

# First steps

## Desktop CNC-/3D-System STEPCRAFT 300 / 420 / 600



Original instructions

Status: 01.10.2013

**Manufacturer:**

STEPCRAFT GmbH & Co. KG

An der Beile 2

58708 Menden

Germany

Phone: +49 (0) 2373 – 179 11 60

Fax: +49 (0) 2373 – 179 11 59

E-mail: [info@stepcraft-systems.com](mailto:info@stepcraft-systems.com)

Website: [www.stepcraft-systems.com](http://www.stepcraft-systems.com)



Please read these instructions completely before the initial start-up of your machine and only operate the machine when you are sure that you have understood everything.



Before starting, the machine should be checked for proper functionality and perfect technical condition.

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## 1 GENERAL NOTES

This manual is intended to familiarize you with your desktop CNC-/3D-System and to give you all the information you need in order to operate the machine safely and professionally.

These instructions apply to the desktop CNC-/3D-Systeme STEPCRAFT 300, 420 and 600 equally, referred to in the following as STEPCRAFT.

Please read this manual completely before first use of your machine.

To minimize the risk of injury and / or to prevent property damage, please only operate the machine and the associated control when you are sure that you have understood these instructions completely!

Should questions arise, please contact us. Our contact details can be found on the second page of this manual.

## 2 PREPARATION OF DESKTOP 3D-SYSTEM

The following installation and testing instruction only applies to machines with a USB interface and USB software WinPc-NC Starter or WinPc USB. For buyers of the machine with a parallel port, only section 2.5 in chapter 2 is relevant.

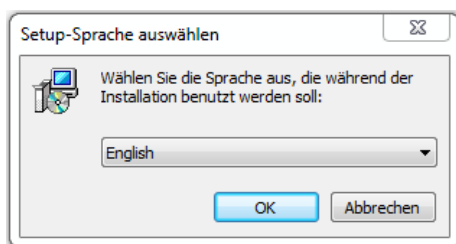
### 2.1 INSTALLING THE SOFTWARE

**Note:** Win PC-NC starter comes with a desktop 3D system. Please connect this to the computer only after the software has been completely installed and thus the necessary drivers have been copied.

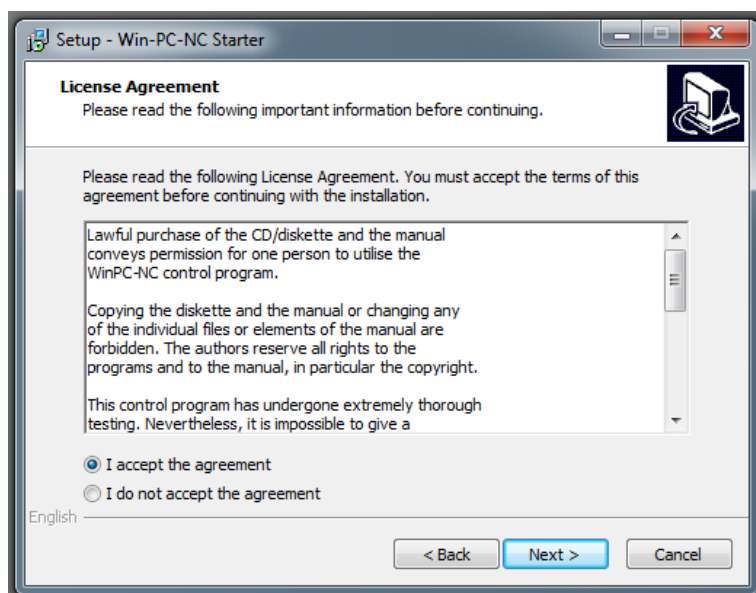
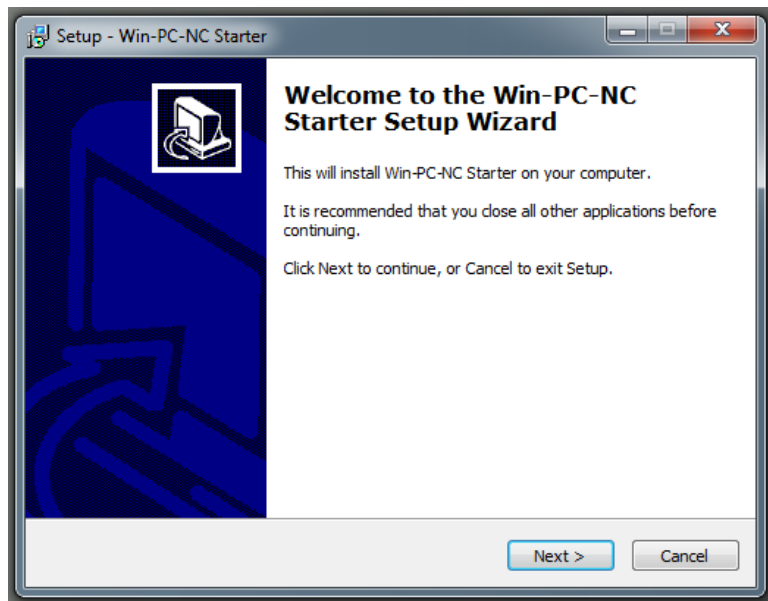
The installation of WinPc-NC is an easy to use set up program. Please insert the CD into the drive and wait for the automatic installation to start. Should this not start within a few seconds, run the SETUP.EXE program from the CD:



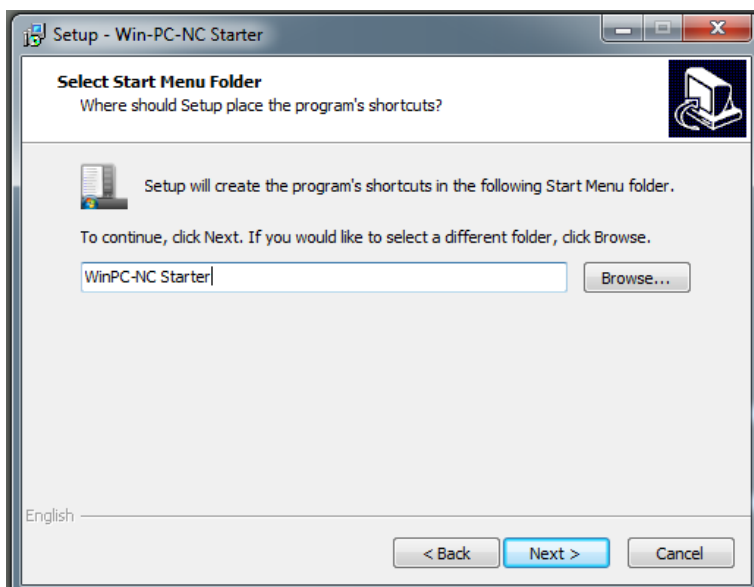
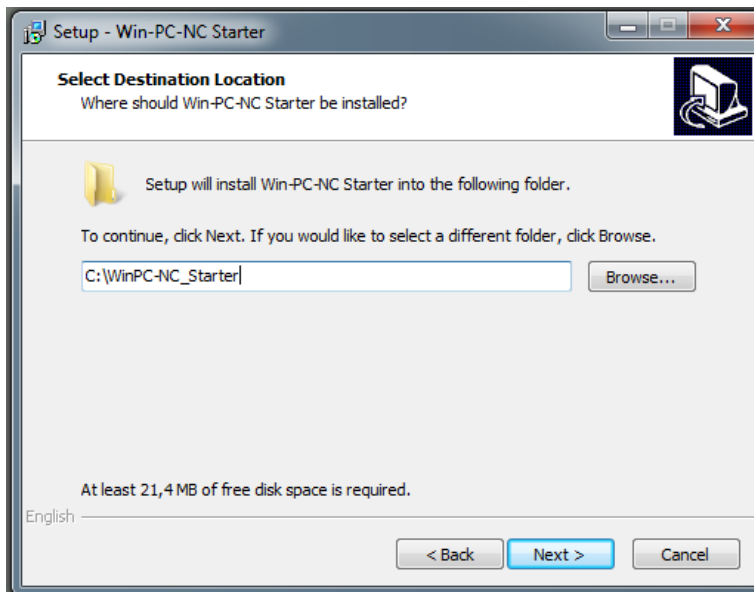
Select your language and press OK to confirm:

