

# First Steps

## 3D Print Head PH-40



\* Picture contains optional accessories

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Translation of the Original First  
Steps Instructions

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## NOTICE

All instructions, warranties and other collateral documents are subject to change at the sole discretion of STEPCRAFT, Inc. For up-to date product literature, visit [www.stepcraft-systems.com](http://www.stepcraft-systems.com) for customers from Europe or [www.stepcraft.us](http://www.stepcraft.us), for customers from US / Canada and click on the service & support tab for this product.

## Meaning of Special Language

The following terms are used throughout the product literature to indicate various levels of potential harm when operating this product: The purpose of safety symbols is to attract your attention to possible dangers. The safety symbols, and their explanations, deserve your careful attention and understanding. The safety warnings themselves do not eliminate any danger. The instructions or warnings they give are not substitutes for proper accident prevention measures.

- NOTICE** Procedures, which, if not properly followed, create a possibility of physical property damage AND little or no possibility of injury.
- CAUTION** Procedures, which, if not properly followed, create a probability of physical property damage AND a possibility of serious injury.
- WARNING** Procedures, which, if not properly followed, create a probability of property damage, collateral damage, serious injury or death OR create a high probability of superficial injury.



Safety Alert: Indicates caution or warning. Attention is required in order to avoid serious personal injury.



Read the ENTIRE instruction manual in order to become familiar with the features of the product and how to operate them. Failure to operate the product correctly can result in damage to the product, personal property and cause serious injury, electric shock and/or fire.

This is a sophisticated hobby and a semi-professional product for advanced craftsmen with previous experience in the operation of tools such as electric drills, routers and computerized tools like CNC routers or 3D printers. It must be operated with caution and common sense and requires some basic mechanical ability. Failure to operate this product in a safe and responsible manner could result in personal injury or damage to the product or other property. This product is not intended for use by children without direct adult supervision. Do not attempt disassembly, use with incompatible components or to augment the product in any way without the approval of STEPCRAFT GmbH & Co. KG or STEPCRAFT, Inc. This manual contains instructions for safety, operation and maintenance. It is essential to read and follow all the instructions and warnings in the manual, prior to assembly, setup or use, in order to operate correctly and avoid damage or serious injury.

**Age Recommendation: For advanced handcrafters ages 14 and above. This is not a toy.**

**SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE.**

**Should you encounter any doubts or require any further information, please do not hesitate to contact us before the commissioning of the power tool. Our contact details can be found on the front page of this manual.**

The term "power tool" in the warnings refers to your mains-operated (corded) power supply and the 3D Print Head itself.

## General Power Tool Safety Warnings

### Work Area Safety

<b>NOTICE</b>	<b>Keep work area clean and well lit.</b> Cluttered or dark areas invite accidents.
<b>CAUTION</b>	<b>Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.</b> Power tools create sparks which may ignite the dust or fumes.
<b>NOTICE</b>	<b>Keep children and bystanders away while operating a power tool.</b> Distractions can cause you to lose control and can result in accidents.
<b>CAUTION</b>	<b>Always operate your tool indoors on a solid horizontal table or workbench.</b>
<b>NOTICE</b>	Always keep the product, related tools, small parts and electrical components out of the reach of children.

## Electrical Safety

<b>⚠ WARNING</b>	<b>Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.</b> Unmodified plugs and matching outlets will reduce the risk of electric shock.
<b>⚠ WARNING</b>	<b>Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges and refrigerators.</b> There is an increased risk of electric shock if your body is earthed or grounded.
<b>⚠ WARNING</b>	<b>Do not expose power tools to rain or wet conditions.</b> The spindle is only suitable for indoor use. Water entering a power tool will increase the risk of electric shock.
<b>⚠ WARNING</b>	<b>Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts.</b> Damaged or entangled cords increase the risk of electric shock.
<b>⚠ WARNING</b>	<b>If operating a power tool in a damp location is unavoidable, use a Ground Fault Circuit Interrupter (GFCI).</b> The use of a GFCI reduces the risk of electric shock.
<b>⚠ WARNING</b>	Never spray ignitable liquids or any other liquid on this product.

## Personal Safety

<b>⚠ CAUTION</b>	<b>Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired and/or under the influence of drugs, alcohol or medication.</b> A moment of inattention while operating power tools may result in serious personal injury.
<b>NOTICE</b>	<b>All persons who operate the power tool must have read and fully understood all relevant operating instructions.</b> Misunderstandings may result in personal injury.
<b>⚠ CAUTION</b>	<b>Use personal protective equipment. Always wear safety gloves.</b> Protective equipment will reduce personal injuries.
<b>NOTICE</b>	<b>Dress properly. Do not wear loose clothing or jewelry. Keep your hair above your shoulders, so that it cannot be caught in the linear guides or rotating tools.</b>
<b>NOTICE</b>	<b>Prevent unintentional starting. Ensure the switch is in the off-position before connecting the power tool to the power source, picking it up or carrying the tool.</b> Carrying power tools with your finger on the switch or energizing power tools with the switch on invites accidents.
<b>NOTICE</b>	<b>Keep proper footing and balance at all times.</b> This enables better control of the power tool in unexpected situations.
<b>⚠ CAUTION</b>	<b>This tool is controlled by a computer.</b> During operation it cannot be controlled directly. Missing caution, program errors or lack of expertise can cause unexpected movement.
<b>⚠ CAUTION</b>	<b>Do not touch tools or motors as they can become extremely hot during use.</b>
<b>⚠ CAUTION</b>	<b>Never place any portion of the tool or related accessories in your mouth as it could cause serious injury.</b>

## Power Tool Use and Care

<b>⚠ CAUTION</b>	<b>Do not alter or misuse tool.</b> Any alteration or modification is a misuse and may result in serious personal injury.
<b>NOTICE</b>	<b>Do not force the power tool. Use the correct power tool for your application.</b> The correct power tool will do the job better and safer at the dedicated rate for which it was designed.
<b>NOTICE</b>	<b>Do not use the power tool if the switch cannot be turned on and/or off.</b> Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
<b>⚠ CAUTION</b>	<b>Disconnect the plug from the power source and/or the battery pack from the power tool before making any adjustments, changing accessories, or storing power tools.</b> Such preventive safety measures reduce the risk of starting the power tool accidentally.
<b>⚠ CAUTION</b>	<b>Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.</b> Power tools are dangerous in the hands of untrained users.
<b>NOTICE</b>	<b>Maintain power tools. Check for misalignment or binding of moving parts, breakage of parts and any other conditions that may affect the power tool's operation.</b> If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.
<b>NOTICE</b>	<b>Use the power tool, accessories and end mills etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.</b> Use of the power tool for operations different from those intended could result in a hazardous situation.
<b>⚠ CAUTION</b>	<b>Make sure to leave sufficient space to the heated parts (Hot-End) and never touch these as this could lead to serious injuries.</b>

