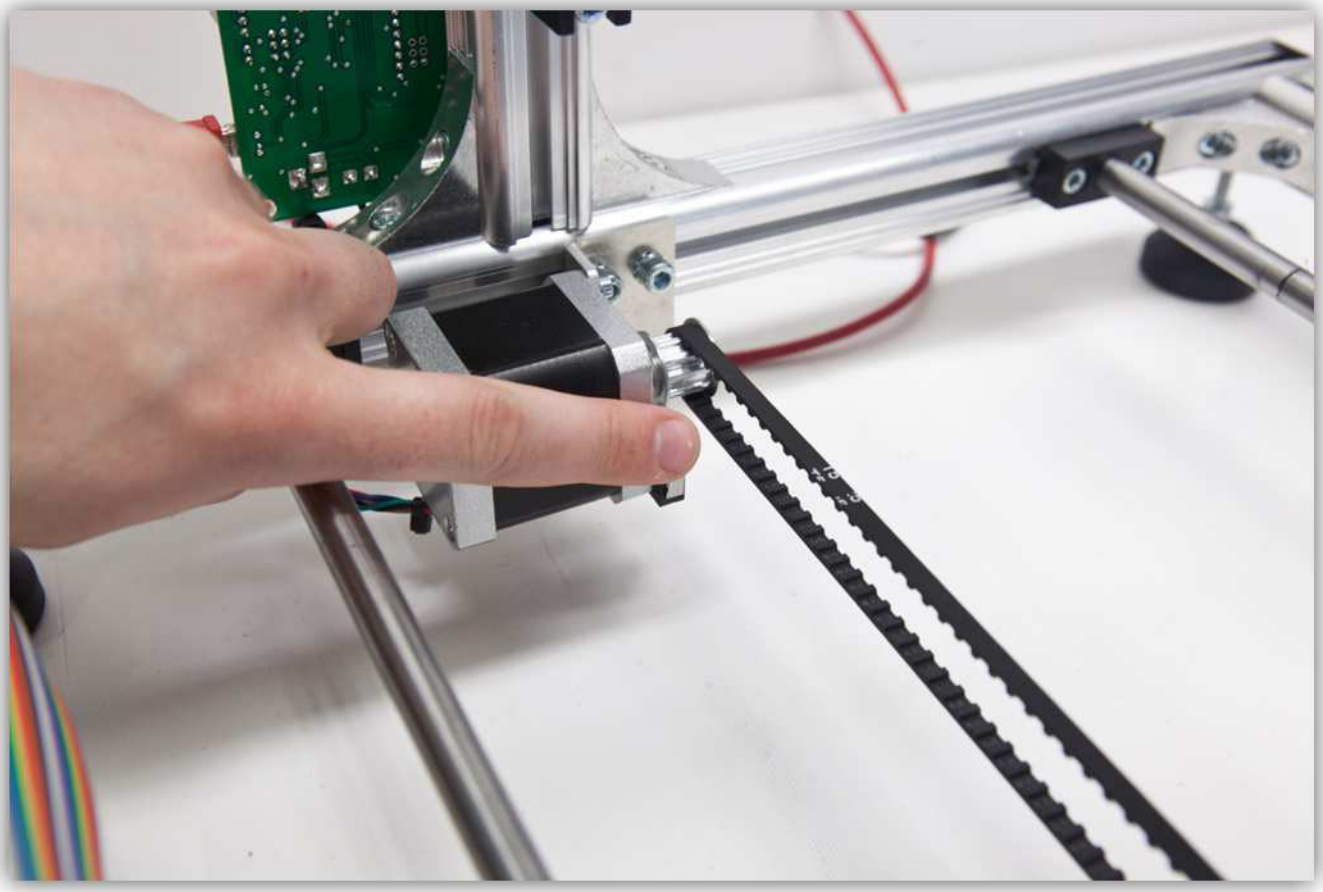
First press the button “Turn Motor Off”. This turns off the hold capability of the motors so you can move the HEATED BED PCB around by hand.