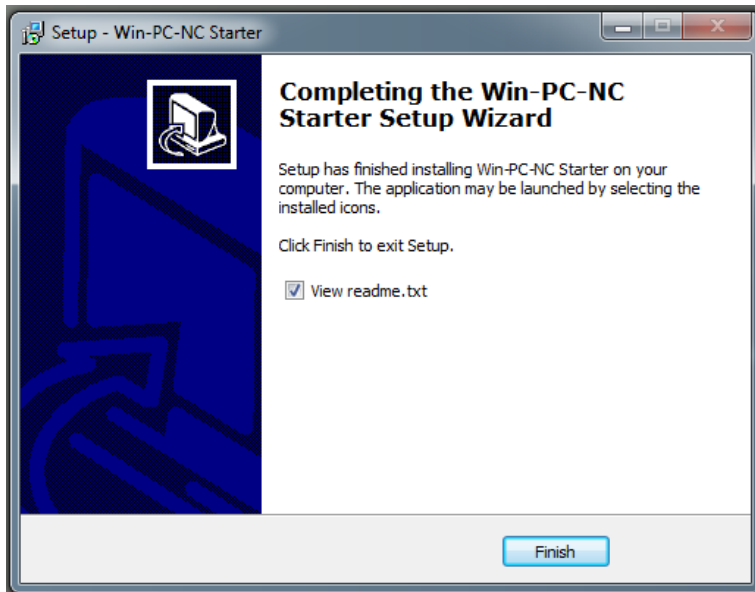


Confirm the following installation steps with "Next":



Select the installation directory / start menu folder and finish the installation by clicking "Finish":

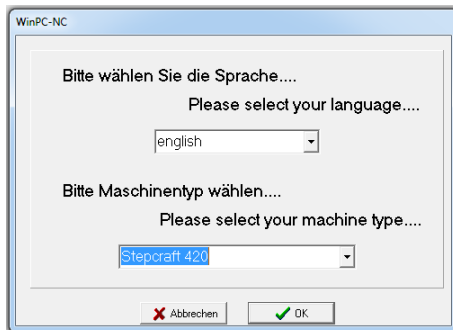




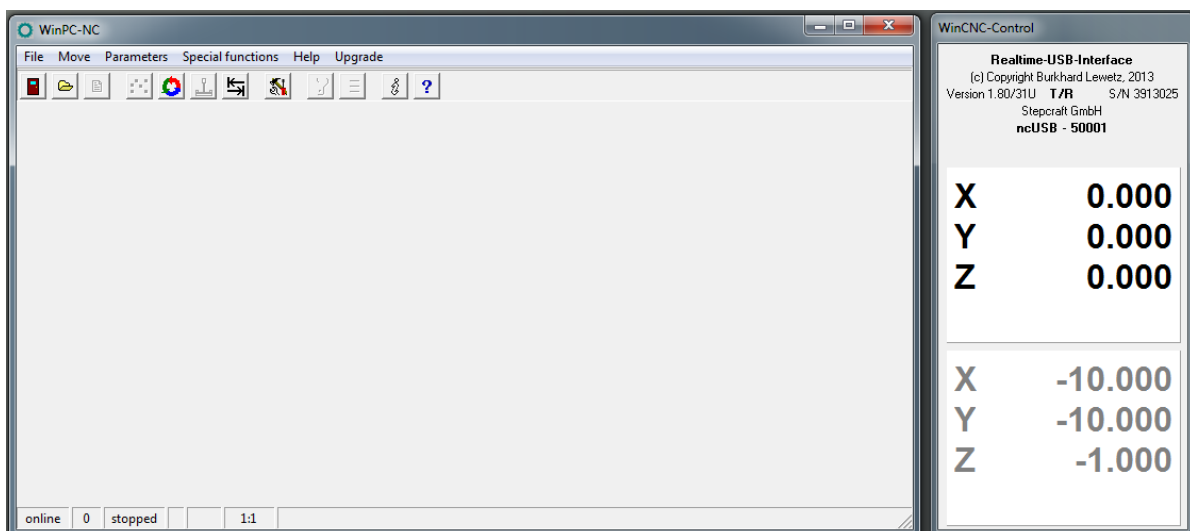
The software installation is now complete.

## 2.2 CONNECTING THE MACHINE TO THE COMPUTER

After completing the software installation, connect the AC adapter to the power supply and the STEPCRAFT on desktop 3D system. Connect the machine with the enclosed USB cable to the computer and launch the program: Win PC-NC starter / USB via the icon on your desktop. Select the language and your machine type:



Confirm with "OK". The program is now initialized with the STEPCRAFT machine parameters.



## 2.3 CHECKING OPERATIONAL READINESS

After completing the software installation, the machine is ready. You can check the status of the machine via the LEDs on the control board on the back of the machine:



(left-to-right direction: USB module LED 1, control board LED 2 and LED 1)

Status	USB-Modul LED 1 (green)	Control board LED 2 (green)	Control board LED 1 (green)
1	Status = on Win PC-NC program was started, USB interface is ready	Status = on Sharing ok, output stage switched on, emergency switch switched off	Status = on Voltage is applied at (5V)
2	Status = off Win PC-NC program has not been started or is not ready, USB interface <u>not</u> ready	Status = on Sharing ok, output stage switched on, emergency switch switched off	Status = on Voltage is applied at (5V)
3	Status = off Win PC-NC program has not been started or is not ready, USB interface <u>is not</u> ready	Status = off Release not OK, off stage, emergency switch <u>switched on</u>	Status = on Voltage is applied at (5V)
4	Status = off Win PC-NC program has not been started or is not ready, USB interface is <u>not</u> ready	Status = off Release not OK, end stage switched off, power is not active	Status = off Power disabled