## Service

<b>NOTICE</b>	<b>Have your power tool serviced by a qualified repair person using only identical replacement parts.</b> This will ensure that the safety of the power tool is maintained.
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### Safety Rules for System-Guided Tools

<b>CAUTION</b>	The 3D Print Head can be controlled by a control software of a CNC router. Therefore the power supply of the 3D Print Head has to be properly connected to the external output of the main board of the CNC router via a 15-pin Sub-D cable. Prior to each commissioning of the power tool the ON/OFF, speed and emergency button functionality has to be checked. Malfunction may result in serious personal injury.
<b>CAUTION</b>	This is not a handheld tool. The 3D Print Head is designed to be system-guided and must be operated in a STEPCRAFT CNC System or a CNC router. Operation of the power tool handheld may result in serious personal injury.
<b>NOTICE</b>	Do not leave a running CNC system and power tool unattended, turn power off. Only when a CNC router or power tool comes to a complete stop and is disconnected from the mains it is safe.
<b>CAUTION</b>	Never touch the workpiece (to measure or process it etc.) while the STEPCRAFT CNC System or your CNC router is operating. There is a high risk of personal injury.

### Additional Safety Warnings

<b>NOTICE</b>	Depending on the application field of the machine (private or commercial), observe the applicable occupational safety and health, safety and accident prevention and environmental regulations, too.
<b>NOTICE</b>	<b>GFCI and personal protection devices, like electrician's rubber gloves and footwear, will further enhance your personal safety.</b>
<b>CAUTION</b>	Do not use AC only rated tools with a DC power supply. While the tool may appear to work, the electrical components of the AC rated tool are likely to fail and create a hazard to the operator.
<b>NOTICE</b>	Develop a periodic maintenance schedule for your tool. When cleaning a tool be careful not to disassemble any portion of the tool since internal wires may be misplaced or pinched or safety guard return springs may be improperly mounted. Certain cleaning agents such as gasoline, carbon tetrachloride, ammonia, etc. may damage the surface.
<b>CAUTION</b>	Risk of injury to user. The power cord must only be served by a STEPCRAFT service facility.

## Symbols

**IMPORTANT:** Some of the following symbols may be used on your tool. Please study them and learn their meaning. Proper interpretation of these symbols will allow you to operate the tool better and safer.

Symbol	Name	Designation / Explanation
V	Volts	Voltage (potential)
A	Amperes	Current
Hz	Hertz	Frequency (cycles per second)
W	Watt	Power
Kg	Kilograms	Weight
Min	Minutes	Time
S	Seconds	Time
mm	Length, Height, Width	Size in millimeter (metric)
inch	Length, Height, Width	Size in inch
∅	Diameter	Size of drill bits, end mills, etc.
.../min	Revolutions or reciprocation per minute	Revolutions, turns, etc. per minute
V→, V↓	Speed	Horizontal / vertical speed in millimeter per second
0	Display off position	Zero speed / revolution per minute
15, 45, 75, 99	Display selector settings	Speed / revolution per minute as percentage share of the max. speed / revolution. Higher number means greater speed. 99 equal the max. revolution per minute.
→	Arrow	Action in the direction of an arrow
	Warning symbol	Alerts user to warning messages
	CAUTION hot surface	Alerts user not to touch the surface – danger of burns
	CAUTION rotating tool	Alerts user not to touch the blade / the insertion tool - danger of lacerations
	Wear eye protection symbol	Alerts user to wear protective glasses
	Wear hand protection symbol	Alerts user to wear protective gloves
	Grounding symbol	Alerts user to ground the power tool / electrical system
	Wear ear protection symbol	Alerts user to wear a hearing protector
	Read manual symbol	Alerts user to read manual <b>BEFORE</b> first commissioning
	Unplug symbol	Alerts user to unplug the device <b>BEFORE</b> servicing the power tool
	Disposal symbol	Instructions for disposal of WEEE by users of the European Union

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## 1 INTRODUCTION

This manual will help you familiarize yourself with your STEPCRAFT 3D Print Head PH-40 and gives you all the information you need to make your first 3D printed model.

	<p><b>⚠ WARNING</b> Please read this manual and all the accompanying documentation in full before using your 3D print head with your machine:</p> <ol style="list-style-type: none"> <li>1. The operating instructions of your STEPCRAFT system</li> <li>2. The operating instructions of your STEPCRAFT 3D Print Head PH-40</li> <li>3. The manual for your CNC machine control software</li> </ol> <p>To minimize the risk of injury and/or damage to property, only use your STEPCRAFT and your 3D print head once you have read and fully understood these instructions.</p>
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If you have any questions, please use the contact details printed on the cover of this manual to get in touch with us.

## 2 ABOUT FDM 3D PRINTING

The process of creating 3D printed components using the STEPCRAFT FDM (Fused Deposition Modeling) 3D Print Head can be divided into four major sections:

1. Your model has to be available digitally. Sample models are available from various online sources, including thingiverse.com, archive3d.net, and sketchup.com.

You can create your own models using applications such as *AUTODESK Fusion 360*, *SketchUp*, *Blender*, and *OpenSCAD*.

You need to save your model in the STL file format to process and print it.

2. STEPCRAFT recommends the *Cura* 3D printing software package. *Cura* unites all the necessary software in a single, easy-to-use interface, and uses your STL file in conjunction with any preinstalled machines to generate corresponding G-code and NC files.
3. The STEPCRAFT 3D Print Head has to be mounted on your machine and, if required, a print bed mounted on the machine table. Once you have performed a reference movement, you can load your file and locate and save the model zero point.
4. The nozzle has to be completely filled with filament (i.e., properly primed) before you begin printing. To do this, manual feed the 4<sup>th</sup> axis (filament feed) until the filament emerges from the print nozzle and oozes smoothly downward. Remove any excess filament, switch out of manual control mode, and start your print run.

