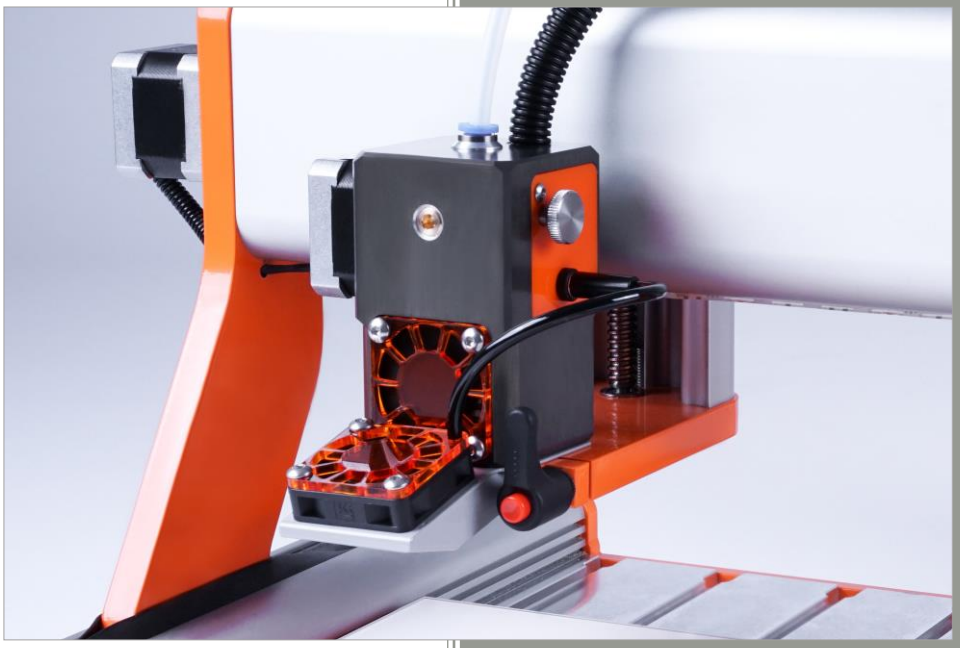
IMPORTANT: Read before using

Operating/Safety Instructions

3D Print Head PH-40



* Picture contains optional accessories.

Call for consumer information

Customers from outside the U.S.

STEPCRAFT GmbH & Co. KG
An der Beile 2
58708 Menden
Germany
Phone: 0049-2373-179 11 60
E-mail: info@stepcraft-systems.com

Customers from the U.S. / Canada

STEPCRAFT Inc.
59 Field Street, Rear Building
Torrington, CT, 06790
United States
Phone: 001-203-5561856
E-mail: info@stepcraft.us

Original Operating/Safety Instructions

Date of: 02/16/2018

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* for customers from Europe or *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.

⚠WARNING	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

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

Electrical safety

⚠WARNING	**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.** Unmodified plugs and matching outlets will reduce the risk of electric shock.
⚠WARNING	**Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges and refrigerators.** There is an increased risk of electric shock if your body is earthed or grounded.
⚠WARNING	**Do not expose power tools to rain or wet conditions.** The spindle is only suitable for indoor use. Water entering a power tool will increase the risk of electric shock.
⚠WARNING	**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.** Damaged or entangled cords increase the risk of electric shock.
⚠WARNING	**If operating a power tool in a damp location is unavoidable, use a Ground Fault Circuit Interrupter (GFCI).** The use of a GFCI reduces the risk of electric shock.
⚠WARNING	Never spray ignitable liquids or any other liquid on this product.

Personal safety

⚠ CAUTION	**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.** A moment of inattention while operating power tools may result in serious personal injury.
HINWEIS	**All persons who operate the power tool must have read and fully understood all relevant operating instructions.** Misunderstandings may result in personal injury.
⚠ CAUTION	**Use personal protective equipment. Always wear safety gloves**. Protective equipment will reduce personal injuries.
HINWEIS	**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.**
HINWEIS	**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.** Carrying power tools with your finger on the switch or energizing power tools with the switch on invites accidents.
HINWEIS	**Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.
⚠ CAUTION	**This tool is controlled by a computer.** During operation it cannot be controlled directly. Missing caution, program errors or lack of expertise can cause unexpected movement.
⚠ CAUTION	**Do not touch tools or motors as they can become extremely hot during use.**
⚠ CAUTION	**Never place any portion of the tool or related accessories in your mouth as it could cause serious injury.**

