3D Industries – Bed Levelling & Z Gap setting procedure

1 Preamble

The 3D Industries printers have a bed that is stationery in the X and Y axis but descends vertically in the Z Axis for every layer of print completed. This type of mechanism requires the carriage holding the hotend and nozzle to move in both the X and Y axis, but it reduces to an absolute minimum the amount of movement of the Object in progress.
The bed is an aluminum plate heated by 3D Industries 24 Volt proprietary heater from below. A captive thermistor measures the temperature of the bed.
Glass is the preferred choice of consumable bed material optionally using a FlashForge sheet (mandatory for larger ABS printing)
The 3D Industries printers feature a manually adjustable Z Gap setting facility. This is useful as the setting is independent of any Gcode files produced and can be tweaked if special filament or objects are being printed.

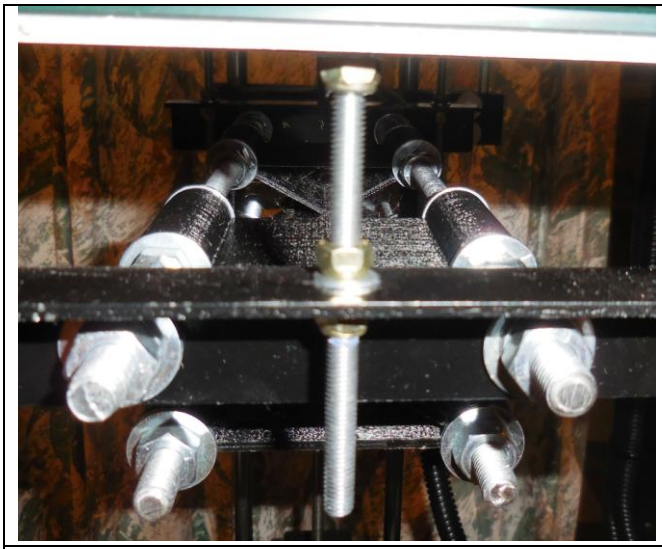
2 The Bed mechanism

The aluminium bed is mounted on the Z Axis gantry by three screws, one in the front and two at the back left and right. These three screws are used to set the bed level in the X and Y Axis.
4mm float glass is used for the bed and clipped to the aluminium base.

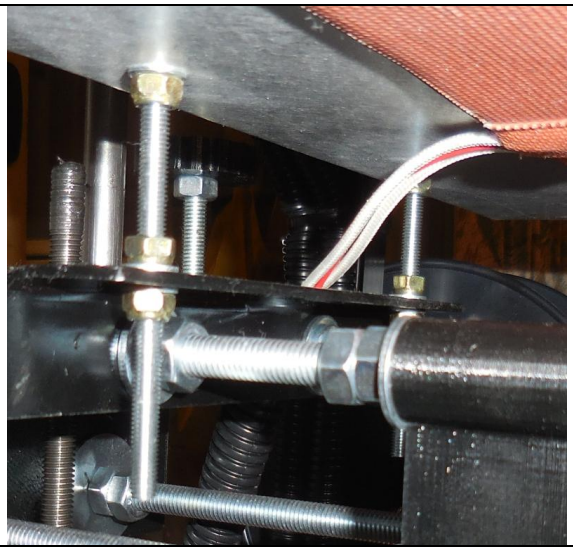
3 Bed leveling procedure

- Clean the nozzle of any extruded plastic and move the carriage so that the nozzle is over one of the back bed screws.
- Place a piece of paper between the nozzle and the glass.
- Manually raise the bed upwards using the coupler at the bottom of the threaded rod at the back of the machine, until there is some minor friction felt when the paper is moved back and forth.
- Move the carriage to the other back screw and check that the friction felt when moving the paper is the same. If it is tighter then the bed is higher on this side than the other.

If the friction is not the same between the right and left sides of the bed then adjustment is required.



Front bed level adjuster

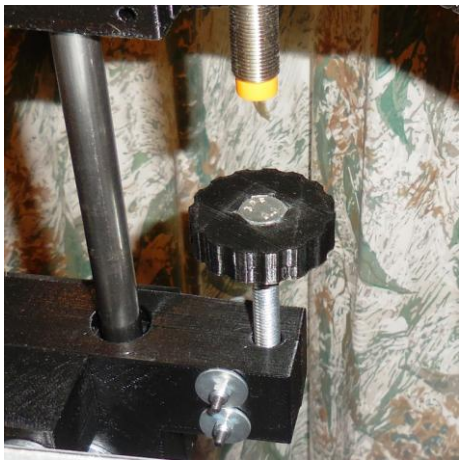


Side bed level adjuster

- If the left hand side is too high for example the on the left side loosen slightly the upper M6 bolt and tighten the lower bolt to take up the slack and test again.
- Repeat until the bed is level across the back.
- Put the carriage to the centre of the bed and above the screw in the front. Test the friction of the paper movement between the nozzle and the glass.
- Move the carriage towards the back and test again.
- Test by moving the carriage towards the front. The bed will either be flat, high at the back or high at the front.
- If the bed is lower in the front then use the front adjuster screws to raise the bed at the front by loosening the higher adjustment nut and tightening the lower nut to take up the slack.
- If the bed is higher in the front then use the front adjuster screws to lower the bed at the front by loosening the upper adjustment nut and tightening the lower nut to take up the slack.
- Test again and repeat as necessary.
- Repeat the test from side to side.

4 Z Gap setting

Before testing the bed levelling with a calibration print it will be necessary to set the Z Gap.
The Z gap is set manually by rotating the Z gap adjuster mounted on the Z Axis back plate.



To set the Z gap:

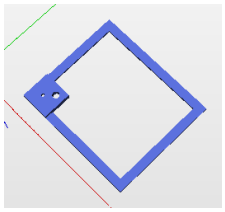
- Move the carriage to the centre of the bed.
- Turn the Z Gap adjuster to the anticlockwise (looking down) a few turns, this increases the Z gap.
- Put the paper between the nozzle and the glass.
- At the LCD screen select "**UTILITIES Menu**" and push to confirm
- Select "**Home Z**" and push to confirm.
  The bed will lower and then raise itself until the bed activates the Z Gap sensor.
- Check by moving the paper between the nozzle and the glass that the gap is correct. (Initially it will too big)
- Rotate the Z adjuster clockwise (looking down) and retest by selecting **Homez** again.
- Repeat the Z adjustment and the homez testing moving the Z Gap adjuster half a turn at a time until the gap is such that there is some resistance to moving the paper.
- Check that this gap is consistent across the bed and if not adjust the bed levelling a bit more.

5 Bed Level testing

When the bed level setting and initial Z gap setting have been performed the testing of the adjustments can be made more finely by printing a calibration object designed for this purpose. First pre heat the bed and the nozzle:

- Press the knob and rotate the knob to select the "**UTILITIES Menu**" press the knob to confirm, another menu will be displayed.
- Rotate the knob to select "**Pre Heat PLA"** (or **ABS**) and push to confirm.
- Rotate the knob to selected either "**PLA 1"** or "**ABS 1**".
  or "**PLA bed " or "ABS bed"**
  The selection made will set the target nozzle / bed temperatures.

Next print the bed level test object:



The test bed level object

- Press the knob and rotate the knob to select the "**Print SD Card**" and press to select
- Rotate the knob to select the **bedleveltest** Object and press to confirm.
- The bed level object will be printed. Examine the skirt and brim and the object itself to check if the print shows any issues indicating that the bed is not level.