## 3 CURA 3D PRINTING SOFTWARE

### 3.1 INSTALLING CURA

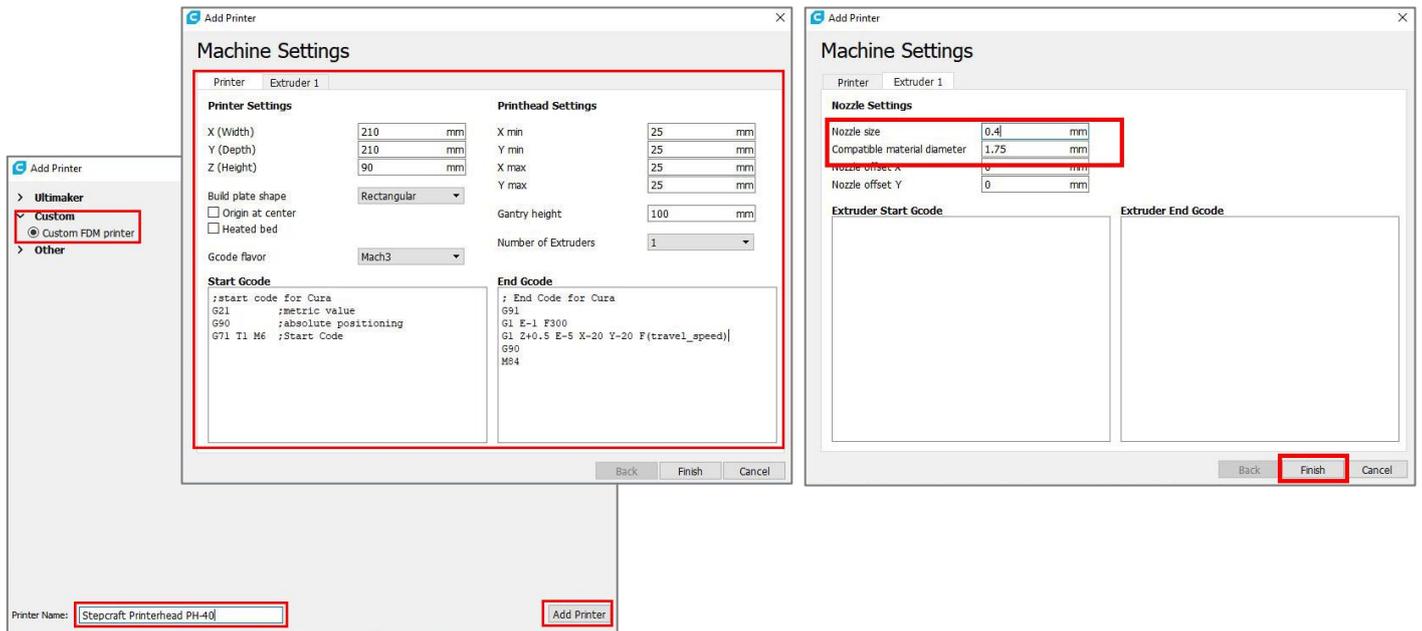
Download the latest version of the *Cura* package from <https://ultimaker.com/en/products/ultimaker-cura-software> and install it on your computer.

### 3.2 DEFINE YOUR STEPCRAFT 3D PRINT HEAD

Begin by defining your STEPCRAFT 3D Print Head as a new printer. To do this, go to Settings > Printer > Add Printer and choose the *Custom FDM Printer* option. Give your new print head a name and click the **Add Printer** button.

Enter the values shown below in the dialog that follows and click **Finish**.

You can now select and use your STEPCRAFT 3D print head.

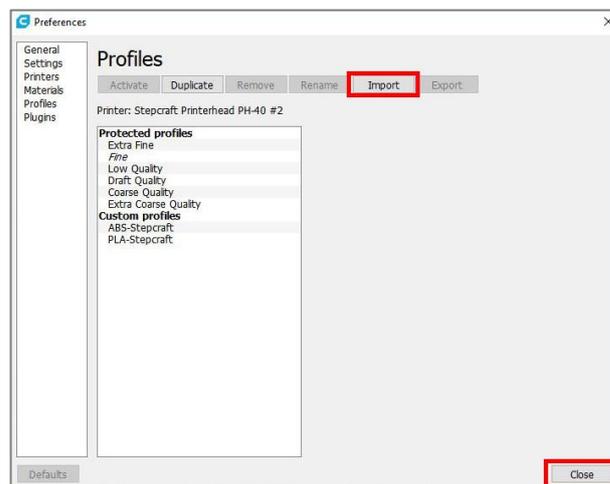


### 3.3 IMPORTING A STEPCRAFT 3D PRINTING PROFILE INTO CURA

There is a selection of tested STEPCRAFT 3D printing profiles available for download at <https://www.stepcraft-systems.com/download/curaprofileph40.zip>.

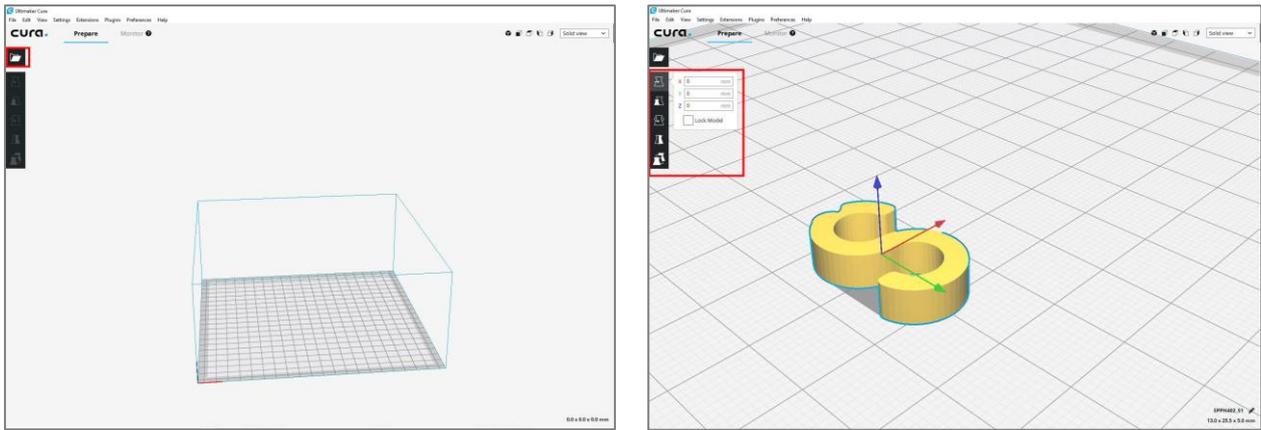
To import a profile, go to Settings > Profile > Manage Profiles and click the **Import** button.

