



Kick off

kick off and previous settings before starting

RepRapBCN Team

With the wiring ready and firmware installed (it comes installed) we can start the printer. We just have to press the switch located in the back of the printer. The screen should look like in the image below:



When we do it for the first time it is important to watch out for some noise or something weird.

If you have received your printer already mounted, it is not necessary to perform many of the following checks although it is advisable to do them just in case we detect potential problems or we want to familiarize it better with its working system.

➤ Display Menu Tree:

- To enter to the three press the rotary knob:
- Prepare
 - Dissable steppers (unlocks engines for the manual movement)
 - AutoHome (Bring the printer to $x=0, y=0, z=0$)
 - Preheat (Preheating the printer)
 - Cool down (Cooling the printer)
 - Move Axis (Axis movement from screen)
- Control
 - Temperature
 - Nozzle (Extruder temperature manual selection)
 - Bed (Temperature of the heating base manual selection)
 - Motion

To learn more about the other menu options and visit our [forum](#).

> Operational Checks: Thermistors and X and Y engines

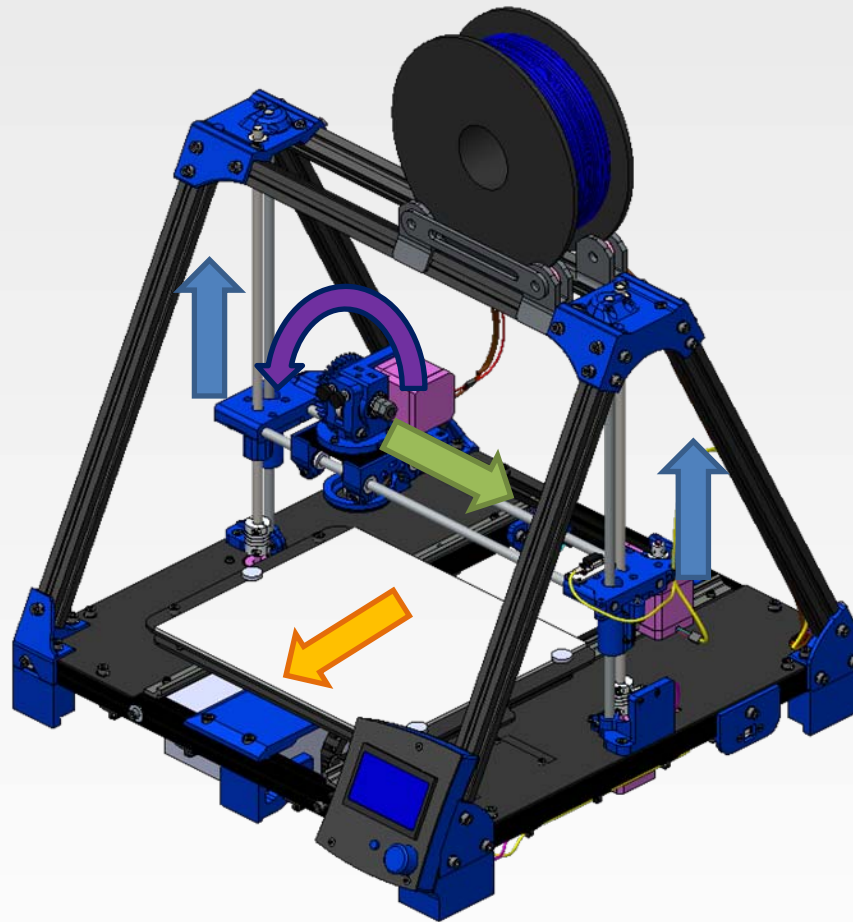
- Thermistors :
 - Check that the temperature measured is "logical" . The display should show temperatures that are around the environment temperature.
 $\sim 025/000^{\circ}$
- X and Y engines orientation:
 - Enter to the menu: *Prepare > Move Axis*
 - Select 1mm and select X. Turning the wheel clockwise the extruder carriage should move to the right (**getting close to the end stop**).
 - If not, **stop the printer** and change the orientation of the connector from the X engine in the motherboard.
 - Make the same check for the Y axis. (In this case it must **be away from the Y end stop**)

> Operational Checks: Z Engine

- Z Engine orientation :
 - Select Z in the menu *Move Axis*
 - Turn the wheel clockwise **JUST A LITTLE BIT**
 - Check that the two engines rotate in the same direction.
 - If not, **stop the printer** and turn one of the two connections. (Both engines must follow the same color code)
 - Go back to move the axis. Now you can spin the wheel without fear.
 - Check that the Z axis is going up when the wheel spins clockwise.
 - If not, rotate **the two connectors**

> **Axis system**

- X AXIS
- Y AXIS
- Z AXIS
- E AXIS



> Operational Checks: End stops

- Find all the end stops (X, Y and Z in this order)
- Check that the end stops contact correctly with the corresponding moving part from each axis as it approaches to them and that the LED lights up when they are pressed by it.
- If pressing an end stop makes the printer lose power, it might be due to the bad connection of the end stop.

