Ender 3 V3 KE & SE - Levelling the Bed Instructions

BEFORE

-1.33	-0.85	-0.39	0.10	0.63
-1.18	-0.71	-0.22	0.27	0.78
-0.98	-0.51	-0.01	0.46	0.95
-0.80	-0.30	0.15	0.62	1.15
-0.60	-0.14	0.33	0.80	1.31

+1.31 To -1.33 OUT 2.64mm

AFTER

-0.02	-0.04	-0.04	-0.08	-0.08
-0.01	-0.03	-0.04	-0.07	-0.07
0.02	0.04	-0.00	-0.03	-0.01
0.04	0.01	0.00	0.01	0.00
0.01	-0.04	-0.02	-0.02	0.01

+0.04 To -0.08 OUT 0.12mm

1) Overview

The following describes how I levelled the bed on my Ender 3 V3 KE

When I got my printer it was tantamount to cheating, every first layer was perfect, with what has to be one of the best auto bed levelling systems out there.

I thought it odd at the time my prints were 0.71 mm out in depth over 95 mm.

**Before Leveling The Bed**

After Leveling the Bed

I later realised that the printer corrected any discrepancies over the first layers, so if your bed is out of level your prints will be out by the same amount. (Thicker and Thinner)

This is not a problem when printing Vases or Snakes, however when you are printing geometric objects it can be critical.

My printer bed differed by 2.64mm over the full bed, I have since corrected this and it is now only 0.12mm. This varies slightly every time I do an auto level

2) Decide if you need to level up your machine

a) See what the auto level output is.

b) Print out the test print and use a vernier to measure the discrepancies, it should reflect the auto level output.

c) Measure the test print using a vernier in several locations. (It should be 5.00mm)

d) You need to make your own mind up if you need to level your bed depending on what you are printing.
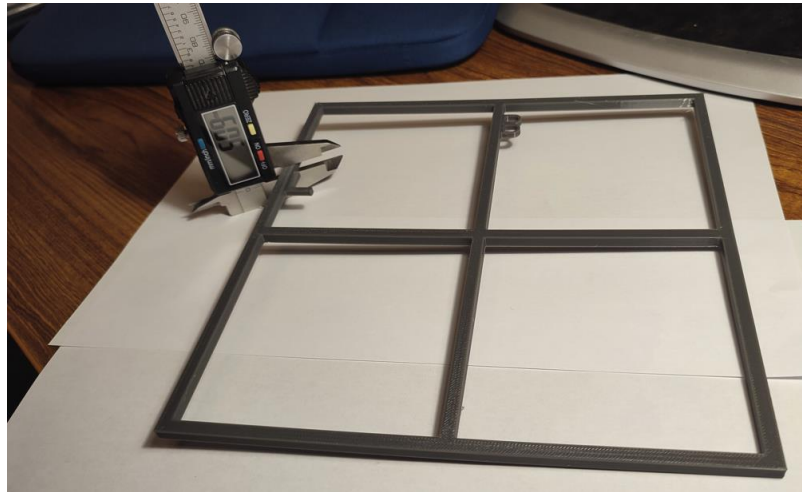
3) Tools and Materials

a) Drill & and a new sharp 4mm Drill Bit

b) Dremel Multitool or Similar with a grinding disk

c) An assortment of 4mm washers

d) The printer's toolkit (32.5mm Alen Key)

You will need to purchase a set of Metric Feeler Gauges to destroy (This is what the Shims will be made off) The parallel ones should make better Shims.

I used an old set I had laying around.

0.04 - 0.63mm
.0015 - .025 inch

4)   Levelling the Bed Procedure

As my printer is set up I will not be dismantling it, I will show the steps to get there.

a)   Before you start remove the build plate an ensure all of the fixing screws are just nipped up (Not to Tight not to lose), I found 2 out of the 4 screws loose. Replace the build plate.

b)   Run your bed levelling, take a photo for prosperity. If it is accurate there is no need to continue.

c)   Adjust the X Axis Gantry to be parallel to the bed. This is well documented make sure you move the centre of the bed directly under the gantry.
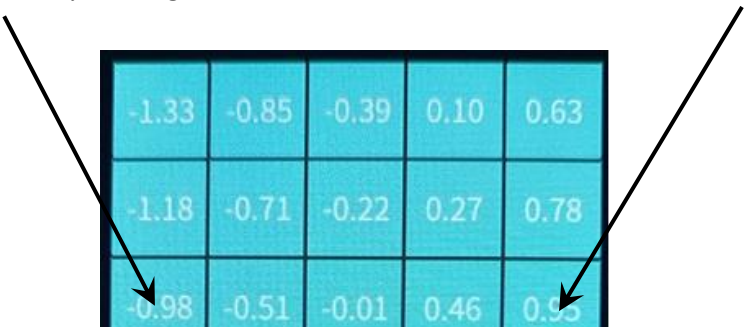
Follow this link - https://youtu.be/Cmwq9r5tePk