Select where you want to save the extracted file and click **Close** to finish. The imported profile is now available for use.



### 3.4 LOADING A 3D WORK FILE

The **Open File** button is located at the top of the toolbar on the left of the application window. Click here to load a 3D work file. Our sample file is available for download at <https://www.stepcraft-systems.com/download/S1.stl>.



Opening the saved sample file automatically places the model on the virtual print bed.

Holding the right-hand mouse button and dragging, alters the angle of the print bed.

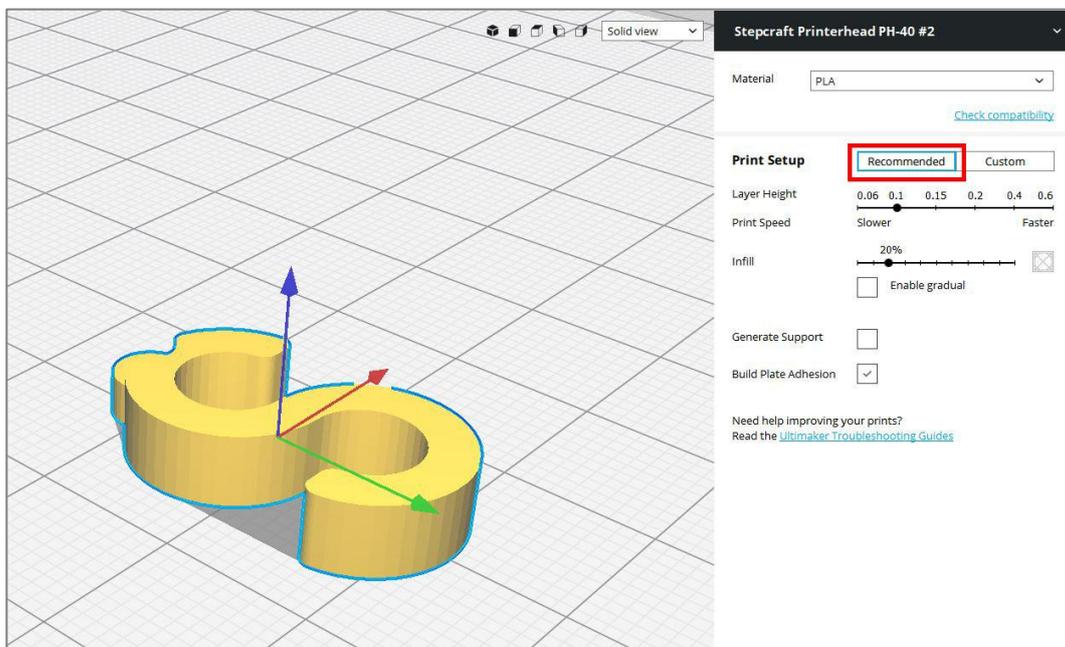
Rotating the mouse wheel zooms the view in and out, while pressing and holding the mouse wheel allows you to drag the entire view within the application window.

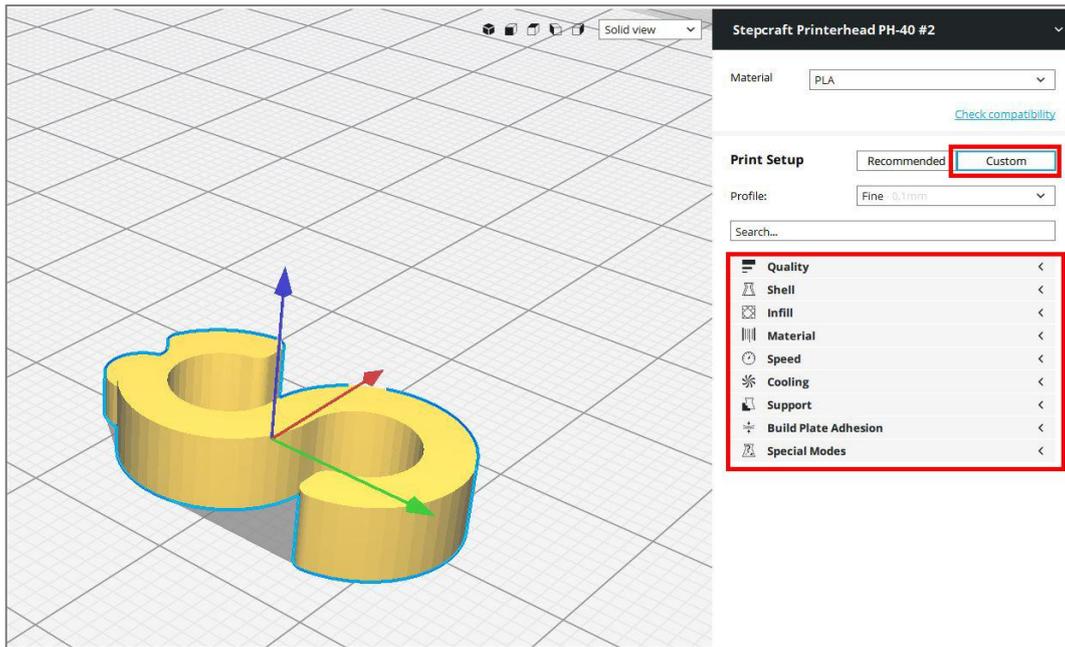
Additional buttons can be used to move, scale, rotate, mirror, and duplicate your model.

## 3.5 CONVERTING THE WORK FILE TO G-CODE

Cura generates G-code automatically. You can choose between the *Recommended* print setup or your own *Custom* settings.

There are only a few settings you can alter in the *Recommended* settings tab, while the *Custom* tab contains a comprehensive set of tools for setting up a print run for each model according to your specific requirements.





Once you have made your settings, click the **Save to File** button to generate a G-code file. You are now ready to print.