For the Z axis perform these checks with the grub screw at the highest position (the screw go out under the part the maximum as possible exit) to avoid contact between the extruder and base.

We are going to **manually** check the mechanics of the end stops:

- Enter to the menu/ prepare and place the cursor on the option *Auto home* **WITHOUT** clicking on it yet.
- Once *Auto home* is activated the X axis will go toward the end stop, then so will the Y axis and then Z axis.

The goal is to activate the end stops with finger before the moving parts of the machine make it

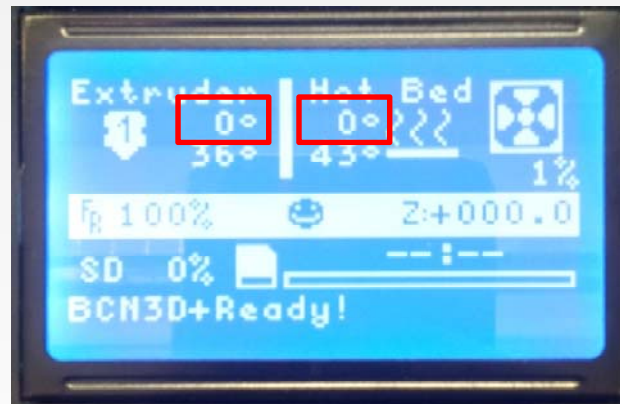
- As you the axes move, press with your hand the corresponding end stop. If pressing any of the end stops does not stop the axis motion, **stop the printer immediately**.
- If this error occurs it will mean that, although they are well connected, the positions of the end stops on the motherboard are exchanged. Check them and connect them correctly.
- When the above test is successful, press *Auto home* again to make sure the contact of the mobile part with the end stop.

> Operational checks: Resistance and heating

Heating activation:

- Select in the menu *prepare > Preheat PLA*.
- When you choose this option will begin to heat the base and the extruder until the set temperatures in the firmware.
- Check that the main screen shows the target temperatures:

Extruder and Heated Base



- Let it heat it up and see if it reaches the target temperature. (The extruder should last less than 5 min, while the base can take up to 15 min).

> Operational Checks: Extruder

- Once the extruder is at the preset temperature for PLA, press *1mm* > *Extruder* on the *Move Axis* menu and check that the **big** gear rotates in the direction of clockwise
- If not, change the orientation of the engine connector on the motherboard.

This check should be performed with the printer hot and the extruder to the temperature of the filament that is going to be extruded (PLA \pm 190/220°C , ABS \pm 230/250°C)

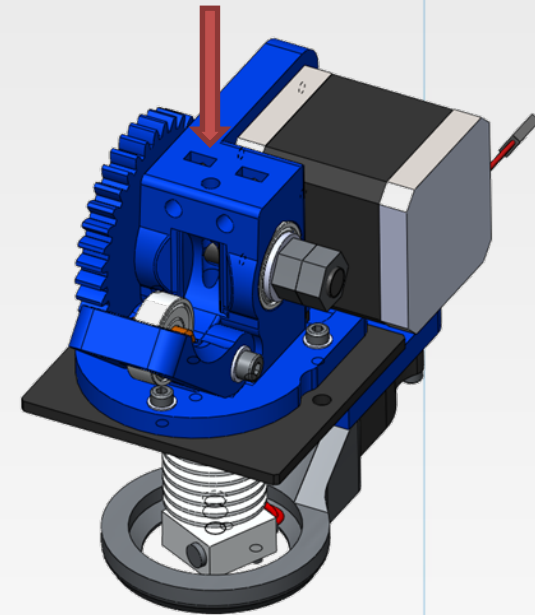
To modify the target temperatures select Temperature > Nozzle on the Control menu

> Operational Checks: Extruder

- When the rotation direction is correct, check that the heat sink fan (the smallest one is running)
- Open the clamp of the extruder and insert the filament through the hole. Make sure that the filament is facing the second hole.
- Inserting the filament gently until it begins to melt from the nozzle exit.
- Close the clamp of the extruder until it exerts a certain pressure
 - Too much force will erode the filament and will not traction correctly with the knurled part.
 - Exerting low force will let the filament loosed and will not come out.

Check should be performed with the printer hot and the extruder to the temperature of the filament that is going to be extruded (PLA \pm 195/220°C , ABS \pm 230/250°C)

To modify the target temperatures select Temperature > Nozzle on the Control menu



> Operational Checks: Extruder

- Once the filament is ready we must access to the *menu prepare > move axis > 1mm > Extruder* **WITHOUT** tighten it.
- Place your fingers on the part where the filament goes through the top hole and we click on *Extrude*.
- Check if the extruder scuffs and slips the filament (let it get in it. **NEVER** attempting to prevent the filament movement)
- Press *Extrude* several times until the plastic goes out smoothly and continuously through the nozzle.