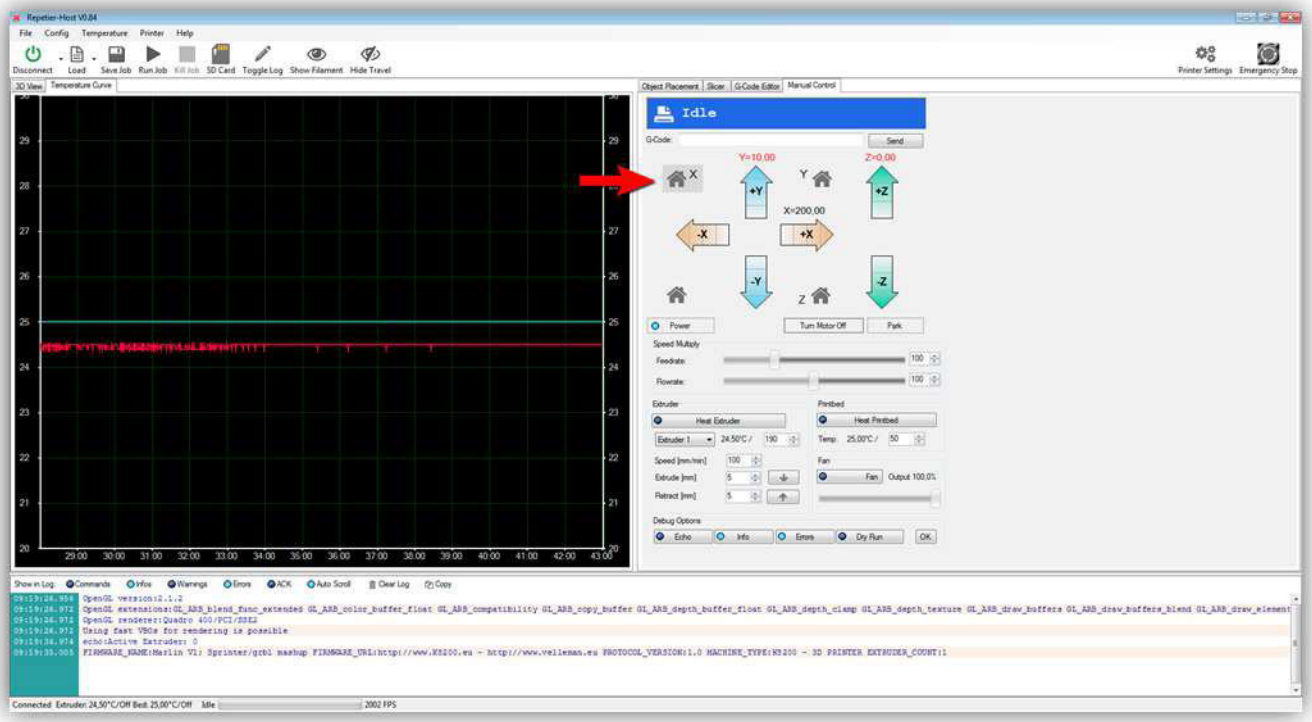
Next move the HEATED BED PCB completely to the **LEFT** by hand.

Put your finger on the micro switch of the X AXIS, do not press it.





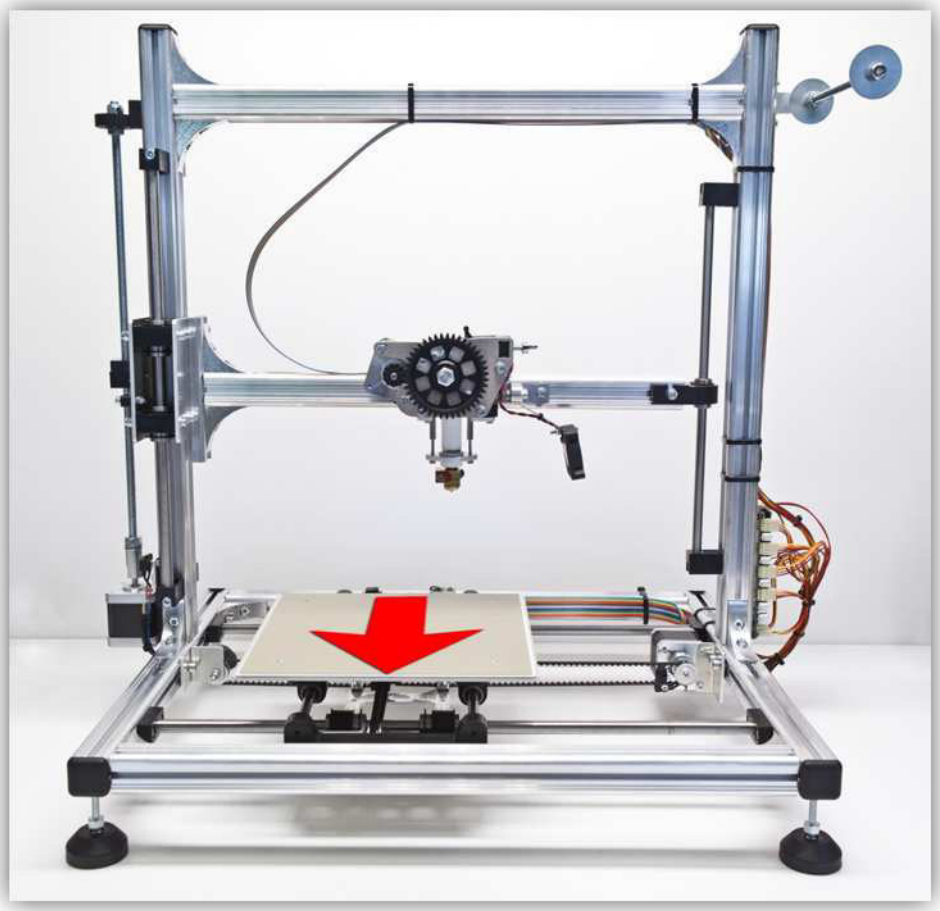
Now press the “Home X AXIS" button.