## 4 PREPARING THE PRINT HEAD / PRINT BED

### 4.1 MOUNTING THE PRINT HEAD

Mount the Print Head in the 43 mm spindle holder of your STEPCRAFT CNC System with the fan pointing forward, and tighten it gently. The controller can be positioned beside or behind the machine. Position the filament roll holder so that the filament can unroll freely.



The mounted print head and nozzle



The filament roll holder is positioned so that the filament can unroll freely

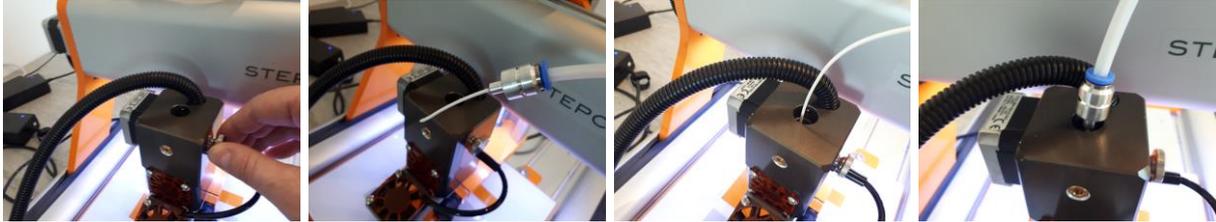
### 4.2 THREADING THE FILAMENT

Loosen the pinch roller spring loader by rotating the quick-release screw through 180 degrees. This produces a perceptible click stop.

Pull the filament feed tube and the filament inlet upward out of the Print Head. Feed the filament into the feed tube until it emerges in the filament guide on the other side. Feed the end of the filament into

the Print Head from above so that it passes between the pinch roller and the drive gear and continue to feed it until you feel resistance. Now rotate the quick-release screw through a further 180 degrees to tighten the pinch roller in place.

Finish off by replacing the filament supply in the Print Head.



## 4.3 MOUNTING THE PRINT BED

Anything with a smooth surface can serve as a print bed—for example, a sheet of glass or plexiglass. You can also use the optional STEPCRAFT Heating Bed.

Place your print bed centrally on the machine table and fix it in place.

Note that if you do not use the STEPCRAFT Heating Bed, you need to raise your own print bed by about 10 mm so that the print head's nozzle can reach its surface.

# 5 SETTING UP THE UCCNC CONTROL SOFTWARE

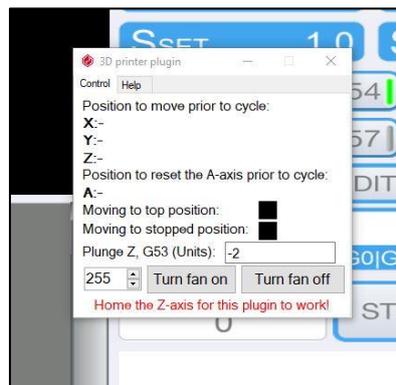
## 5.1 GENERAL SETTINGS

If you have not already installed the 3D print profile for your STEPCRAFT CNC System, please do so now before you continue.

To do this, run the screensetinst.exe from the UCCNC software CD and select the appropriate profile.

The installer creates a new 3D print icon on your desktop, which you can run by double-clicking it.

Starting UCCNC using the 3D print profile automatically loads a plug-in that controls the 3D printing process.



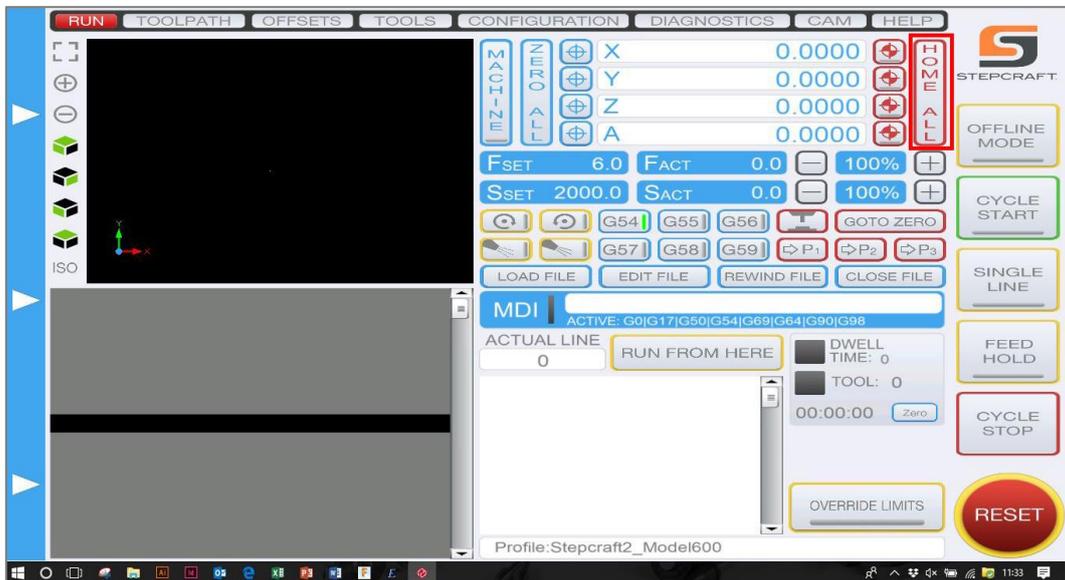
Additionally, you have to manually set the current hi/low under Configuration > I/O Setup.

E-stop pin:	<input type="text" value="11"/>	port:	<input type="text" value="1"/>	<input type="checkbox"/> Active low
Probe pin:	<input type="text" value="0"/>	port:	<input type="text" value="1"/>	<input type="checkbox"/> Active low
Charge p. pin:	<input type="text" value="0"/>	port:	<input type="text" value="0"/>	<input type="checkbox"/> Active low
	<input type="checkbox"/> Charge pump always on			
Current hi/low:	<input type="text" value="16"/>	port:	<input type="text" value="1"/>	<input type="checkbox"/> Active low
Laser output:	<input type="text" value="0"/>	port:	<input type="text" value="0"/>	<input type="checkbox"/> Active low

Save your settings.

## 5.2 REFERENCE MOVEMENT

Perform a reference movement so that the controller (UCCNC) can establish the machine zero point.



## 5.3 LOADING A WORK FILE

Click the **LOAD FILE** button to load a work file. To run our sample print job, select the G-code file called *Stepcraft-Logo-Standard-Print*.