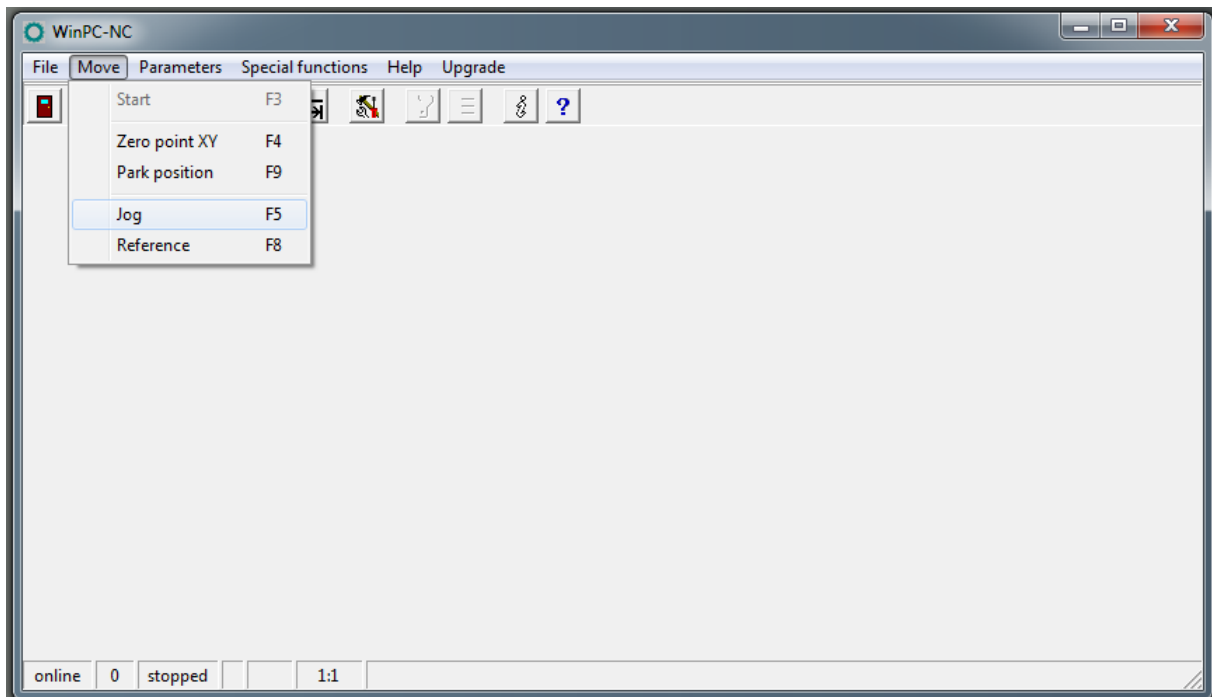
## 2.4 MANUAL TEST

If the STEPCRAFT is in status 1, it can now be moved manually.

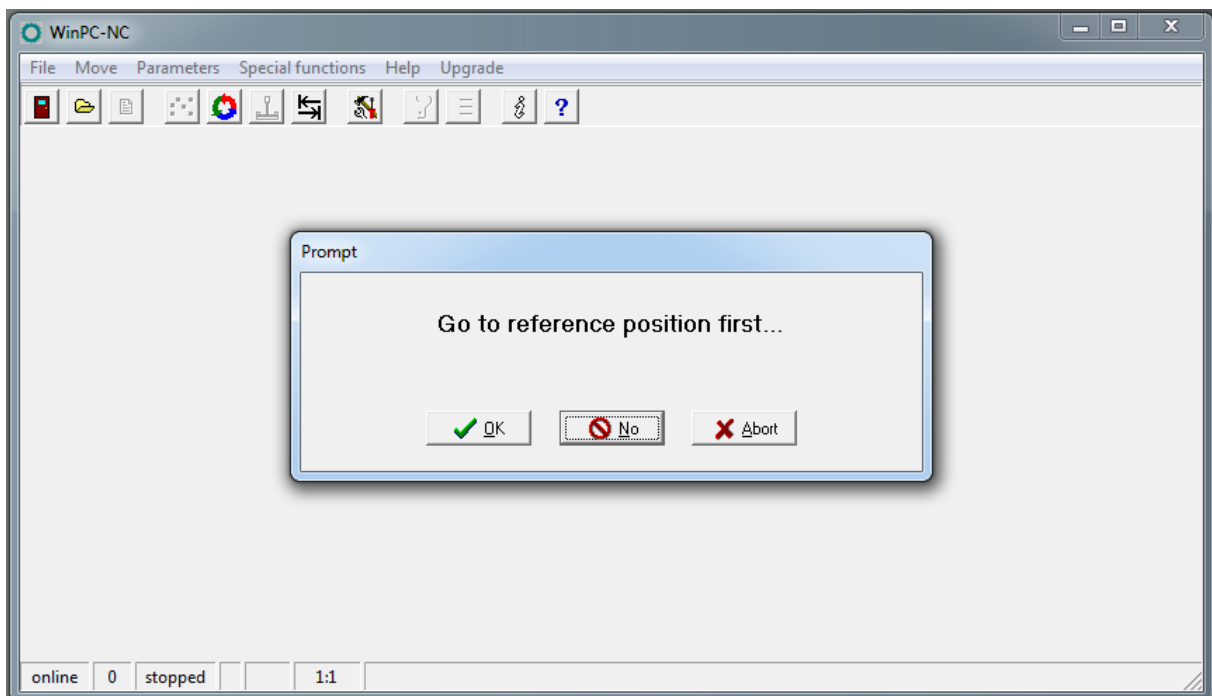
**Note:** Another requirement is that the machine has been properly assembled according to instructions and all guides, thrust bearing and the rotary screw are greased or oiled according to the maintenance plan.



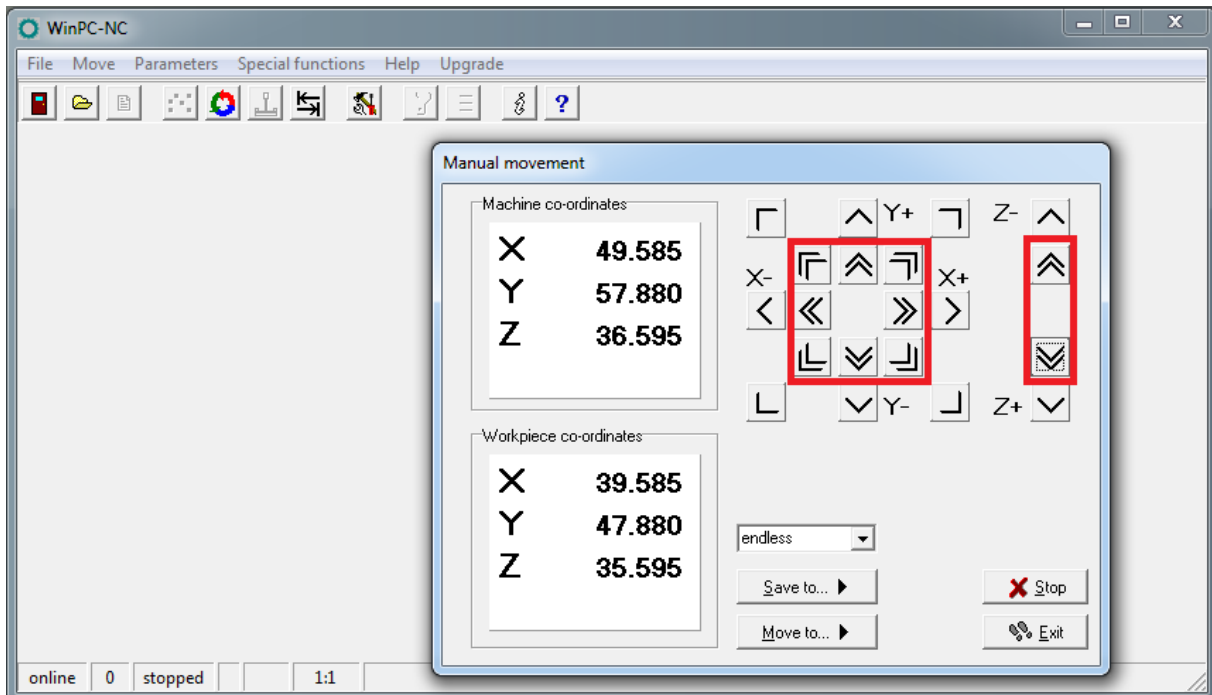
Now open "Jog" (F5) in the "Move" menu:



Confirm the implementation of referencing with "No":



Move the cursor over the arrow keys and move the machine carefully into the middle of the workspace:



Double arrows = manual drive fast (X / Y axis at 30 mm / s, Z axis at 25 mm / s)

Simple arrows = manual drive slow (X / Y / Z axis at 5 mm / s)

## 2.5 VERIFICATION OF THE LINEAR AXES

The machine must be noiseless and move without friction and tension in all linear axes.

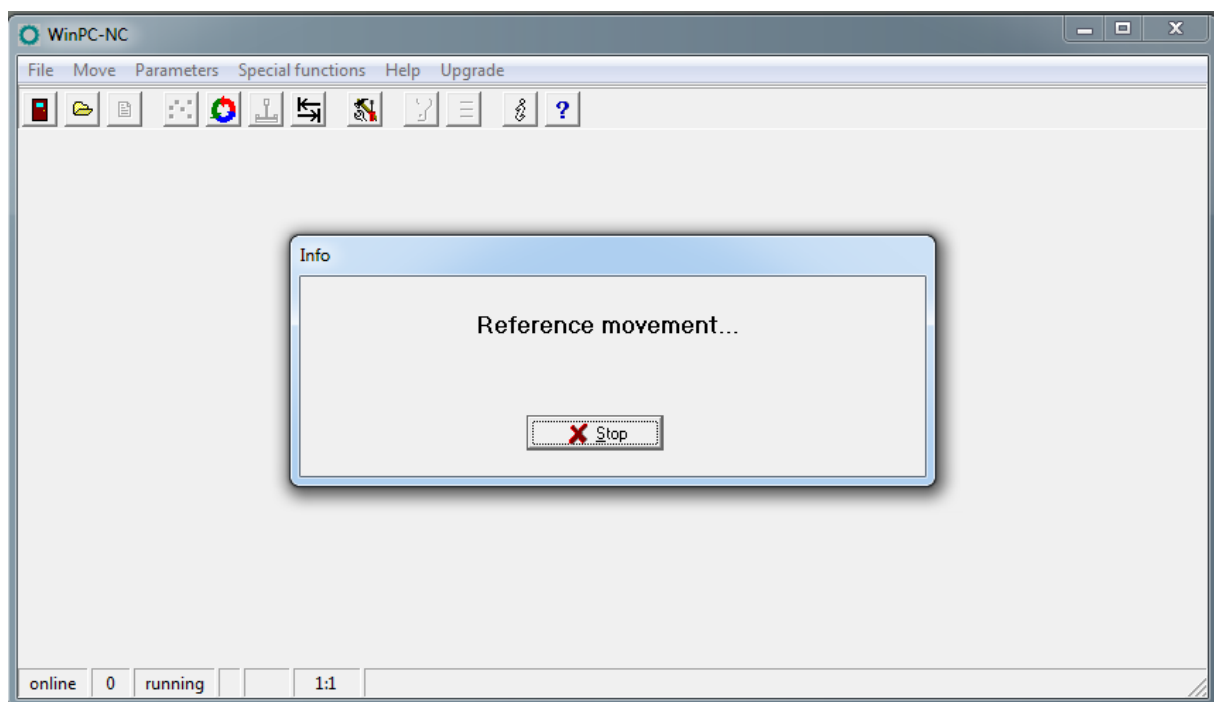
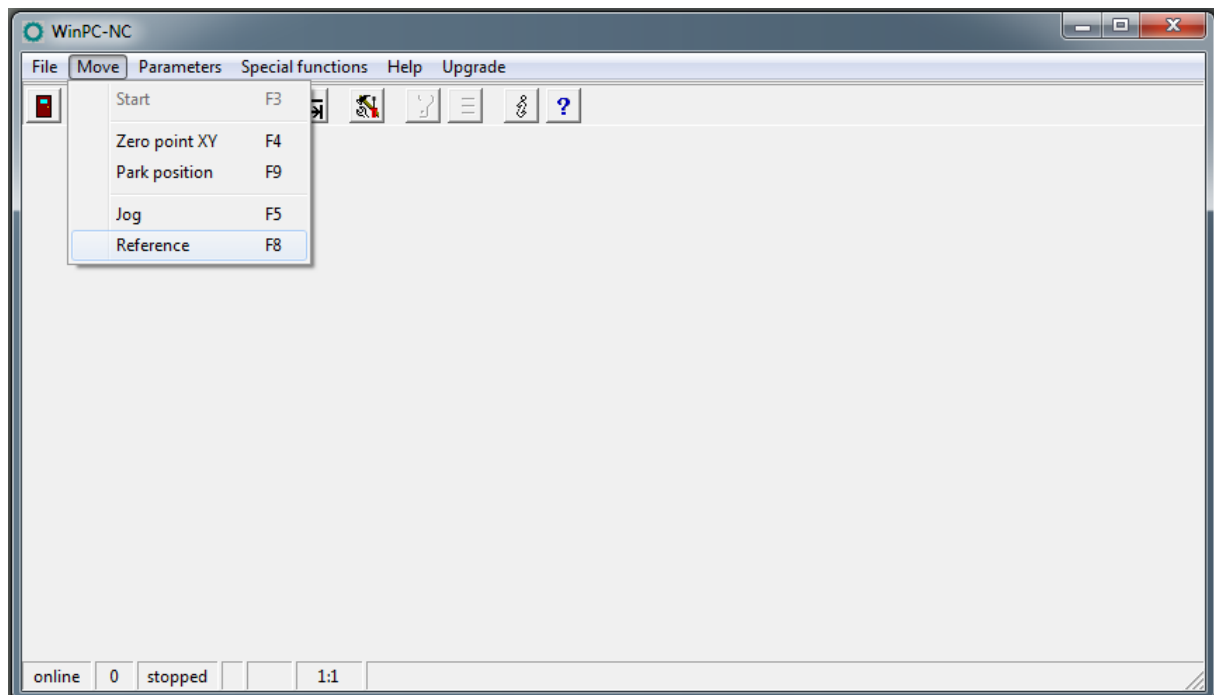
For checking, please proceed as follows:

- Place the machine on a level surface
- First loosen the screws of the portal parts of the X-axis (see instruction 3.2 and 3.4), the back (see instruction 4.6) and the front (see instruction 4.18 and 4.19) of the Y axis
- Move the Z axis manually to an average height
- Move the X axis manually to each page of the portal and tighten the screws of each portal page part
- Now move the Y axis towards the back and tighten the screws of the back panel firmly
- Proceed now towards the front and tighten the screws of the front panel

**Note:** If you do not reach the final position of an axis in this way, then you must check the smooth running of linear axes and spindles. To do this, close the WinPc-NC program and unplug the machine from the electricity supply. The X and Z axis can then be moved by hand over the shaft coupler (part 53). For movement of the Y axis remove the timing belt cover (part 65), and possibly also the timing belt (part 63) to check the axes individually.