**Watch your fingers do not place them in any mobile part
apart from the filament!**



Calibration guide

what, how and why

RepRapBCN Team

Calibración

3D printing printer need to be calibrated for several reasons:

- Avoid collisions between the extruder nozzle and base.
- To print with a good first layer and have no taking off and warping problems.
- The simple operation of the printer discalibrates it.
- When you take off the parts can disarrange the printer.

If you do not calibrate it can provoke:

- Get faulty or vague productions
- The breakage of some of the components (specially the nozzle or the glass base)

To have the printer well-calibrated you must achieve the following:

- Parallelism between the base plane and the movement plane from the carriage.
It implies that the distance between the nozzle and the platform must be the same throughout all the X and Y movement.
- Adequate distance between the nozzle and the platform in the first layer.
For a good start you should get approximately a distance between 1-2 tenths of mm between the nozzle and the platform. This corresponds to the thickness of a folded sheet of paper.

> Previous

- Check that **ALL** end stops are properly tight and that there are no impediments to the full movement of the X, Y and Z axis:
 - Adjust the Z end stop enough away to prevent the nozzle touching the plate.
 - Be careful with the wiring so that the base movement does not disconnect anything.
- Click on *Prepare > autohome* and see what happens.
 - Watch the movement and check that it touches the end stops well
 - Be ready to stop the printer if it is necessary. (Red button)

Flatness of the platform

- Using the calibration tool to ensure that the three points of calibration are at the same height.
- Match the distance with screws just in case.

Adjusting the height of the Z axis

1. Place the extruder at 1 cm from the end stop of X axis.
2. Adjust gradually the distance in the calibration screw from the Z axis until the nozzle is at 0.1 mm away
 - With a folded paper, make sure that it passes with certain friction between the nozzle is at 0.1 mm away.
3. Move the extruder manually move along the X axis. Correct it with the side bar where **IS NOT** placed the Z end stop if a height variation is produced.
 - It may be necessary to readjust the Z end stop adjustment.
4. Verify moving the Y axis that the distance is maintained the on the said shaft.

The printer should be calibrated. To finally check it:

- Repeat the paper checking process along the Y axis.
- Check the distance on the four corners of the plate.

It is somewhat normal that it is not quite the same in all corners.

Since most of the pieces start in the center it should be the main point to check.

If when you check the endpoints there are disparate distances after completing the above steps:

- Back to repeat the process from "Flatness platform"
- In case you cannot still calibrate it correctly:
 - Check with a level that the Y axis is equally inclined in its two extremes.
 - The slope must be equal but that it does not have to be flat because depends on the surface on which will be the machine mounted.
 - The bubble must be in the same position being set at the same distance in the four screws on the platform as it was previously done.
 - If there is some error you will have to adjust the mounting bars and try to get a stable orientation.
- In general the latter rarely happens, so if you have any doubts try to repeat the process before performing this adjustment.



Recommendations for use and maintenance

Some tips for getting the most out of your printer and ensure its good operation

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> Z axis settings

Despite having the machine calibrated, it is possible that when it starts printing the piece, the nozzle is too high. This is why instead of leaving a constant filament; it is releasing droplets of molten material.

The droplets also occur when the extruder has not yet been stabilized to melt the plastic.
Wait a few passes before diagnosing the problem.

You can temporarily fix this problem by turning to hand the two Z-axis rods counterclockwise. You have to watch the spin number of steps for the two rods to not decalibrate the machine.

Be very careful as they are moving parts driven by the motor

➤ **Taking off the pieces**

- To remove the parts of the base, you have to remove the glass first unscrewing at least one of the white screws (of polyamide) that hold it.
- Once it is removed from the machine, remove the parts of the base. In this way you significantly reduce the risk of uncalibration.
- Every few prints it is recommended to clean the base.

➤ **Hot Surface Traction**

To improve the adhesion of the pieces to the heated base it is good to use lacquer Nelly (supplied in the kit) especially for ABS

To apply the lacquer on the glass, spray it at a distance between 30 and 40 cm over the entire surface of the glass.

➤ Cleaning the extruder

Every few months of use, it is advisable to clean the outside of the nozzle. You can do this by cleaning the nozzle (with hot extruder) with a cloth soaked in acetone (or some similar product).

Contact with the extruder can cause severe burns. Be careful when you perform this step. Also, do not maintain contact between the cloth and mouthpiece many seconds as it can burn the cloth.

➤ **When do I calibrate?**

- When you appreciate at the beginning of the printing a difference in height of the first layer.
- From time to time and according to your personal pleasure
- What is important is that the printer prints the first layer with guarantees, with the material stuck on the surface.



We hope you have enjoyed the experience!
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