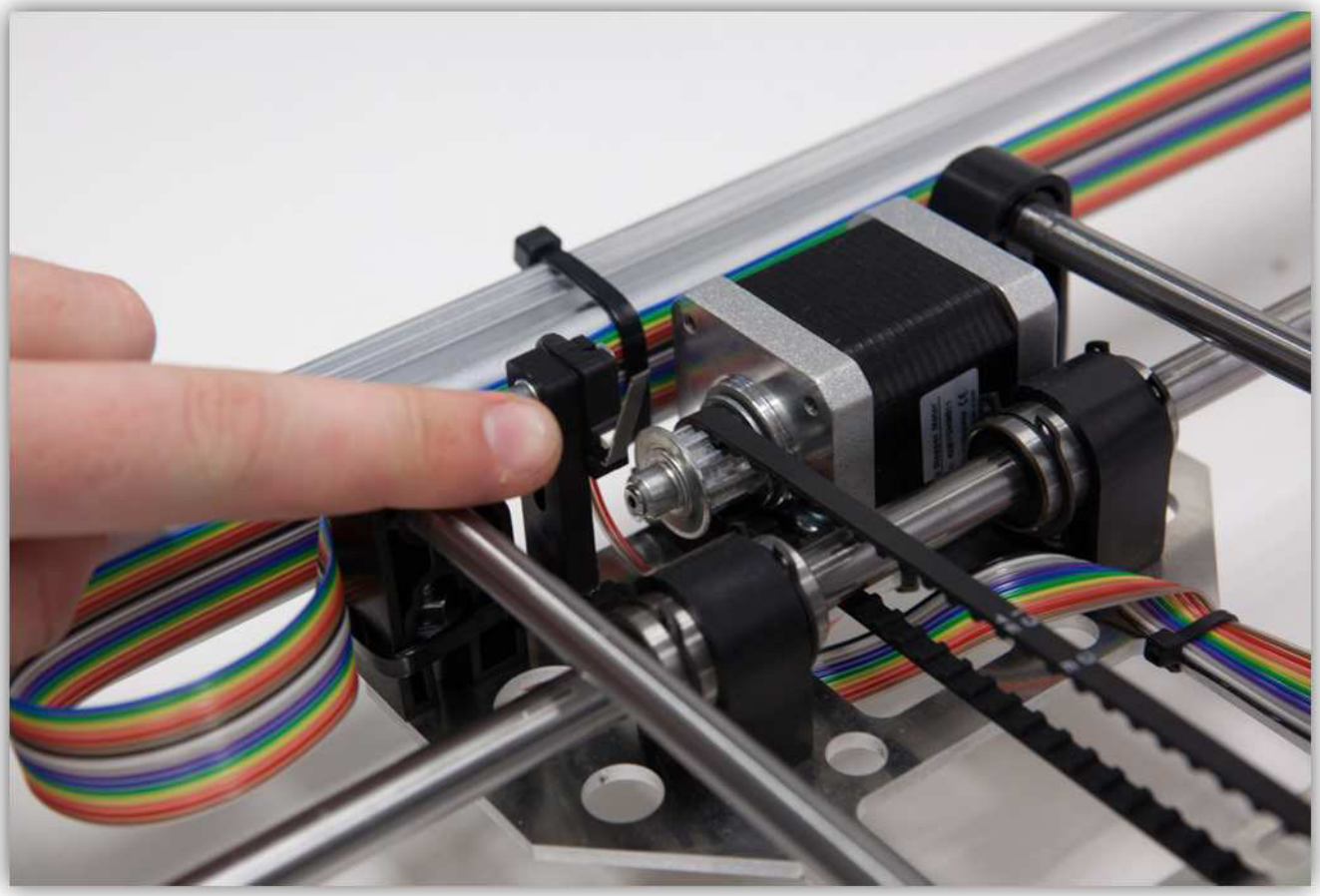
As soon as you have pressed this button the print bed will move towards the micro switch that your finger is resting on. Quickly press the micro switch. If the micro switch is working correctly the bed will stop.