Power tool use and care

⚠ CAUTION	**Do not alter or misuse tool.** Any alteration or modification is a misuse and may result in serious personal injury.
NOTICE	**Do not force the power tool. Use the correct power tool for your application.** The correct power tool will do the job better and safer at the dedicated rate for which it was designed.
NOTICE	**Do not use the power tool if the switch cannot be turned on and/or off.** Any power tool that cannot be controlled with the switch is dangerous and must be repaired.
⚠ CAUTION	**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.** Such preventive safety measures reduce the risk of starting the power tool accidentally.
⚠ CAUTION	**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.** Power tools are dangerous in the hands of untrained users.
NOTICE	**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.** If damaged, have the power tool repaired before use. Many accidents are caused by poorly maintained power tools.
NOTICE	**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.** Use of the power tool for operations different from those intended could result in a hazardous situation.
⚠ CAUTION	**Make sure to leave sufficient space to the heated parts (hot-end) and never touch these as this could lead to serious injuries.**

Service

NOTICE	**Have your power tool serviced by a qualified repair person using only identical replacement parts.** This will ensure that the safety of the power tool is maintained.

Safety Rules for System-Guided Tools

⚠ CAUTION	**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.
⚠ CAUTION	**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.
NOTICE	**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.
⚠ CAUTION	**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

NOTICE	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.
NOTICE	**GFCI and personal protection devices, like electrician's rubber gloves and footwear, will further enhance your personal safety.**
⚠ CAUTION	**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.
NOTICE	**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.
⚠ CAUTION	**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
Ø	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 BEFORE first commissioning
	Unplug symbol	Alerts user to unplug the device BEFORE servicing the power tool
	Disposal symbol	Instructions for disposal of WEEE by users of the European Union

CONTENT

1 GENERAL INSTRUCTIONS

1.1 INFORMATION AND EXPLANATIONS TO THE OPERATING INSTRUCTIONS

This manual is intended to familiarize you with your STEPCRAFT 3D Print Head PH-40 and its control system, providing you with all the information necessary to operate it safely and professionally.

Please read this manual thoroughly and carefully prior to the first use of your STEPCRAFT 3D Print Head. Operate the 3D Print Head and the associated control system only when you are sure that you have understood these instructions in their entirety. Hereby you minimize the risk of injury and / or prevent property damage.

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

For future reference, keep this manual always in close proximity to the STEPCRAFT 3D Print Head.

We cannot be held accountable either for any kind of injury and / or property damage resulting from improper handling deviating from the recommended use of the STEPCRAFT 3D Print Head or from failure to follow the safety regulations properly (see page 2 cont.).

We reserve the right to further develop the STEPCRAFT 3D Print Head as well as the control system.

1.2 DESCRIPTION OF COMPONENTS

The 3D Print Head consists of a housing with a feed unit for the filament, a fan for the active cooling system, a connection for an optional fan for the active cooling of the workpiece and the hot-end. This is where the inserted filament is heated to the selected temperature and extruded through the filament nozzle. The temperature is accurately monitored by a high-temperature sensor. The STEPCRAFT 3D Print Head has a 43 mm tool holder that serves to easily mount the device onto the STEPCRAFT CNC System.

The control unit is hard wired to the 3D Print Head. It contains the temperature monitoring for the hot-end, a temperature preselection for the optional STEPCRAFT Heating Bed, the filament feed control and the status LC display with 2x16 signs. The universal filament roll holder is positioned separately.

The ready-to-use unit consists of the following components:

1. Electronic control
2. 3D Print Head (permanently connected to the control unit), filament hose
3. Filament roll holder
4. Power supply incl. feeder, input 110 V-240 V ~ 1.5 A 50/60 Hz, output 30 V 4 A
5. Connection cable 15 pin Sub-D male-female
6. Print Bed

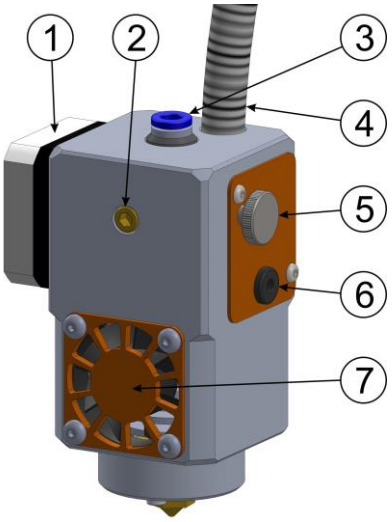
For more information on optional accessories, please see point 3.4 of this manual.

1.3 INTENDED USE

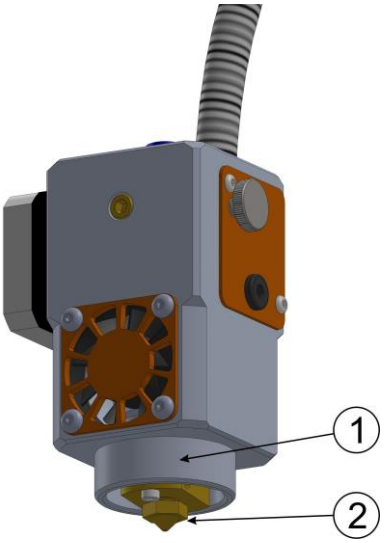
The STEPCRAFT 3D Print Head is constructed for private users (e. g. model builder) as well as for single or small batch production. It is not suitable for large-scale production or the integration into production lines! It is designed for the use of filaments with a diameter of 1.75 mm. The system is specifically developed for the installation and connection to our STEPCRAFT CNC System.