Most use blocks of equal size under the gantry, I measured mine with my verniers
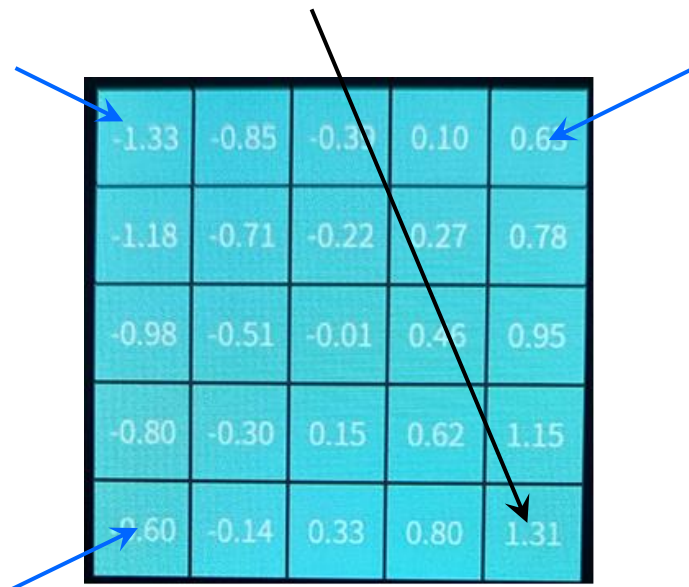

Run the auto bed levelling again

The centre left and right values should be the same or very close, (Not as Shown) repeat c) until you have them as close as you can get them

-1.33	-0.85	-0.39	0.10	0.63
-1.18	-0.71	-0.22	0.27	0.78
-0.98	-0.51	-0.01	0.46	0.55
-0.80	-0.30	0.15	0.62	1.15
-0.60	-0.14	0.33	0.80	1.31

d)   Run the auto bed levelling, one of the corners will be high and will not need shimming.


Jot down for each corner the difference between the high corner, for instance if the high corner was 0.45

	Hi	Corner	Shim
Back Left	0.45	-0.20	0.65mm
Back Right	0.45	-0.15	0.60mm
Front Left	0.45	0.35	0.10mm

c)   Make the shims, use washers where you can, more than one shim or a washer and shim may be needed to make up the difference.

i)   Drill the hole holding the handle, have the feeler gauge over a piece of wood for support. If it is a really fine shim you will need to sandwich the feeler gauge between two pieces if wood to prevent it wrapping round the drill.
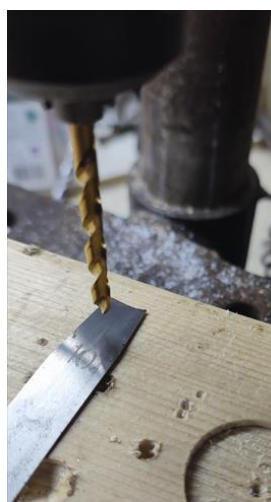
ii) Cut the hole out of the feeler gauge to make the shim, I found the best tool was my multi tool grinder

iii) Remove the build plate and slack off all of the screws, I found the magnetic stick on pad had been hurriedly fitted and interfered with the screws which I had to force out
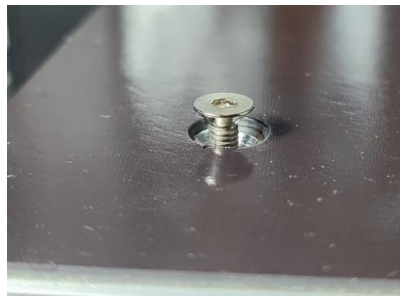
iv) Add the shims and washers to each corner in turn, remove the screw and slide the shim in. I found tweezers very helpful.
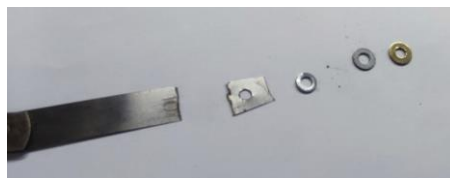
After all the shims are fitted, nip up all of the screws **(Do not fully tighten**), put the build plate back on.

d)   Run the bed levelling again, we now should be very close.

I attempt to get to a difference of 0.10mm, now where a corner is high tighten the screw a quarter of a turn or less, where a corner is low slacken a screw a quarter of a turn or less.

Repeat and stop when the difference of 0.10mm or you cannot get any better.

Note: The Auto Bed Levelling will give slightly different results every time

Finished – Good Luck