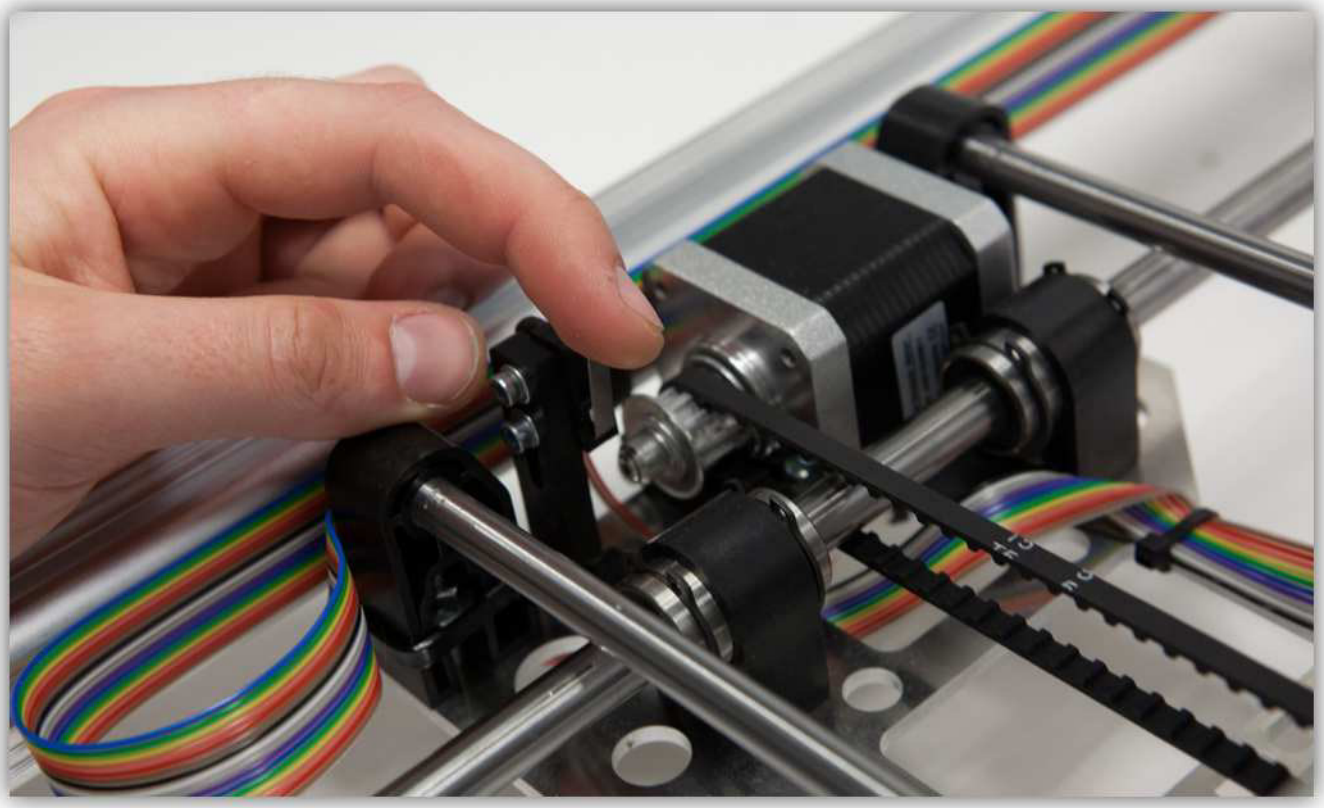
If the bed has stopped the micro switch wiring for the X AXIS is correct.