## 5.4 SETTING THE ZERO POINT

For technical reasons, the default model zero point is in the center of the model.

Make sure the print bed is fixed and level, then move the print nozzle manually to its center.

Move the Z-axis manually downward until the nozzle is about 1 mm above the print bed. Make sure the nozzle is not clogged with cold filament from previous jobs and clean it if necessary.

Place a strip of 80 g paper between the nozzle and the print bed.

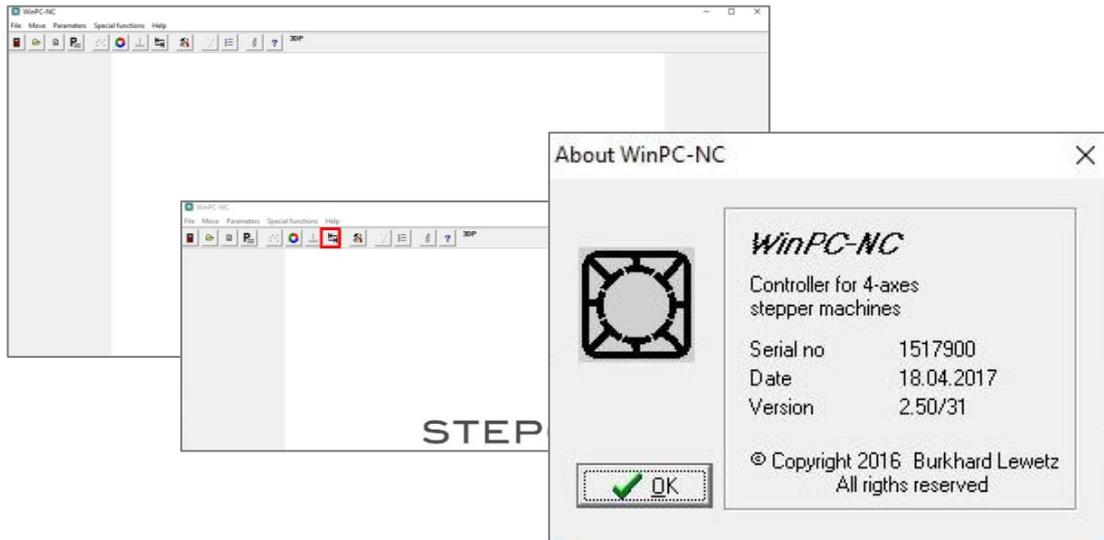
Move the paper strip gently back and forth and slowly move the nozzle down until it just touches the paper. Alternatively, use the optional Tool Length Sensor to establish the zero point.

Finish off by moving the Z-axis 0.1 mm upward and save this position by clicking the **ZERO ALL** button.

The model zero point is now set.

## 6 SETTING UP THE WINPC-NC V2.X CONTROL SOFTWARE

The *WinPC-NC USB* (STEPCRAFT version) software package is suitable for 3D printing from version 2.10.49 onward. If you have an older version of the software, you can request a free update from the manufacturer at [www.lewetz.de](http://www.lewetz.de). Go to Help > About to check the version number of your software.



### 6.1 GENERAL SETTINGS

To make the necessary settings for 3D printing, first start your machine then run the software. Once a connection is established between the machine and the USB module, go to Parameters > Load Machine Setup.

The setup file for your STEP CRAFT CNC System is available for download at <https://www.stepcraft-systems.com/download/winpcnc2x3dsetup.zip>.

Before you load a new setup file, use the profile management dialog to save your current setup for later use.

To activate the new profile, restart WinPC-NC.

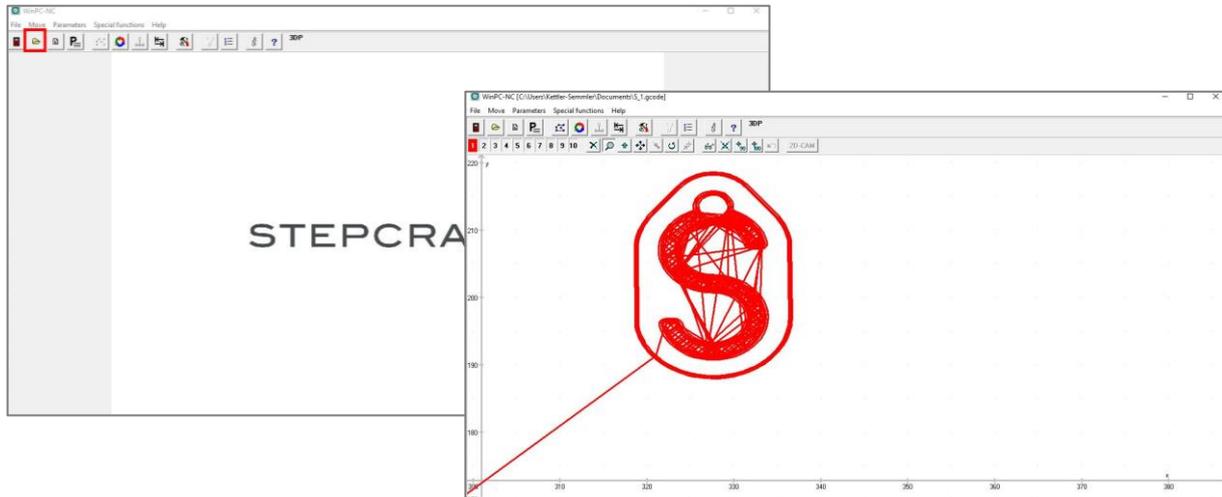
### 6.2 REFERENCE MOVEMENT

Perform a reference movement so that the software can find the machine zero point.



## 6.3 LOADING A WORK FILE

Go to File > Open and load your work file. The G-code file for our sample print job is called S\_1.



## 6.4 SETTING THE ZERO POINT

For technical reasons, the default model zero point is in the center of the model. You can change this using the *Zero point in file* in the Misc. tab in the Parameters dialog (Parameters > Misc.).

Make sure the print bed is fixed and level, then move the print nozzle manually to its center.

Move the Z-axis manually downward until the nozzle is about 1 mm above the print bed. Make sure the nozzle is not clogged with cold filament from previous jobs and clean it if necessary.