2 Design and Function

2.1 Designation of the Print Head Components



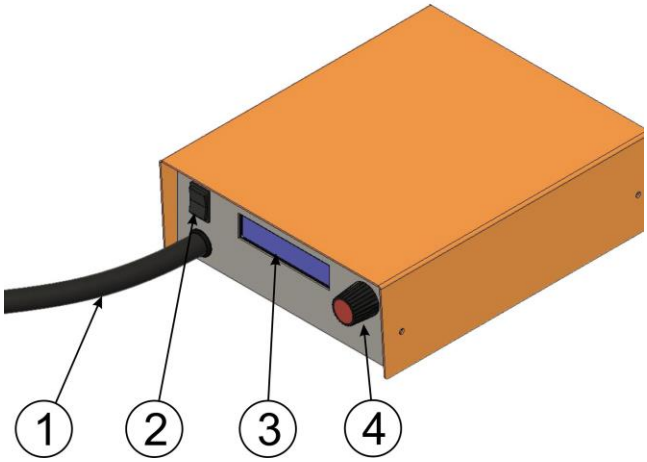
1 = Stepper motor
2 = Adjusting screw for filament pinch roller
3 = Hose coupling „Push-Fit“, filament inlet
4 = Cable feed
5 = Quick-release screw for the filament pinch roller
6 = Connection for optional, active workpiece fan
7 = Hot-end cooling fan incl. cover



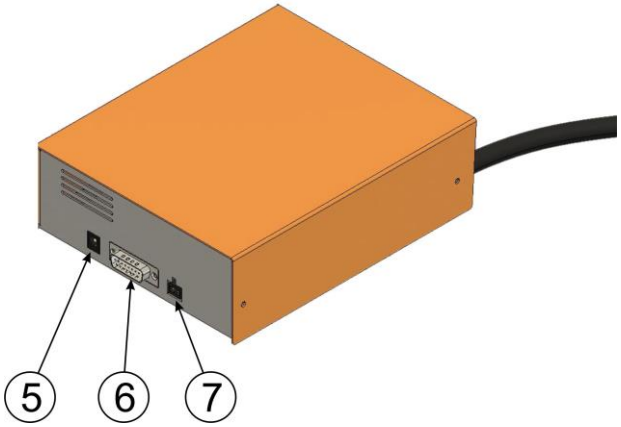
1 = 43 mm tool holder
2 = Print nozzle

2.2 Designation of the Controller Components

1 = Cable feed
2 = Main switch
3 = LCD display
4 = Push / Rotary button

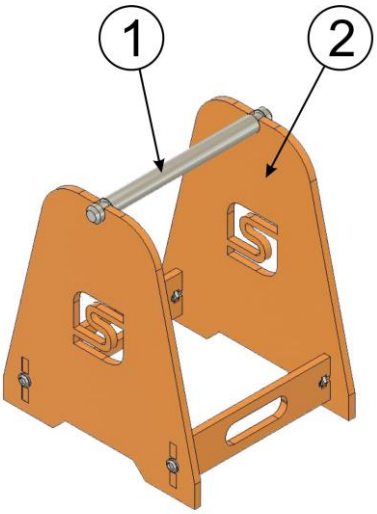


5 = Power supply 30 V mind. 4 A
6 = System connection (15-polig. Sub-D male)
7 = Connection Heating Bed



2.3 Designation of the Components of the Filament Roll Holder

1 = Filament roll axis
2 = Filament roll holder



3 COMMISSIONING

3.1 CLAMPING THE 3D PRINT HEAD

The 3D Print Head is inserted without an additional adapter directly into the tool holder of the machine and is fixed easily. The adjusting screw for the filament pinch roller (2) should be facing forward.

The connecting hoses of the STEPCRAFT 3D Print Head should be straight out to the side so that they cannot get jammed between the guides of the machine.

3.1.1 ADJUSTING THE CNC CONTROL SOFTWARE

Please see the enclosed First Steps manual on how to adjust your CNC control software for the use of the 3D Print Head.

3.2 ENVIRONMENTAL REQUIREMENTS

The 3D Print Head is suitable only for indoor usage.

The ambient air should be kept dust-free. Excessive exposure to dust may cause damage to the 3D Print Head.