Next move the HEATED BED PCB completely **FORWARD** by hand.

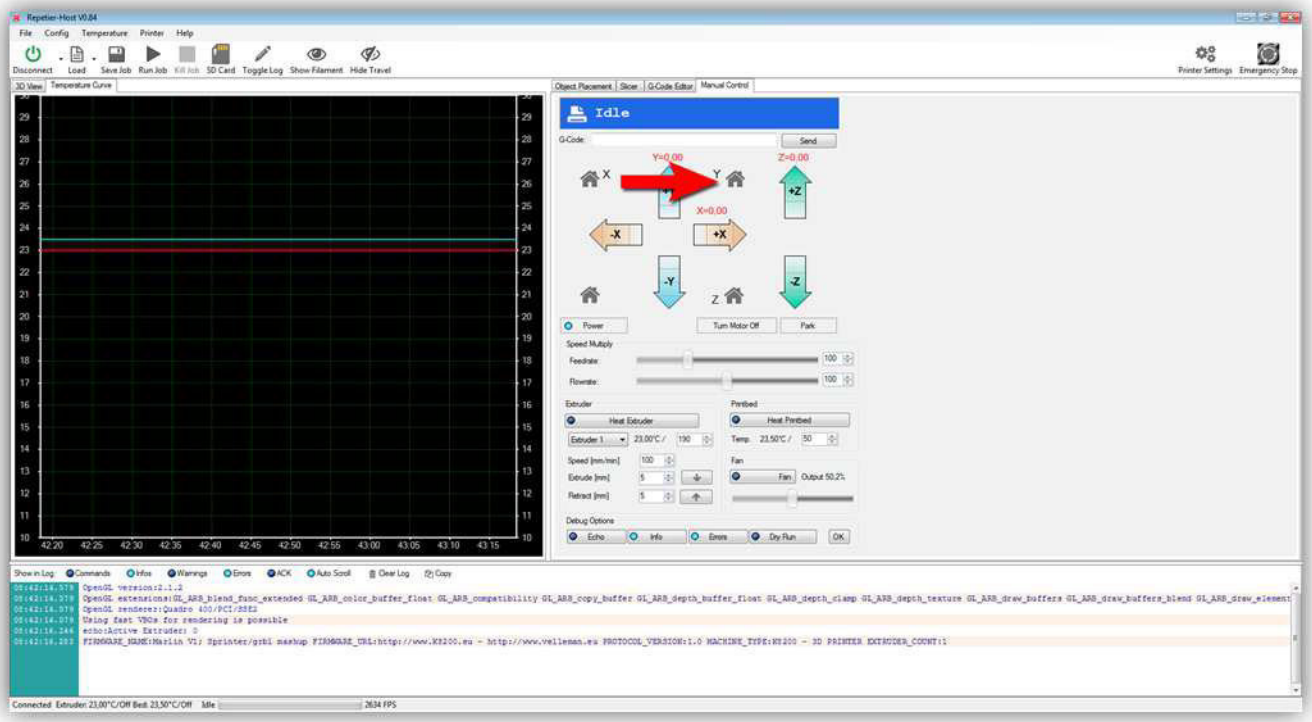


Put your finger on the micro switch of the Y AXIS, do not press it.