## 2.6 REFERENCING

Now open "Reference" the "Move" menu (F8):



The machine now drives all axes, starting with the Z-axis successively until reaching the reference switch. When the referencing is completed, the machine (seen from the front) has on the left (X), back (Y), above (Z).

At the same time, the reference for the machine zero point is initialized (following Example is for STEPCRAFT 420):

WinCNC-Control	
Realtime-USB-Interface	
(c) Copyright Burkhard Lewetz, 2013	
Version 1.80/31U T/R S/N 3913025	
Stepcraft GmbH	
ncUSB - 50001	
X	0.000
Y	419.000
Z	0.000
X	-10.000
Y	409.000
Z	-1.000

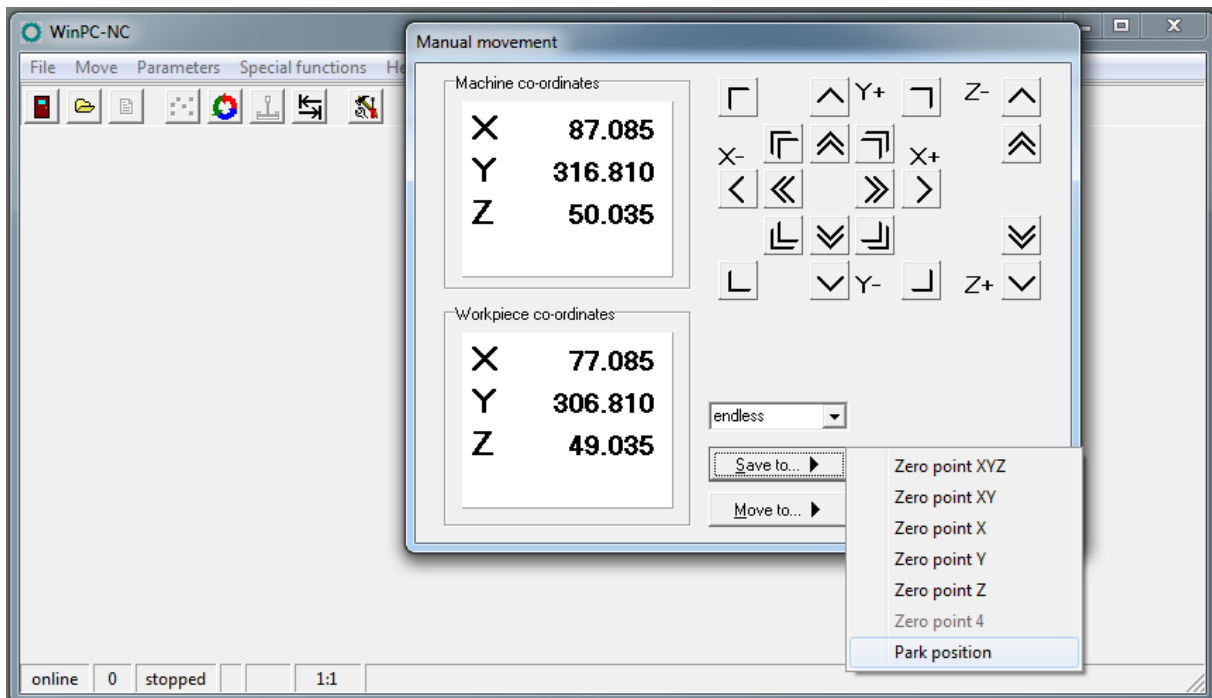
**Note** The actual machine zero point is (front) Left (X), front (Y), above (Z).

The reference run is to be carried out regularly after turning on the machine and before starting work.

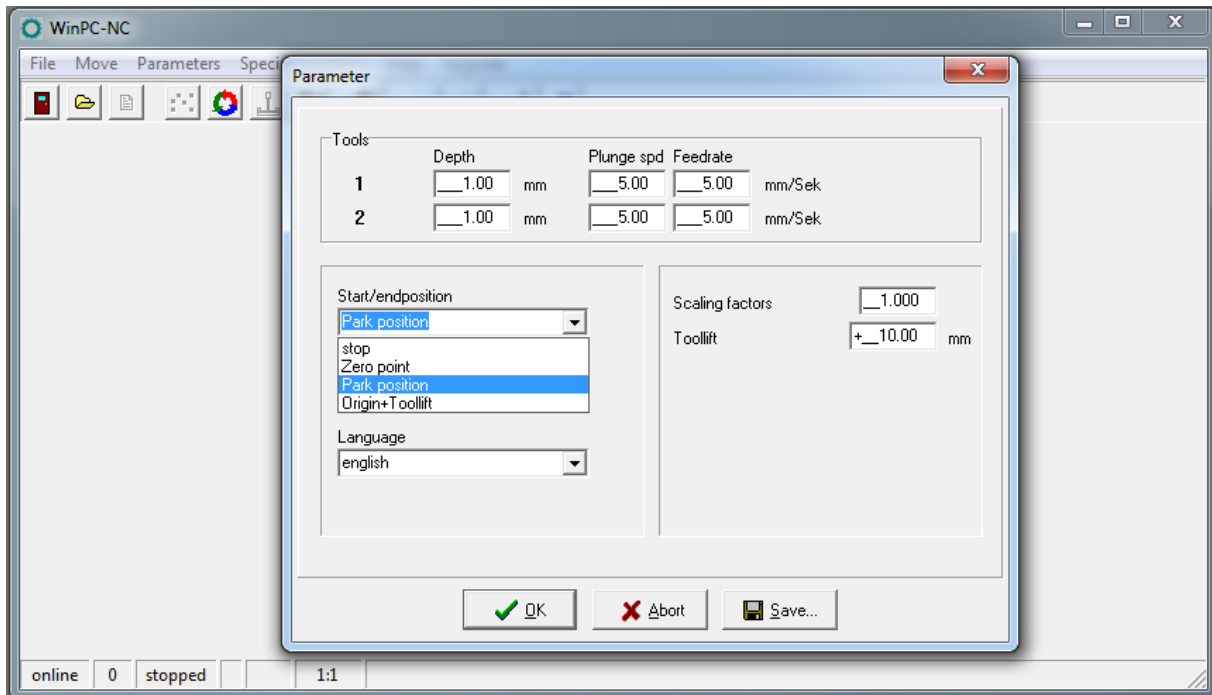
## 2.7 PARKED POSITION

The park position is the position of the machine from which it can be started after the completion of referencing and / or after completion of the program run.

Drive the machine via the menu item Move / Jog / to a parked position of your choice. The park position is then stored using "Save to":



Whether the machine is to move to the park position e.g. after performance of referencing, is set in the menu under Parameters / Misc. / Start-/end position:



## 3 PREPARATION OF THE FIRST COMPONENT

For further implementing the first step instruction you need the following materials:

- Spindle, eg Proxxon IBS / E with clamping adapter or alternative spindle
- Cutters for woodworking (spiral cut) with 1 mm diameter or similar tool
- Offer worktop, e.g. out of MDF
- Workpiece material such as plywood with a thickness of 3 mm

Alternatively, you can perform your first test with a pen plotter.