Humidity should be within the usual levels for humidity in indoor environments. Protect the 3D Print Head from moisture and humidity.

The ideal ambient temperature of the system is between 18°C and 25°C.

Especially protect the electronics from overheating by avoiding exposure of the 3D Print Head and the controller to direct sunlight or close proximity to a heater.

Make sure that there is enough space around the system for you to work comfortably and for the machine to fully extend its travels. Ensure enough safety distance from any other machines.

Position the controlling PC close to the machine. This way, you will always have both in clear view.

3.3 ELECTRICAL CONNECTION OF THE CONTROL UNIT

Connect the control unit to the system output of your STEPCRAFT CNC System using the supplied 15-pin Sub-D connection cable.

The power supply has to be connected with its low voltage adapter plug to the marked power connector jack at rear panel power connector.

3.4 OPTIONAL ACCESSORIES

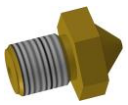
Should you use accessories which are not manufactured or sold by STEPCRAFT, please check compatibility with your system before the first use.

When in doubt, please contact the respective manufacturer.

3.4.1 PRINT NOZZLES

The STEPCRAFT 3D Print Head is supplied with a print nozzle ø 0,4 mm. The following replacement nozzles are available:

- Print nozzle ø 0,3 mm
- Print nozzle ø 0,4 mm
- Print nozzle ø 0,5 mm
- Print nozzle ø 0,7 mm
- Print nozzle ø 1,0 mm



All nozzles are available in our online shop.

3.4.2 FILAMENT

The filament should have a diameter of 1,75 mm. You will find matching filament rolls in different colors and varieties in our online shop.

3.4.3 PRINT BED

Every even surface with a minimum height of 10 mm can be used as a print bed. In order to level it optimally you should clamp it onto a face milled basis. The 3D Print Head is delivered together with a print bed out of acrylic glass with a surface of 150 x 250 mm.

When using the Heating Bed in connection with the control unit of the STEPCRAFT 3D Print Head PH-40, please use the power supply included in the scope of delivery of the 3D Print Head.

3.4.4 HEATING BED / ADAPTER CABLE

The Heating Bed can be used separately or it can be connected to the control unit of the STEPCRAFT 3D Print Head with the help of an adapter cable. Both articles are optionally available in our online shop.

3.4.5 WORKPIECE FAN

Sometimes it can be necessary for filament lines to cool fast. This can be achieved by using the additional active workpiece fan. It is directly connected to the STEPCRAFT 3D Print Head and is available in our online shop.

The optional workpiece fan is controlled by a PWM signal. The intensity can be defined in the slicing software during the print preparation.

4 Operation Control Unit / 3D Print Head

4.1 Control Unit

The control unit is functionally tested in our headquarters. The language is set to English but can easily be changed to another available language (German, French or Spanish) by pressing, holding and releasing the push / rotary button (4) while turning on the system and by pressing it again when the display shows the desired language.

After switching on the control unit, the set and the actual temperature of the 3D Print Head are displayed (in °C). The heating of the hot-ends immediately starts heating up the filament and the print nozzle to the stored preset temperature. This value can be increased or reduced by turning the push / rotary button and stored by pressing the button twice (menu → Save temp).

When using the optionally available adapter cable, the STEPCRAFT Heating Bed can be switched on/off as well as three times varied in its heating power via the control unit of the STEPCRAFT 3D Print Head. The third step equals a temperature of 100°C.

If the emergency switch is pressed on the STEPCRAFT CNC System, this signal is passed to the control unit of the STEPCRAFT 3D Print Head leading to a shutdown of the 3D Print Head and the set power of the Heating Bed. The emergency status needs to be cancelled on the STEPCRAFT CNC System and afterwards also on the control unit of the STEPCRAFT 3D Print Head by turning the rotary button. The power of the Heating Bed needs to be selected anew while the 3D Print Head is heated up to the preset temperature.

Turn the control unit off again after finishing the work.

4.1.1 Automatic Shutdown of the 3D Print Head

The STEPCRAFT 3D Print Head contains an automatic, two-stage shutdown of the 3D Print Head.

After an inactivity of the system of approx. 5 minutes, the heating power of the 3D Print Head is reduced by 40°C from its preset temperature. Ten minutes later, the power of the 3D Print Head as well as of the Heating Bed is switched off and the notice “Time Out” appears on the display of the control unit.

A restart is possible by turning the rotary button.

4.2 3D Print Head

⚠WARNING **Never touch the print nozzle (2). There exists a serious risk of burns.**

Prior to each print, the filament must be extruded with the arrow keys of the 4th axis until a clean thread is released out of the print nozzle. This procedure is called “exhausting”. Remove the thread and start printing. If you take a print break, you need to exhaust the system again before any further printing. Print breaks are useful for filament change (color change), for the insertion of components (e. g. square nuts in the bags printed for them) or for checking the workpiece.