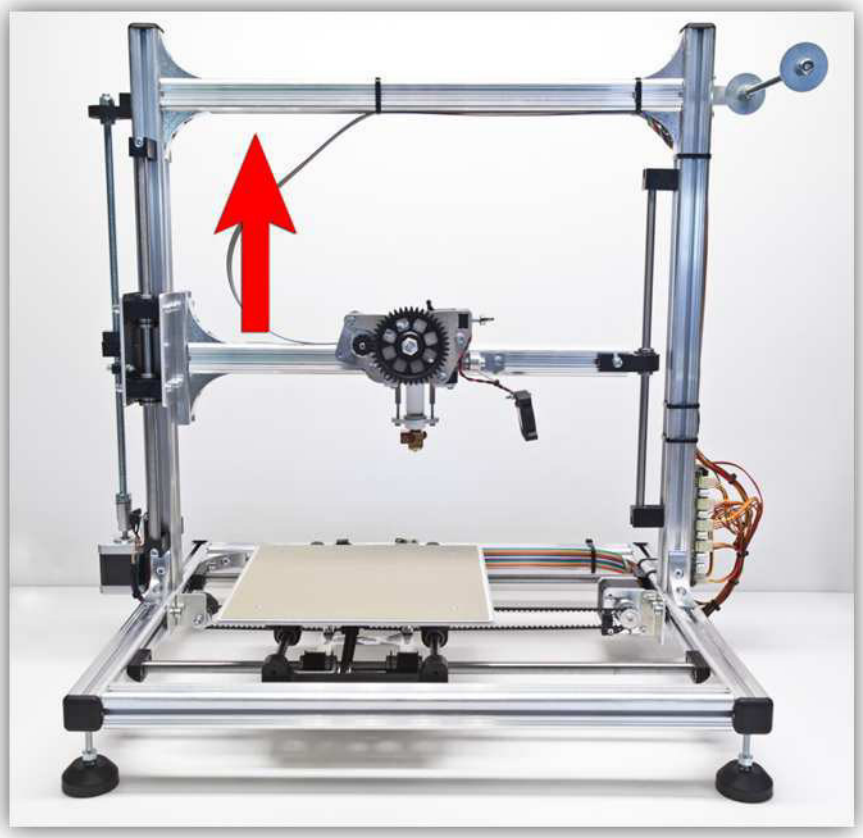
Now press the “Home Y AXIS" button.



As soon as you have pressed this button the print bed will move towards the micro switch that your finger is resting on. Quickly press the micro switch. If the micro switch is working correctly the bed will stop.

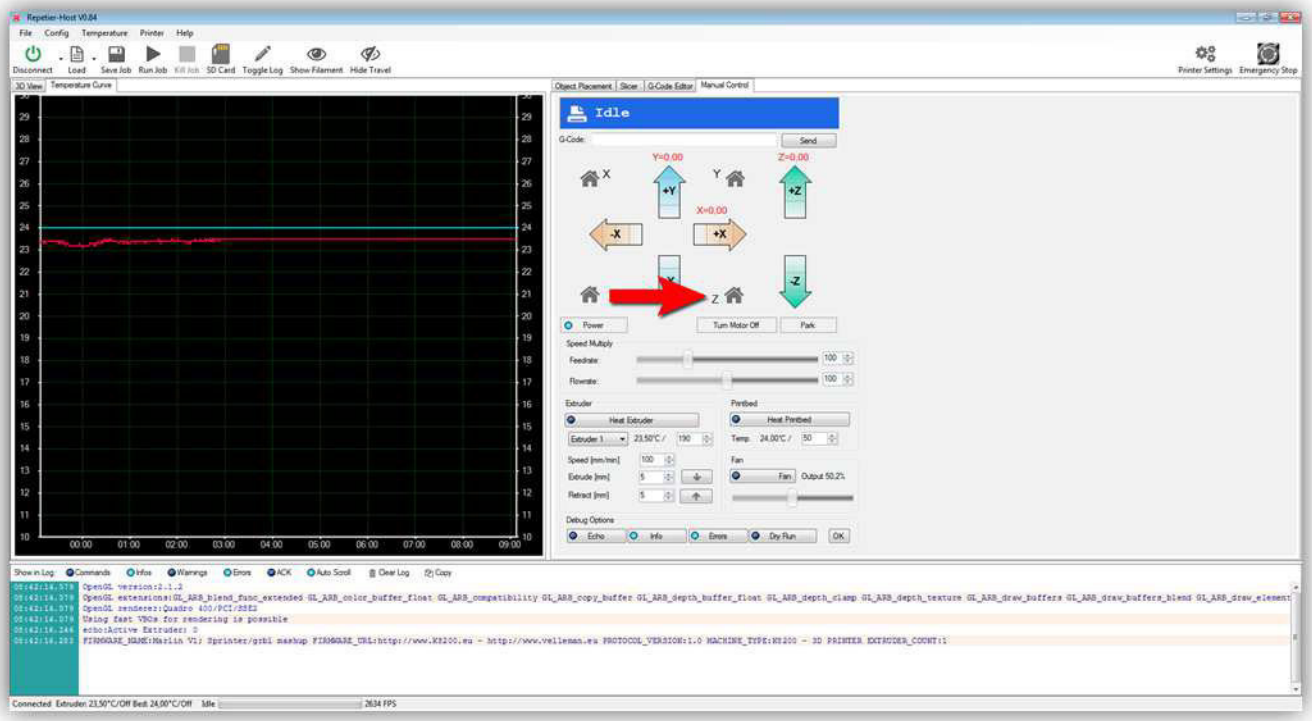
If the bed has stopped the micro switch wiring for the Y AXIS is correct.