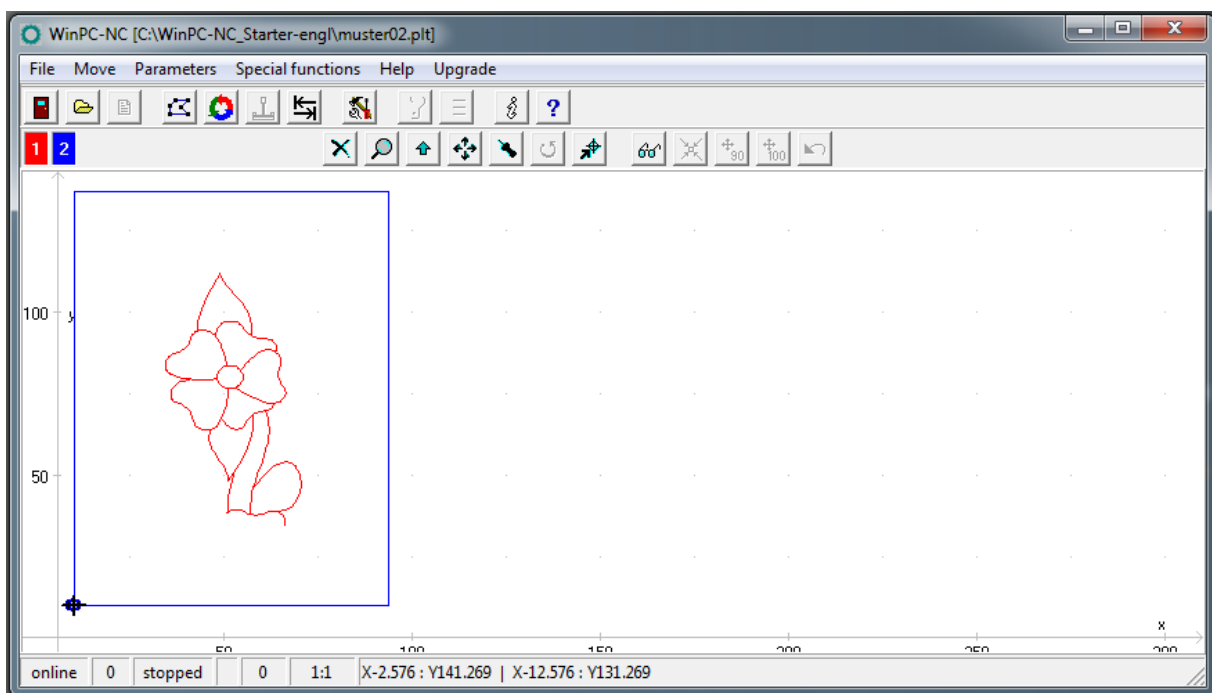
### 3.1 CLAMPING OF THE WORKPIECE MATERIAL

First you put the offer worktop and then the workpiece material on the machine table. With the accompanying retainers from the STEPCRAFT fix the two plates on the machine table. The screws have to only be tightened by hand:



## 3.2 IMPORT THE PATTERN DRAWING

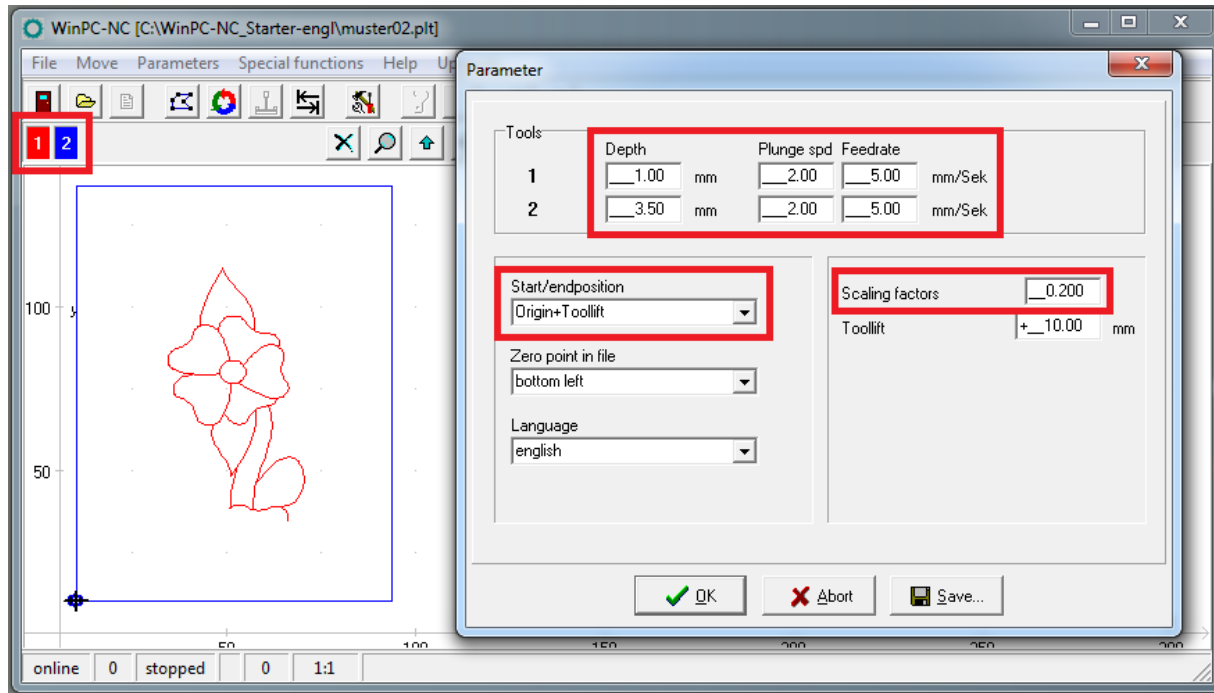
Open the "File" menu and then "Open". Navigate to the installation directory of the NC WinPc starter / USB installation (often c: \ WinPc-NC\_xxx \) and open the file *Muster02.plt* :



The file consists of an engraved pattern (red line) and the cut out of the workpiece (blue line).

## 3.3 SETTING THE PARAMETERS

Now open the "Parameters" menu and go to "Misc." and make the following settings:



The engraving (tool 1 = red line) is to be set with a depth of 1 mm.

The clamped workpiece material has a thickness of approximately 3 mm in this example. The cut out is thus a service of 3.5mm (2 tool = blue line).

**Note:** Numbers with decimal places must be entered with a decimal point. The correct depth setting for tool 2 is therefore 3.5.

In this example the pattern is made of plywood or plastic. The in-feed rate / plunge speed is thereby set to 2 mm / sec and the feed rate to 5 mm / s.