The adjusting screw for the filament pinch roller (2) is already preset. To change the filament, however, it needs to be released. For this purpose, please turn the quick-release screw (5) by 180°. Now, you can easily insert the filament. After the filament change, turn the quick-release screw (5) back again by 180°. The pinch roller will seize the filament.

4.2.1 Nozzle Change

Remove the filament from the 3D Print Head and switch off the control unit before changing the nozzle (4.2.2).

Unscrew the old nozzle on the 10 mm spanner flat.

Screw the new nozzle slightly hand tight (torque 2 Nm) into the hot-end.

4.2.2 Filament Exchange

The heating must be switched on and the operation temperature must have been reached.

Release the filament by relieving the pressure on the filament pinch roller.

Pull the filament inlet from the housing.

Remove the old filament and slide the new one into the filament feed hose so that it protrudes from the filament inlet. Take the filament end and slide it into the 3D Print Head, past the drive shaft and into the filament channel.

Reinsert the filament inlet into the 3D Print Head.

Turn the quick-release screw (5) back by 180° so that the filament pinch roller seizes the filament.

Exhaust the STEPCRAFT 3D Print Head until an even filament thread is released from the print nozzle.

4.2.3 Filament Jam

If no filament can be extruded, the nozzle is usually clogged. The cleaning procedure is very difficult and often the old nozzle needs to be replaced by a new one.

In case of a filament jam please try to remove the nozzle and extrude the filament. If the filament thread is extruded from the hot-end, tear off the soft part downwards and pull the filament upwards out of the 3D Print Head.

Clean the nozzle or use a new one (see point 4.2.1).

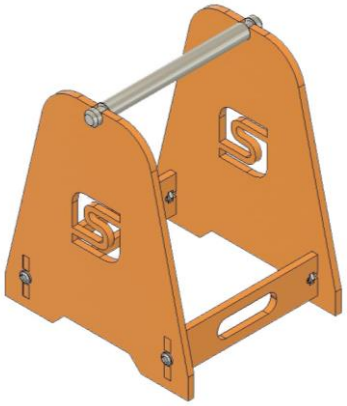
Afterwards, insert the filament again (see point 4.2.2).

4.3 Filament Roll Holder

The filament roll holder is suitable for all popular filament rolls.

For an exploded-view drawing illustrating the easy assembly of the filament roll holder see point 9.1 of this manual.

The filament roller is freely positionable in order to ensure an optimal filament unwinding.



4.4 EMERGENCY SWITCH

The emergency switch is located on the front of the STEPCRAFT CNC System.

Pressing the emergency button leads to an emergency stop of the machine. Simultaneously, the power supply of the control system is interrupted. In addition, the control software receives a signal to stop the operation. The machine will stop immediately.

⚠ CAUTION **The emergency switch can only lead to a cessation of all components when they are properly connected to the emergency stop functionality of the mainboard.**

Actuate the emergency switch only in emergency situations!

NOTICE: Actuating the emergency switch will result in immediate machine shutdown and can cause step and data losses.

⚠ WARNING **If you are using third-party products, such as another control device, you are solely responsible for connecting the emergency stop functionality properly to your control unit. Otherwise a danger of personal injury or damage to property arises!**

⚠ WARNING **If you wish to use a systemheld tool, such as a drilling and milling spindle, which has a separate on-off switch and is NOT controlled by the PC, you must ensure that it is correctly connected to the emergency-stop functionality of the mainboard. If you fail to do so, the tool will continue to run even if the emergency switch is being pressed. This poses a great danger to persons and property!**

A controlled cessation of the machine´s operation can only be effectuated via the control software.

In order to cancel the emergency stop status, turn the emergency switch to the right. Thus, the control is re-enabled. Afterwards, you also need to cancel the emergency stop status on the control unit of the STEPCRAFT 3D Print Head by pressing the button on the control unit. The work process must be restarted.

⚠ CAUTION **Prior to first usage, read the manual of your control software thoroughly and carefully, making sure that you have understood everything.**

For further questions do not hesitate to contact us. Our contact details can be found on the front page of this manual.

5 TECHNICAL SPECIFICATIONS

5.1 DIMENSIONS AND WEIGHT OF THE 3D PRINT HEAD

Length = 91 mm

Width = 95 mm

Weight = 0,9 kg

Tool holder = 43 mm

Cable length = ca. 80 cm

5.2 FILAMENT FEED

The filament feed is effectuated by a bipolar stepper motor. The filament is moved directly and without gear by the motor with a pinion ø 10 mm. During this process it is hold by a spring-loaded pinch roller with ball bearings. You can comfortably clean the feed unit if you remove the hose coupling (3).