Next move the Z CARRIAGE about 20 cm (7.87") **UP** by turning the motor for the Z AXIS by hand. **Do not use the UP button in the manual control panel.**



Put your finger on the micro switch of the Z AXIS, do not press it.

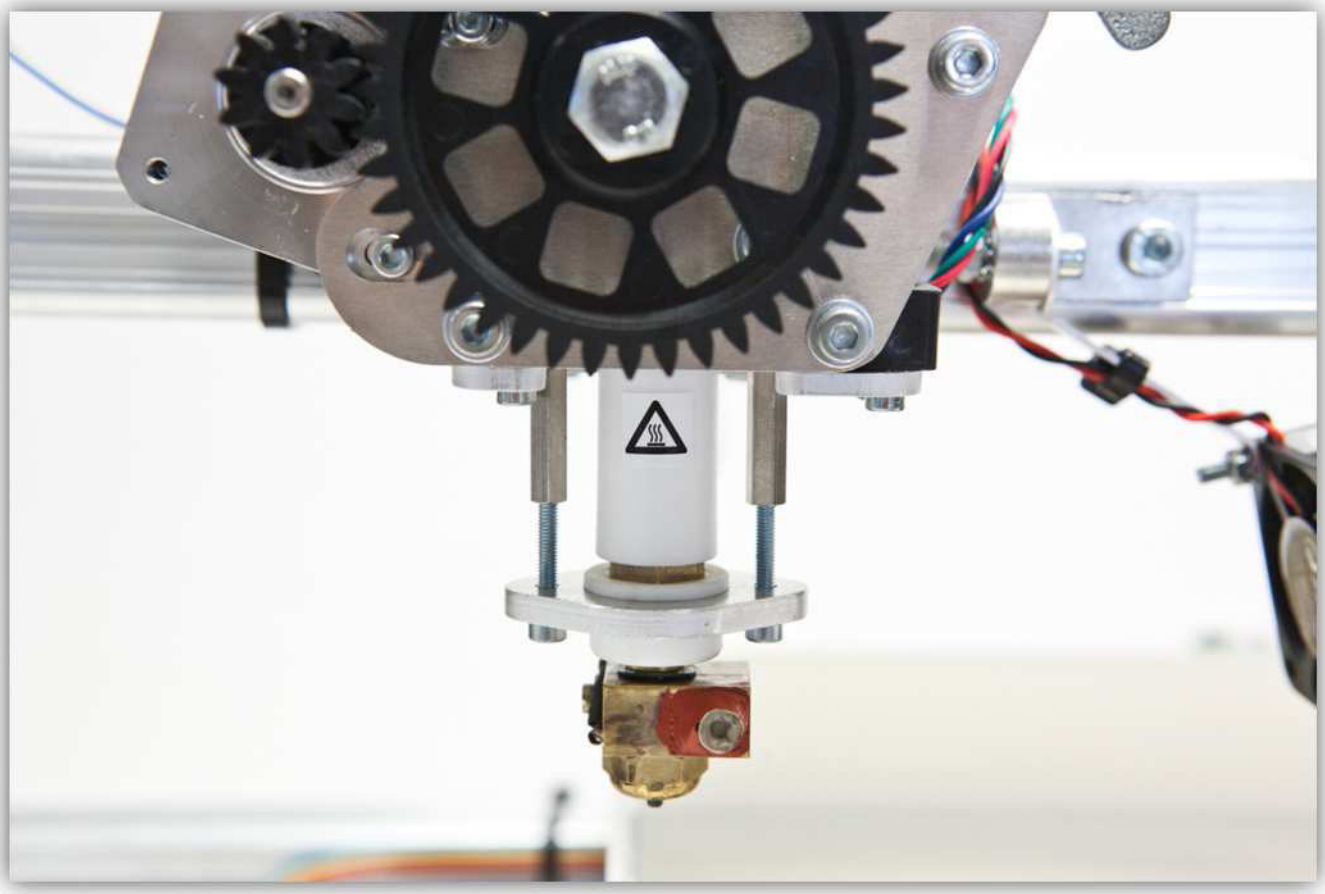
Now press the “Home Z AXIS" button.