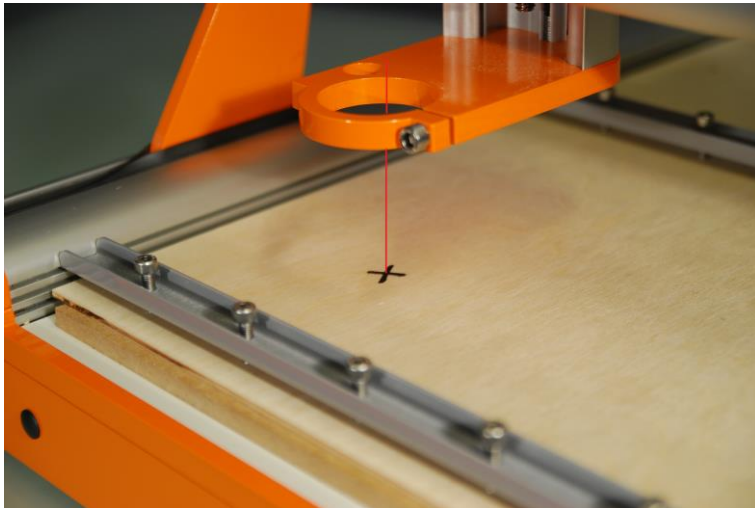
Set the scaling factor for the sample file to 0.2. Thus, the drawing template is reduced to 20% of the original size.

Set the Start-/End position as the *Origin + Tool lift*.

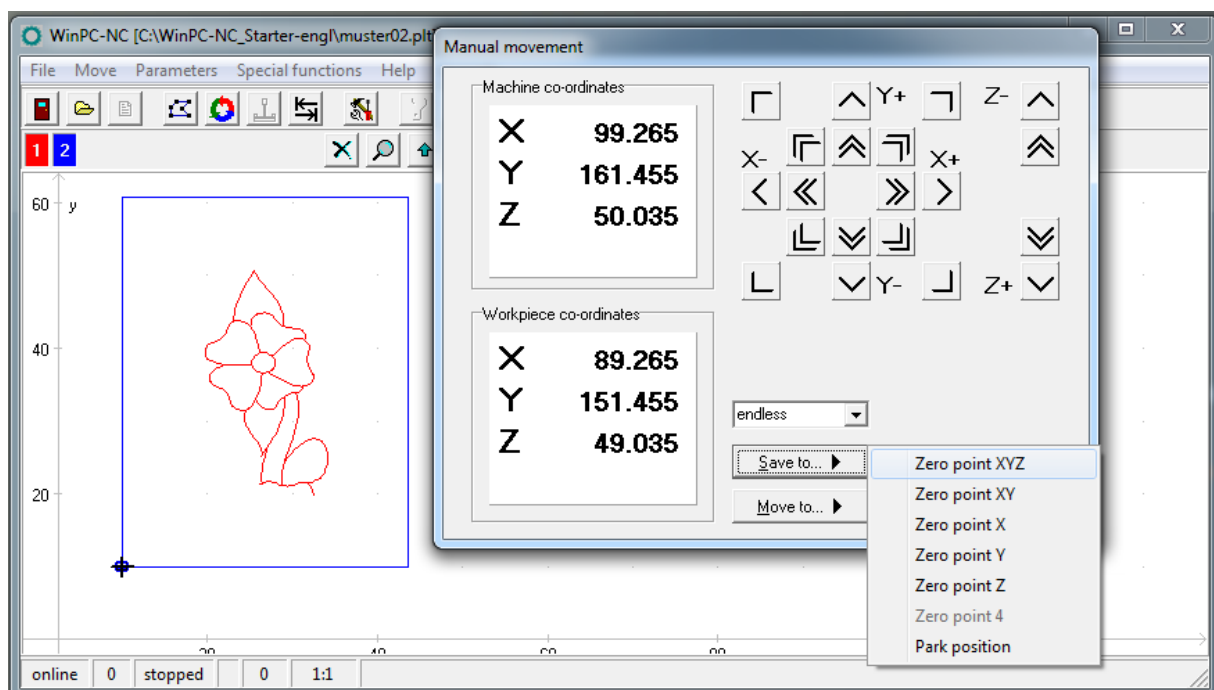
### 3.4 DEFINITION OF WORKPIECE ZERO POINT (X, Y)

Highlight the starting point on the work sheet with an "X". Make sure that seen from there from the front there is sufficient travel available to the right and to the rear (at least 50 - 70 mm).

Open the "Move" menu and then "Jog" (F5) and go manually to the point marked. Move the Z-axis at half maximum height.



Save this using "Save to" as the zero point X / Y / Z.



After saving the machine runs automatically 10 mm higher in the Z-axis (tool lift). The workpiece coordinates are then X = 0.000, Y = 0.000 and Z = -10.000.

### 3.5 TEST DRIVE WITHOUT THE USE OF TOOLS

Now open the "Move" menu and go to "Start" (F3). The machine automatically starts with the processing of the contour. Make sure that the spindle can move in the work area without collision. Please also note that for later milling the spindle start is much lower and a collision with the retainers or the Y-rails should be avoided.

### 3.6 PREPARATION OF THE MILLING SPINDLE

Tension the milling tool in the spindle. Make sure that you select the correct adapter sleeve, so that the cutter is held tightly.



The cutter should always be inserted as far as possible into the chuck.



After the mill has been clamped in the spindle, set the clamping adapter (if required) in the 43 mm spindle taper of the STEPCRAFT. The milling spindle is used in turn in the clamping adapter. Lock the spindle in the spindle with the correct Allen key.

### 3.7 DEFINITION OF WORKPIECE ZERO POINT (Z)

Now open "Jog" (F5) in the "Move" menu: Open the sub-item "Move to" and select *Zero Point X / Y*.

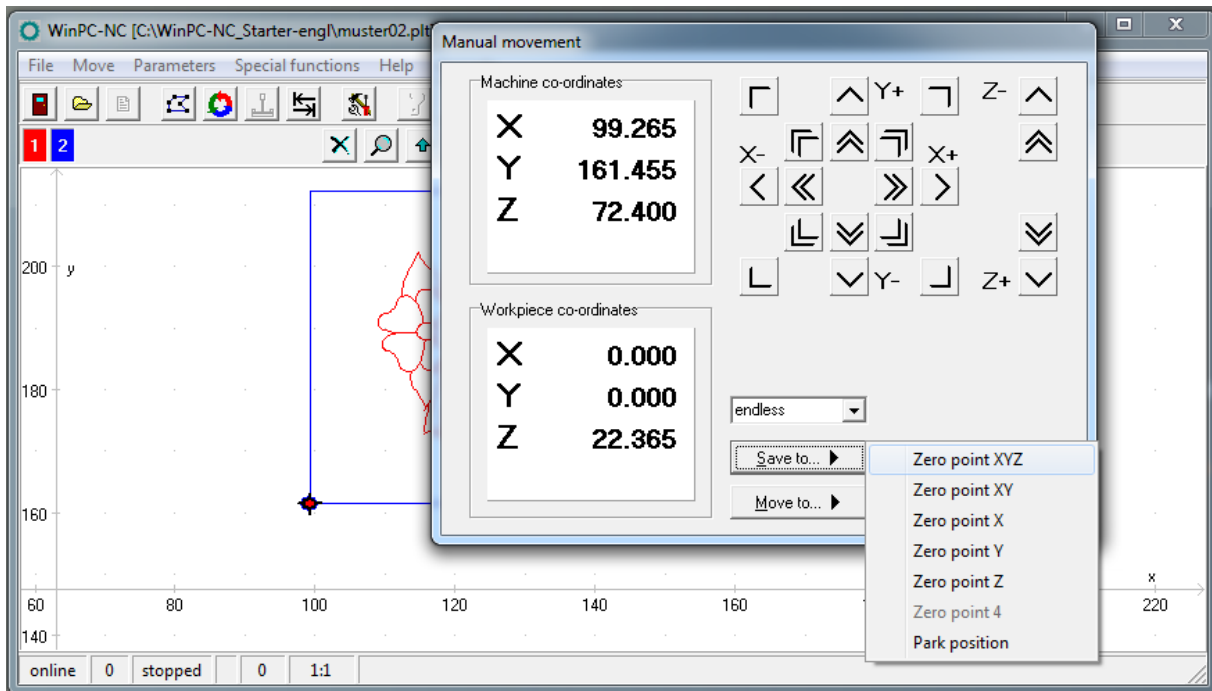
The machine automatically moves to the previously stored X / Y coordinates ("X").