5.3 OTHER CHARACTERISTICS

3D Print Head PH-40	
Heating element	24 V 40 W
Temperature sensor	100 k thermistor
Adjustable emperature	150°C – 265°C
Status indicator	LC-Display 16x2
Stepper motor	Bipolar 1,8° full step, 1,4 A
Stepper motor controller	6400 steps/revolution (1/32 step)
Filament	1,75 mm
Nozzle diameter	0,3 mm; 0,4 mm; 0,5 mm; 0,7 mm; 1,0 mm
Filament feed	0,005 mm / step
Tool holder	43 mm
Fan	PWM controlled

5.4 PIN ASSIGNMENT OF THE INTERFACE (15-PIN SUB-D, INPUT SIGNALS)

Pin number	**Function**	**Pin number**	**Function**
1	Not used	9	Not used
2	GND (mass)	10	GND (mass)
3	Not used	11	Not used
4	4th axis direction	12	Reserved
5	4th axis phase	13	Not used
6	Not used	14	Job active
7	PWM signal (fan speed selection)	15	Not used
8	Not used	---	---

5.5 Spare Parts

All parts of the 3D Print Head as well as of the control unit can be purchased separately.

Please contact us directly. Our contact details can be found on the front page of this manual.

6 Transport and Storage

6.1 Transport

In order to avoid unwanted vibrations, please make sure that the 3D Print Head and the control unit are not exposed to shocks during the transport. If necessary, transport the devices in suitable containers.

6.2 Packaging

If you do not want to re-use the packaging material of the 3D Print Head and the control unit, remove it properly and according to disposal conditions at the site and carry it to the recycling or disposal unit.

6.3 Storage

In case of a prolonged nonuse of the 3D Print Head and the control unit, please observe the following storage conditions:

- Store the device and its components in closed rooms.
- Protect it from moisture, humidity, cold, heat and direct sunlight.
- Store it in a dust-free environment, cover if necessary.
- The storage place should be free of vibrations.

7 Maintenance

7.1 Service

To ensure continued enjoyment of your STEPCRAFT 3D Print Head, handle it carefully.

Regular maintenance positively affects the life expectancy of the device.

⚠ CAUTION **Preventive maintenance performed by unauthorized personnel may result in hazardous situations.** We recommend that all tool service be performed by a STEPCRAFT service facility.

⚠ CAUTION **To avoid injury from unexpected starting or electrical shock, always remove plug from wall outlet before performing service or cleaning.**

7.2 Maintenance Works

Please make sure that you perform the following maintenance works after every 50 hours of operation:

- Clean the filament guide paths with a dry, soft and lint-free cloth.
- Clean the print nozzle with a fine brass brush.
- Make sure that no chips, dust, etc. find its way into the filament guide paths. This would inevitably lead to a clogged nozzle.

⚠ CAUTION **Certain cleaning agents and solvents damage plastic parts and/or the coating.** Some of these are: gasoline, carbon tetrachloride, chlorinated cleaning solvents, ammonia and household detergents that contain ammonia.

⚠ CAUTION **A continued use of the tool in unmaintained condition will permanently damage your tool.**

7.3 Extension Cords

If an extension cord is necessary, its cross section must be dimensioned in such a way that it is suitable for the power consumption of the respective tool.

This will prevent an excessive voltage drop, loss of power or overheating. Grounded tools must use 3-wire extension cords with 3-prong plugs and receptacles.

NOTICE: The higher the power consumption, the bigger the cross section.

8 Failure

8.1 Response to Malfunctions

⚠ CAUTION **If a failure occurs on the device that could cause personal injury or property damage, stop the operation immediately using the emergency switch!**

NOTICE: For less serious malfunctions, stop the machine / device normally using the machine control software. If you cannot fix the malfunction, please contact us, specifying the fault which has occurred.

Our contact details can be found on the front page of this manual.

9 ANNEX

9.1 WARRANTY AND SERVICE CONTACT INFORMATION

Country of Purchase	STEPCRAFT	Address	Phone no. / E-mail address
United States of America	STEPCRAFT Inc.	733 E Main St. Unit 3 Torrington, CT, 06790	+1 203 556 1856 info@stepcraft.us
Germany	STEPCRAFT GmbH & Co. KG	An der Beile 2 58708 Menden Germany	+49 2373 179 11 60 info@stepcraft-systems.com
Rest of the world	Local distributor STEPCRAFT GmbH & Co. KG	see http://www.stepcraft-systems.com/en/company/reseller An der Beile 2 58708 Menden Germany	see http://www.stepcraft-systems.com/en/company/reseller +49 2373 179 11 60 info@stepcraft-systems.com

9.2 MANUFACTURER

STEPCRAFT GmbH & Co. KG
An der Beile 2
58708 Menden
Germany

Phone: +49 (0) 2373 – 179 11 60
E-mail: info@stepcraft-systems.com
Website: www.stepcraft-systems.com

9.3 COPYRIGHT

9.4 NAMEPLATE

The nameplate is located on the rear of the controller.

