

Calibrating your CNC

The leadscrews on our hobby level machines are manufactured by “hot rolling” to form the thread – fluctuations in temperature can mean there are tiny variations between the pitch of the thread and the theoretical value. This means we have to adjust the “steps/mm” values in our controller configuration to correct for these errors.

To calibrate an axis, use a pointy tool close to the spoilboard (don't make an actual cut – that would mean any tool deflection would be included in the results). Start at one end of the axis, jog a short distance – that will take up any backlash you have in your machine – make a mark. Move as far as you reasonably can – with some control software you can change the jog distance – if you can't I'll put some g-code at the end of this guide for moving a fixed distance in one move. Measure how far the machine actually moved. Repeat the whole sequence several times to make sure you are getting consistent results.

Divide the distance you told it to move by the distance it actually moved and multiply your current steps/mm value for that axis by the result.

Then do the whole thing again – getting your steps/mm spot on is vital for accurate results from your machine, but you should only have to do this once. Get it right now, and any inaccuracies that develop later will be caused by something else.

For the Z axis you will need to measure as accurately as you can because you only have a short distance available. You don't need the first short move to take up any backlash -gravity takes care of that. Use calipers to measure the distance moved – a convenient point to measure is the gap between the router/spindle mount and the spoilboard.

G-code for movements – the example shown is for the X axis and assumes you are starting on the left side of the machine.

G91 G0 Xnnn – where nnn is the distance you want to move

If you want to start on the right side of the machine the code would be

G91 G0 X-*nnn*

G91 changes the movement mode to *relative* – the machine will move that distance from where it is now. G91 is MODAL – the machine will stay in that mode until you change it back. It is **important** that, when you have finished calibrating your machine you send G90 to change the movement mode back to *absolute* so that it will move to the workplace coordinate your g-code from your cam software tells it to.

The BACK, RIGHT, UP corner on a cnc machine is always the highest value, so to move away from it the move command (G0 is a rapid move) has to be negative. To move towards that corner the value has to be positive (you don't need to put a + sign though).