Take a piece of paper, put this on the work sheet and proceed slowly manually in the Z-axis downwards towards the workpiece:



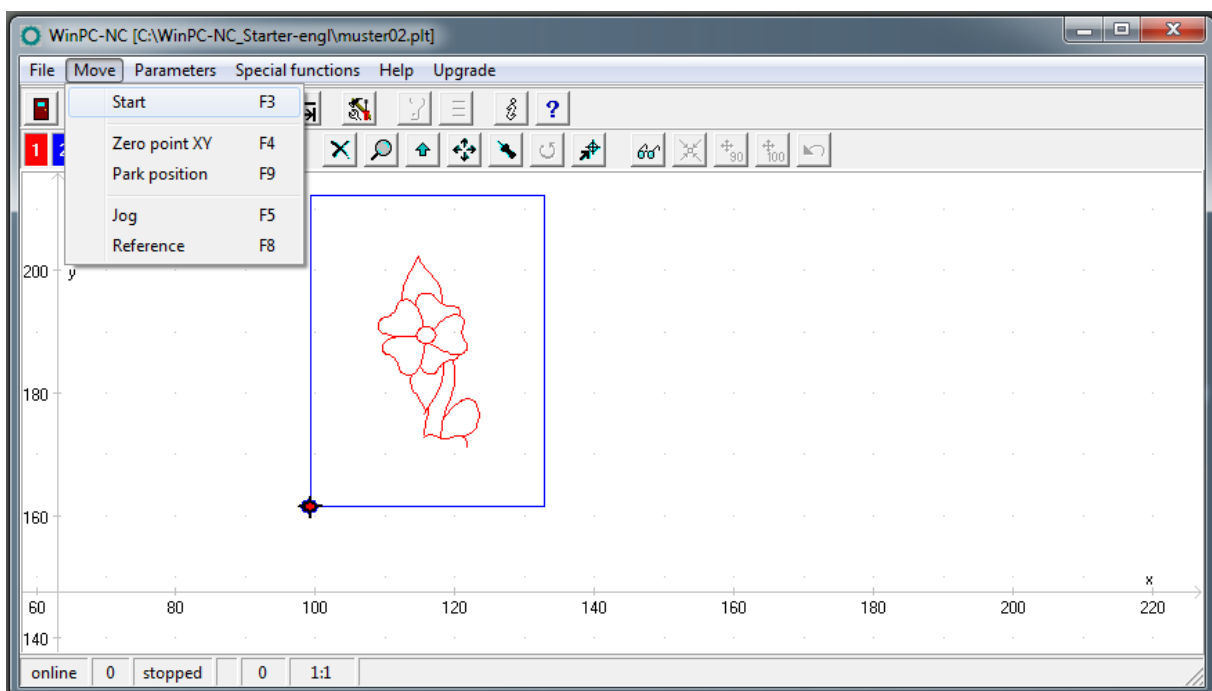
Move the paper back and forth with your fingers. Once the cutter touches the paper, save that point again as the workpiece zero point X / Y / Z:



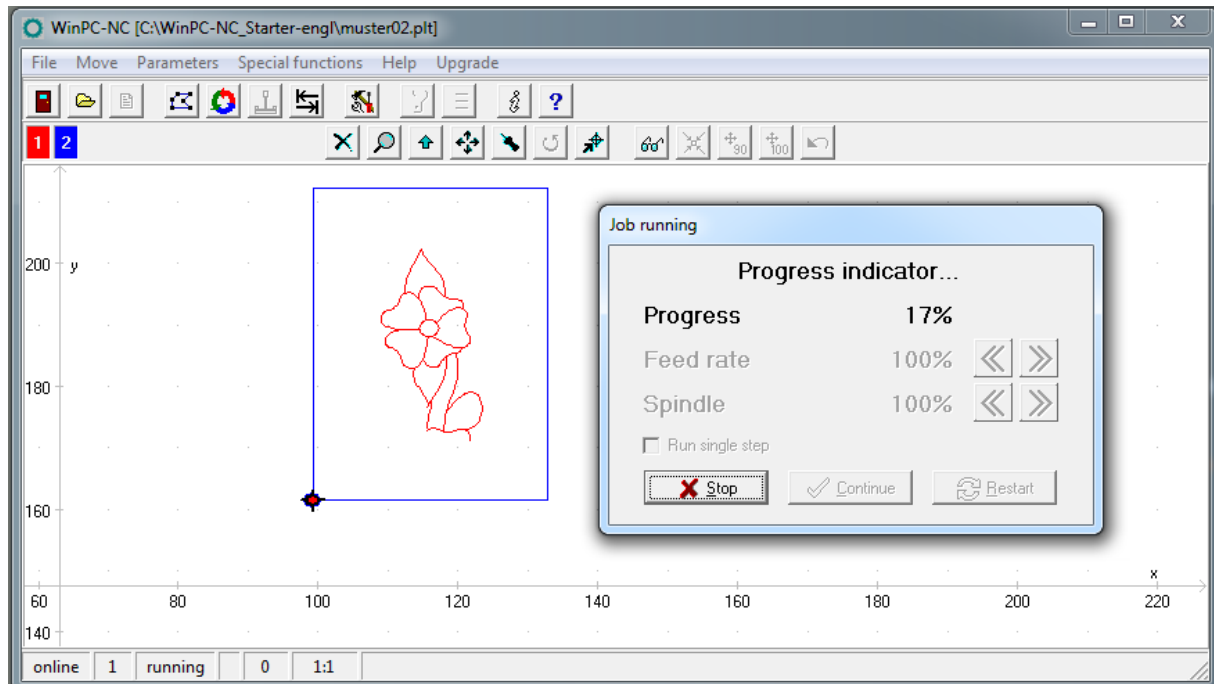
## 3.8 PREPARATION OF THE SAMPLE COMPONENT

In preparation for the first test drive, please proceed as follows:

- Check the seating of the workpiece plate
- Preselect the speed of the spindle to 15,000 rev / min.
- Turning the spindle on
- Now open the "Move" menu and go to "Start" (F3).



The machine moves to the workpiece zero point  $X = 0.000$  and  $Y = 0.000$ , and then in the Z-axis for the first step (= engraving, red line) down to  $Z = 1.000$ . The work in progress is displayed in%:



After completion of the work process, the system automatically moves to the workpiece zero point. Turn off the spindle and remove the workpiece.

**Congratulations!** You have made your first workpiece with your STEPCRAFT.



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