9.5 WARRANTY AND LIABILITY

What this warranty covers

STEPCRAFT GmbH & Co. KG (“STEPCRAFT”) warrants to the original purchaser that the product purchased (the “product”) will be free from defects in materials and workmanship at the date of purchase.

What is not being covered

This warranty is not transferable and does not cover (i) cosmetic damage, (ii) damage due to acts of God, accident, misuse, abuse, negligence, commercial or improper use, installation, operation or maintenance, (iii) modification of or to any part of the product, (iv) attempted service by anyone other than a STEPCRAFT authorized service center, (v) products not purchased from an authorized STEPCRAFT dealer, or (vi) products not compliant with applicable technical regulations.

OTHER THAN THE EXPRESS WARRANTY ABOVE, STEPCRAFT MAKES NO OTHER WARRANTY OR REPRESENTATION AND HEREBY DISCLAIMS ANY IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE PURCHASER ACKNOWLEDGES THAT HE ALONE HAS DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER`S INTENDED USE.

Purchaser´s remedy

STEPCRAFT´s sole obligation and purchaser´s sole and exclusive remedy shall be that STEPCRAFT will, at its option, either (i) service, or (ii) replace any product determined by STEPCRAFT to be defective. STEPCRAFT reserves the right to inspect any and all product(s) involved in a warranty claim.

SERVICE OR REPLACMENT AS PROVIDED UNDER THIS WARRANTY IS THE PURCHASER´S SOLE AND EXCLUSIVE REMEDY.

Limitation of liability

STEPCRAFT SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY, REGARDLESS OF WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY, EVEN IF STEPCRAFT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Further, in no event shall the liability of STEPCRAFT exceed the individual price of the product on which liability is asserted. As STEPCRAFT has no control over usage, setup, final assembly, modification or misuse, no liability shall be assumed or accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the purchaser or user are not prepared to accept the liability associated with the use of the product, the purchaser is advised to return the product immediately in new and unused condition to the place of purchase.

Law

These terms are governed by German law (without regard to conflict of law principals).

This warranty gives you specific legal rights additional to other rights you may have. STEPCRAFT reserves the right to change or modify this warranty at any time without notice.

Warranty services

Questions, assistance, and service

Once assembly, setup or usage of the products has been started, you must contact your local distributor or STEPCRAFT directly. This will enable STEPCRAFT to better answer your question and

help you in the event that you may need any assistance. For questions or assistance, please visit our website or call us in order to speak to a product support representative (see contact details 9.1).

Inspection or services

If this product needs to be inspected or serviced and is compliant in the country you live and use the product, please use the STEPCRAFT online service request submission process found on our website or call STEPCRAFT. Pack the product securely using a shipping carton. Please note that original boxes may be included but are not designed to withstand the rigors of shipping without additional protection. Ship via a carrier that provides tracking and insurance for lost or damaged parcels, as STEPCRAFT is not responsible for merchandise until it arrives and is accepted at our facility. When calling STEPCRAFT, you will be asked to provide your complete name, street address, e-mail address and phone number where you can be reached during business hours. When sending products to STEPCRAFT, please include your contact details and a list of the items included as well as a brief summary of the problem. A copy of your original sales receipt must be included for warranty consideration. Be sure your name and address are written clearly on the outside of the shipping carton.

Warranty requirements

For warranty consideration, you must include your original sales receipt verifying the proof-of-purchase date. Provide warranty conditions have been met, your product will be serviced or replaced free of charge. Service or replacement decisions are at the sole discretion of STEPCRAFT.