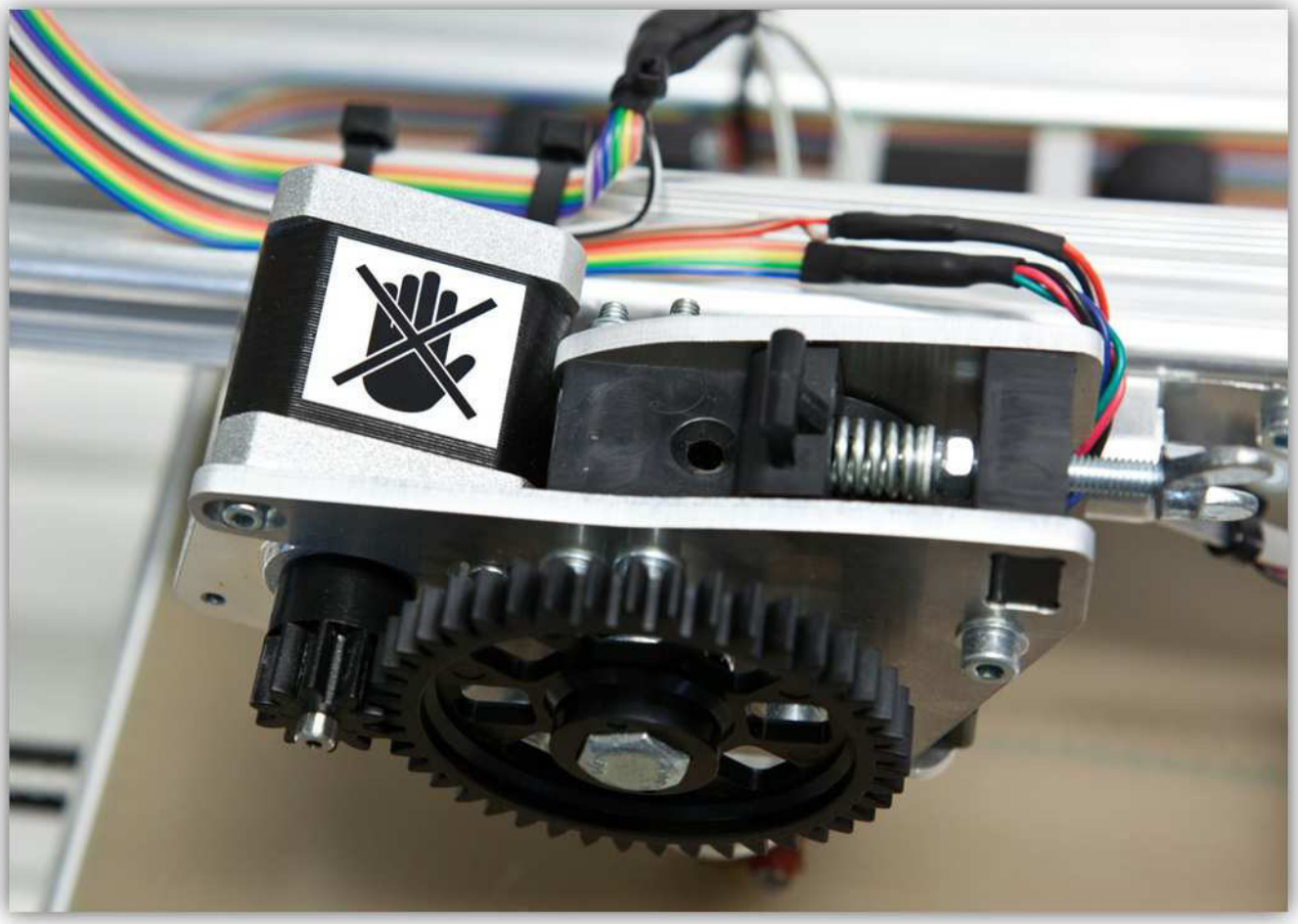


As soon as you have pressed this button the Z CARRIAGE will move towards the micro switch that your finger is resting on. Quickly press the micro switch. If the micro switch is working correctly the Z CARRIAGE will stop.

If the bed has stopped the micro switch wiring for the Z AXIS is correct.

If everything is working apply the stickers found in bag 30 as follows.





Now we have tested all the functions of the printer. We can now start the calibration process. This will be explained in the next chapter.