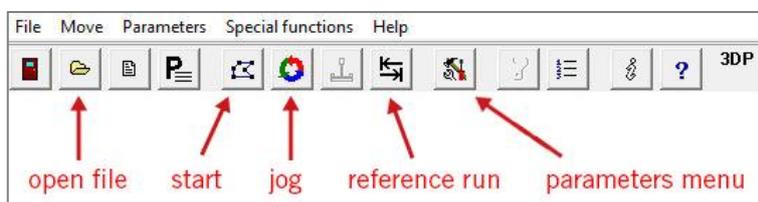
Place a strip of 80 g paper between the nozzle and the print bed.

Move the paper strip gently back and forth and slowly move the nozzle down until it just touches the paper. Alternatively, use the optional tool length sensor to establish the zero point.

Finish off by moving the Z-axis 0.1 mm upward and save this position as *Zero point XYZ*.

The Z-axis will now automatically move 75mm upward to its safe park position.

The model zero point is now set. Click the **Save** button in the Parameters dialog to create a parameter file that matches the currently loaded work file.

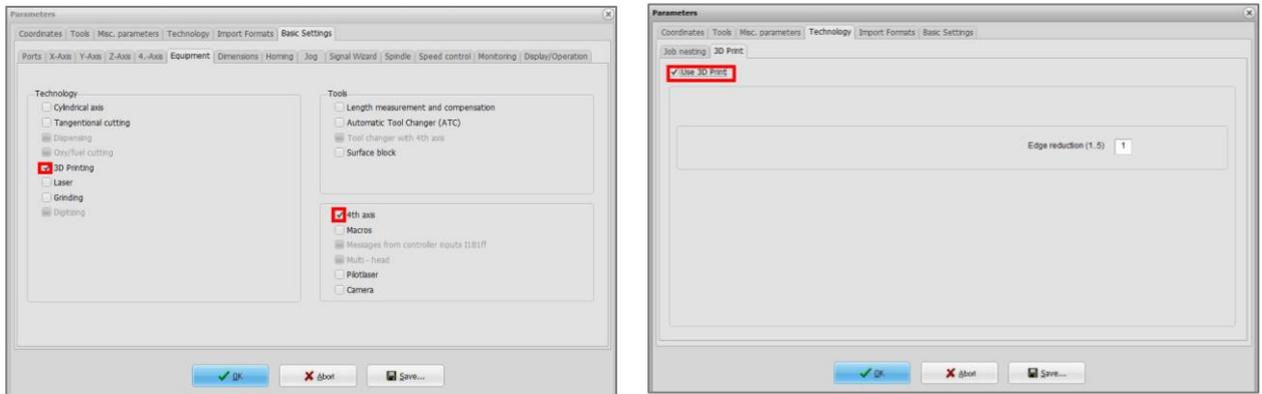


## 7 SETTING UP WINPC-NC V3.X

The 3.0 version of *WinPC-NC USB* (STEPCRAFT version) has many more dedicated 3D printing features and is much easier to set up.

## 7.1 GENERAL SETTINGS

To make the necessary settings for 3D printing, first start your machine then run the software. Once a connection is established between the machine and the USB module, go to Parameters > Equipment and activate the *3D Printing* and *4<sup>th</sup> Axis* options.



Click **OK** to confirm your selections. Now go to the Parameters > Technology tab and activate the *Use 3D Print* option.

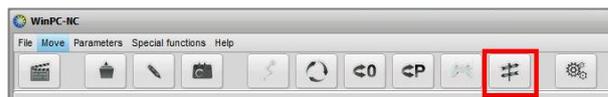
Afterwards, switch to the tab Parameter > Basic Settings > Signal Wizard and define output Q246 as LPT1 Pin16 under Outputs.

Before you load a new setup file, use the profile management dialog to save your current setup for later use.

To activate the new profile, restart WinPC-NC.

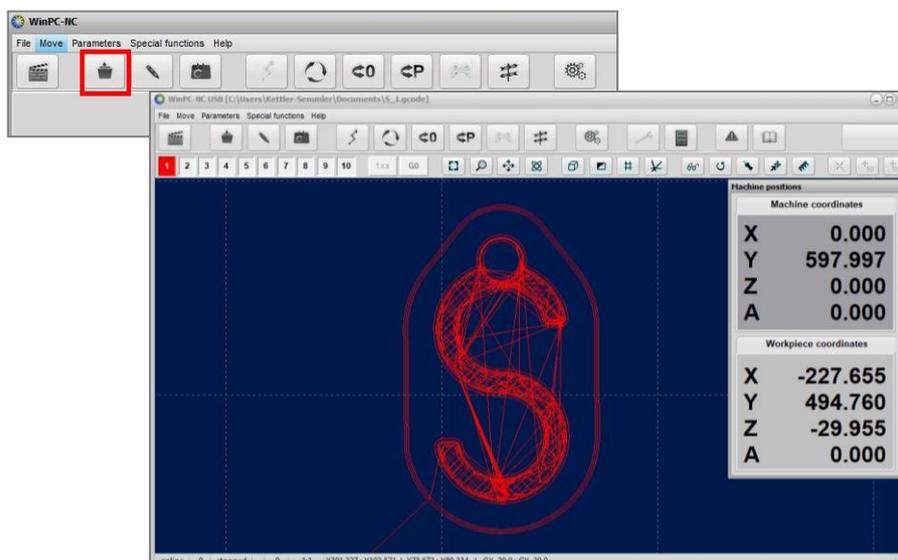
## 7.2 REFERENCE MOVEMENT

Perform a reference movement to that the software can find the machine zero point.



## 7.3 LOADING A WORK FILE

Go to File > Open and load your work file. The G-code file for our sample print job is called *S\_1*.



## 7.4 SETTING THE ZERO POINT

For technical reasons, the default model zero point is in the center of the model. You can change this using the *Zero point in file* in the Misc. tab in the Parameters dialog (Parameters > Misc.).

Make sure the print bed is fixed and level, then move the print nozzle manually to its center.

Move the Z-axis manually downward until the nozzle is about 1 mm above the print bed. Make sure the nozzle is not clogged with cold filament from previous jobs and clean it if necessary.

Place a strip of 80 g paper between the nozzle and the print bed.

Move the paper strip gently to and fro and slowly move the nozzle down until it just touches the paper. Alternatively, use the optional tool length sensor to establish the zero point.

Finish off by moving the Z-axis 0.1 mm upward and save this position as *Zero point XYZ*.

The Z-axis will now automatically move 75 mm upward to its safe park position.