NON-warranty service

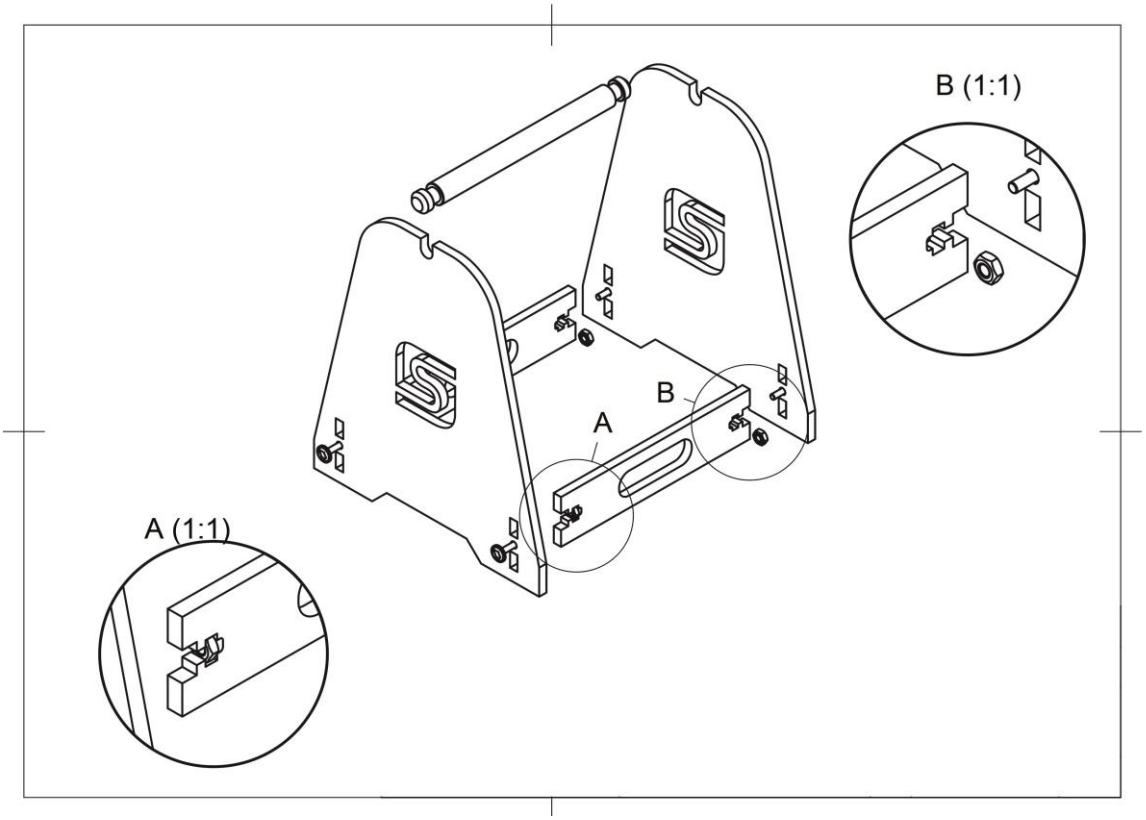
Should your service not be covered by warranty, service will be completed and payment will be required without notification or estimate of the expense unless the expense exceeds 50% of the retail purchase cost. By submitting the item for service you are agreeing to the payment of the service without notification. Service estimates are available upon request. You must include this request with your items submitted for service. Non-warranty service estimates will be billed a minimum of ½ hour of labor. In addition you will be billed for return freight. STEPCRAFT accepts money orders, cashier´s checks as well as credit cards and PayPal payment. By submitting any item to STEPCRAFT for service, you are agreeing to STEPCRAFT`s Terms and Conditions found on our website (see contact details on front page).

ATTENTION: STEPCRAFT service is limited to product compliant in the country of use and ownership. If received, a non-compliant product will not be serviced. Further, the sender will be responsible for arranging return shipment of the unserviced product through a carrier of the sender´s choice and at the sender´s expense. STEPCRAFT will a hold non-compliant product for a period of 60 days from notification after which it will be discarded.

9.6 Instructions for Disposal of WEEE by Users of the European Union

	This product must not be disposed of with other waste. Instead, it is the user´s responsibility to dispose of their waste equipment by handing it over to a designated collections point for the recycling of waste of electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensures that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local office, your house-hold waste disposal or the dealer you purchased your product from.

9.7 Exploded-view Drawing Filament Roll Holder



9.8 RoHS, 2002/95/EG

We confirm that the STEPCRAFT 3D Print Head and the control unit comply with the RoHS, 2002/95/EG.

10 EC Declaration of Conformity

EC Manufacturer's Declaration of Conformity

in terms of the directive 2006/42/EC, appendix II part 1 A

Manufacturer:	STEPCRAFT GmbH & Co. KG
Address:	An der Beile 2, 58708 Menden, Germany
Type of product:	STEPCRAFT 3D Print Head
Type designation:	PH-40

Hereby we declare that the device named above is consistent with the following relevant regulations:

- EC machine directive 2006/42/EC
- EC EMC directive 2004/108/EC
- The machine observes the protection targets of the EC low voltage directive (LVD) 2006/95/EC.

Applied harmonized standards, whose references have been published in the Official Journal of the European Communities:

EN 61029-1	11/2010	Safety of transportable motor-operated electric tools, Part 1: General requirements

Representative for the compilation of the technical documentation is the signatory of this declaration.

This declaration becomes void if not authorized modifications are made to the device.

Menden, February 20th, 2017

STEPCRAFT GmbH & Co. KG,
An der Beile 2, 58708 Menden

Markus Wedel
Managing Director

Peter Urban
Technical Director