

Levelling a Cartesian printer: One approach

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Usual Disclaimer

Note that the 3d Printer has precision parts: don't be heavy handed with them.

The information may not work for you or may cause problems with your setup as not everyone has the same printer. Therefore take the information in good faith and be careful if using it on your printer. If you are not confident in making changes to the printer in the hardware or software then this information is not for you.

Making changes that you are not sure about or haven't thought through properly can cause damage. Therefore use this information entirely at your own risk.

Use of the information brings with it the assumption you accept this.

Digital Level / Protractor



Basic checklist

Set the printer up for axis checking.

Switch off printer, disconnect stepper plugs.

Zero the digital level on the Y leading rod.

Put the digital level on the X leading rod, and rotate the Z couplers slowly by hand until the digital level reads zero

Tram the bed using the LCD menu option, adjusting with the 0.1mm feeler gauge or paper method.

Reconnect steppers

Switch on, home the printer and carry on

Schedule this as a regular check for your printing activity.

Before making adjustments make sure the printer is not switched on.

Movement of the bed carriage, gantry, or extruder on any of the X, Y, Z or E axes can create voltage back into the stepper drivers. (The stepper motors act as a generator)

The ideal would be to put your printer into the following state using your X, Y, Z axis controls before you switch off.

This can be done on the LCD display using the correct menu, or use the USB control interface from your PC, eg Pronterface or whichever you use.

Home the printer.

Move the Z axis to about 60mm above the bed.

Move the Y axis so that you can see around 90mm of the Y loading rod.

Leave the X axis on the home position.

It is best to disconnect your steppers and move any parts connected to a stepper motor slowly.

Rest the digital level gently on the leading rods. Do not apply any pressure as this could affect the reading. You could also bend the rods if you are heavy handed.

Move the bed carriage out of the way so that you can place the digital level on the Y axis leading rod.

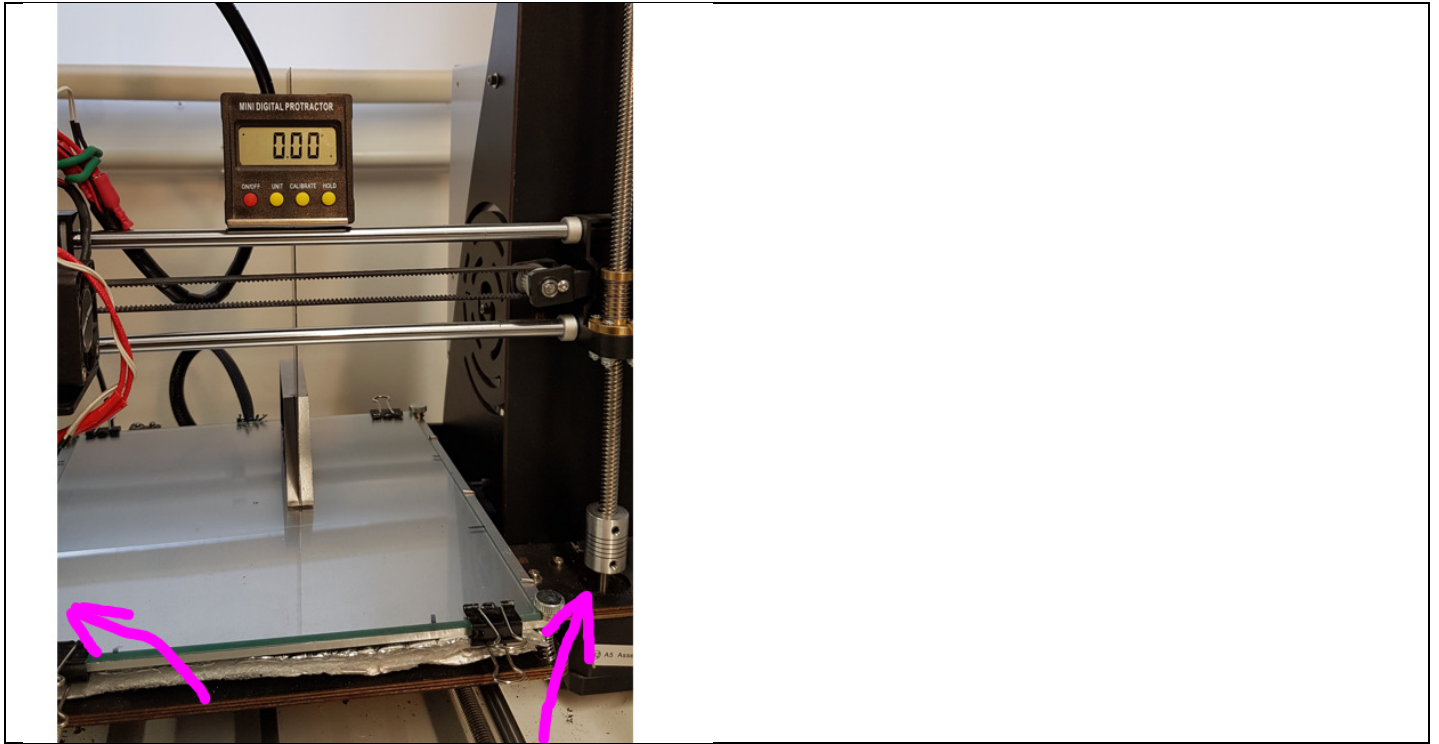
Switch on the digital level, place it on the rail then press the zero or calibrate button. Let the reading settle, and if it changes press zero/cal again.



Place the digital level on the X gantry rod. If it still reads zero after a period of time to settle, then all is good. In the picture you can see a woodworking square end on – this is just to hold the digital level during photography.



If the reading is not Zero, then adjust the position of the left hand side carriage or the right hand side carriage by turning the coupler on the Z axis stepper so that the X gantry rod moves position, while watching the Digital Level reading. You are aiming for this to be Zero. Use small movements and wait for the digital level to settle.



Once everything is done, you can go back and check the levels again to see if they are OK.

Once you have done this, reconnect everything and power up your printer. Follow the usual instructions for “trammng the bed” using the 0.1mm feeler gauge or sheet of paper method. Marlin has an option to ‘level bed’. In later versions this is called “Trammng”. At the end of this you should have a nice X, Y, Z relationship between the axes on your printer. Some printer users advise warming the bed to temperature before trammng the bed. Make sure that there isn’t a little ooze remaining on the nozzle as this can affect the gauging.

Suggestions

You could add a macro button to your printer controller for the GCode to Auto Home then move the Y and Z positions to your preferred checking points. Alternatively, if you run things from the SD Card, you could write up a process and keep it in a folder to use as needed.