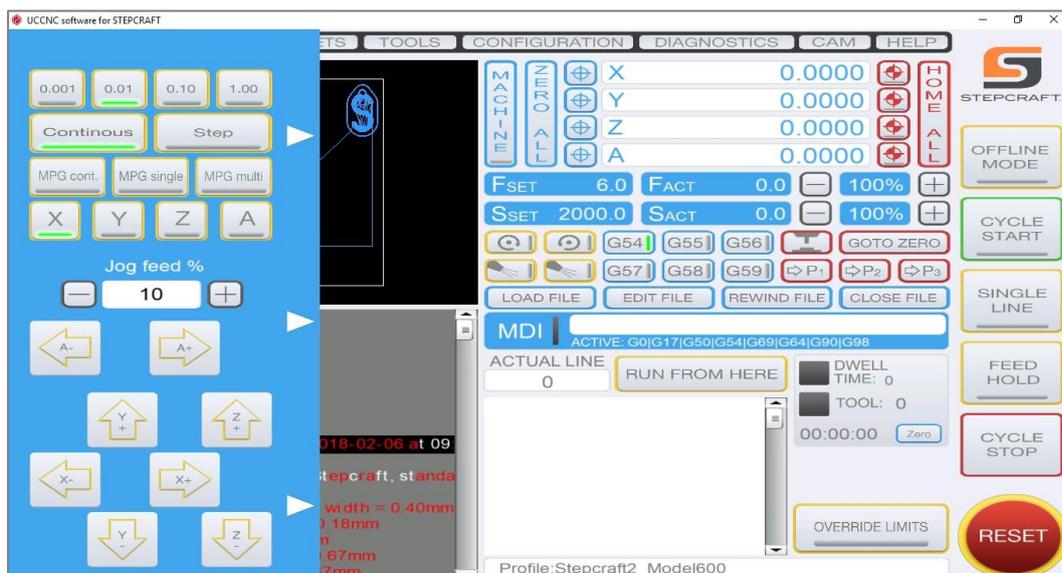
The model zero point is now set. Click the **Save** button in the Parameters dialog to create a parameter file that matches the currently loaded work file.

## 8 PRINTING A MODEL

Make sure all cables are correctly attached and start the 3D print controller. Wait until the preset temperature is reached and the machine is ready.

### 8.1 PRINTING WITH UCCNC

The nozzle has to be completely full of filament (i.e., properly primed) before every job. To do this, mouse-over the white arrows on the left-hand side of the program window to open the manual jog dialog. Set the jog feed speed to 20% and move the filament feed using the A+/C+ (4<sup>th</sup> axis) buttons until filament emerges evenly from the nozzle. Note: Only operate filament feed manually when the nozzle has reached its operating temperature.



Remove any excess filament from the nozzle (for example, using tweezers) and click the **CYCLE START** button.

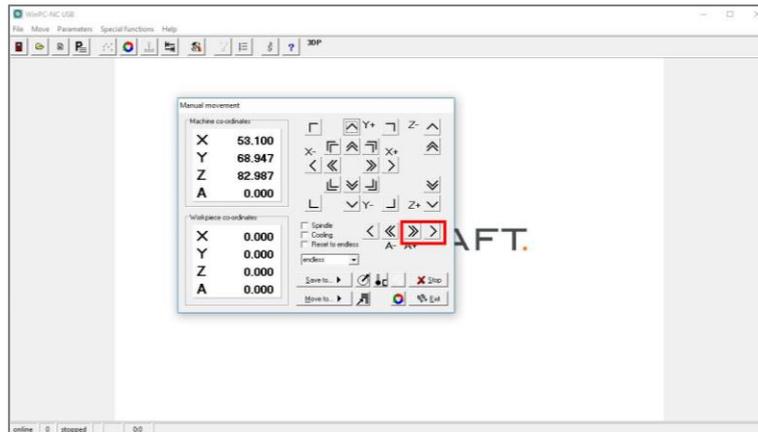
The machine will now begin printing.

## 8.2 PRINTING WITH WINPCNC V2.X

The nozzle has to be completely full of filament (i.e., properly primed) before every job. To do this, open the *Manual Movement* dialog and move the filament feed using the A+/C+ (4<sup>th</sup> axis) buttons until filament emerges evenly from the nozzle. Note: Only operate filament feed manually when the nozzle has reached its operating temperature.

Exit the Manual Movement dialog. Remove any excess filament from the nozzle (for example, using tweezers) and click the **Start** button.

The machine will now begin printing.



## 8.3 PRINTING WITH WINPCNC V3.X

The nozzle has to be completely full of filament (i.e., properly primed) before every job. To do this, open the *Manual Movement* dialog and move the filament feed using the A+/C+ (4<sup>th</sup> axis) buttons until filament emerges evenly from the nozzle. Note: Only operate filament feed manually when the nozzle has reached its operating temperature.



Exit the Manual Movement dialog. Remove any excess filament from the nozzle (for example, using tweezers) and click the **Start** button.

The machine will now begin printing.

## 8.4 TROUBLESHOOTING

At the start of every print run, the machine will print a separate “skirt” around the base of the model. A skirt does not touch the model but serves to prime the print head and ensure a smooth flow of filament. Sometimes, if the distance between the nozzle and the print bed is not properly set up, or if the nozzle is clogged, the filament will not immediately stick to the print bed. If you have checked the distance settings and are still having problems, you can use adhesives such as blue tape or hairspray to help the filament stick. Make sure there are no excess filament threads within the skirt or still attached to the nozzle. Once the skirt has been printed, the model itself follows automatically.

We have prepared a FAQ about printing issues and remedies, which you can download from <https://www.stepcraft-systems.com/service/en/manuals> (menu item *3D Print Head*).

## 8.5 THE FINISHED MODEL

Once the print run is finished, the print head will move to its park position. Let the finished model cool for at least two minutes and then pry it carefully off the print bed using a box cutter or modeling knife.



## 9 CARE AND MAINTENANCE

Clean the warm nozzle regularly and remove any waste filament using a damp cloth.

**⚠ WARNING** Take special care: Risk of burns!

Check regularly under the filament supply cover and keep it clean at all times.

Always keep the print head and the machine’s surroundings clean.

Unwanted dust and dirt can clog the nozzle. If this happens to you, first try unclogging it using a drill bit with the same diameter as the nozzle. If this does not work, you will have to replace the nozzle.

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