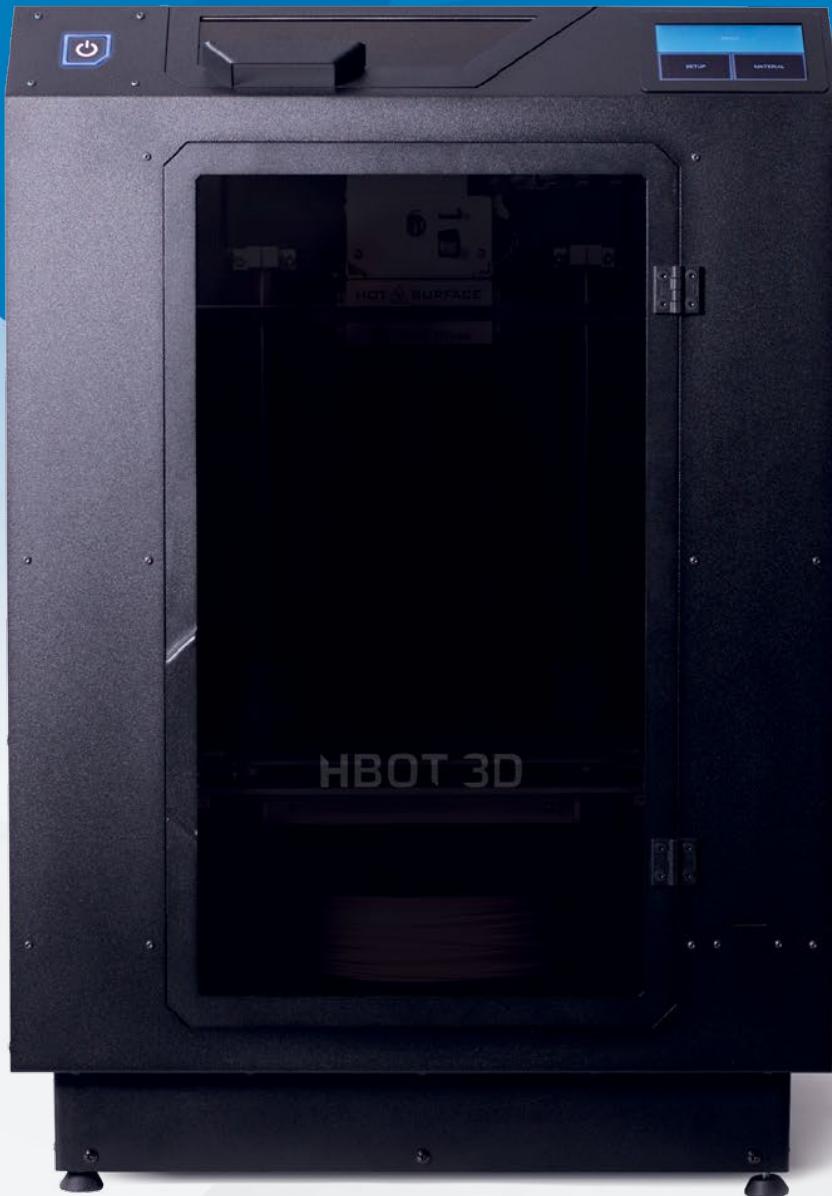


HBOT 3D



Operating Manual HBOT 3D F300

3D printer for industrial applications

OM-F300-EN-01-18

Table of content

1. Preface	3
1.1 Conventions used in this operating manual	3
1.2 Copyright	3
1.3 Trademarks used in this manual	3
1.4 Manufacturer's warranty and responsibility	4
1.5 Intended use of the device	4
2. Operational safety	5
2.1 General principles	5
2.2 Electrical hazards	5
2.3 Risk of injury and burn	6
2.4 Noise emission	6
2.5 Safety marking on device	6
3. Device description	7
3.1 Essential components	7
3.2 Extruder and carriage assembly	8
3.3 Extruder assembly	8
3.4 Control panel	9
3.5 Technical specification	9
3.6 Device identification	10
4. Printer installation	11
4.1 Package content	11
4.2 Removing the transport locks	12
4.3 Selecting location	12
4.4 Leveling	13
4.5 Power supply connection	13
4.6 Connection to emergency supply	13
4.7 Initial commissioning	14
5. Description of use	18
5.1 Preparing the build platform	18
5.2 Storing materials	18
5.3 Loading material	18
5.4 Removing material	18
5.5 Changing material	19
5.6 Replenishing material	20
5.7 Starting a print	20
5.8 Pausing and resuming print	21
5.9 Aborting print	21
5.10 Finishing print	21
5.11 Removing print from the build platform	21
5.12 Removing support structures	22
5.13 Nozzle replacement	22
6. Preparing files	24
6.1 Installation of Simplify 3D	24
6.2 Graphical user interface	25
6.3 Importing material configurations	25
6.4 Modifying the default settings	26
6.5 Importing models and orientation	26
6.6 Configuring printing parameters	27
6.7 Displaying print preview and exporting control commands	28
6.8 Editing support structures	28
6.9 Advanced print parameters	29
6.10 Saving a project	33
6.11 Additional software options	33
6.12 Using SD card and USB port	34
7. Maintenance and operation	35
7.1 Recommended maintenance operations	35

Preface

This Manual contains relevant information regarding installation, operation and maintenance of your device. You are kindly requested to carefully read this Operating Manual before commissioning your device. Strict compliance with the notes contained herein will prevent the misuse and allow you to take full advantage of the features and functions of your printer. Store this Operating Manual so that it is always available to you.

The device, before leaving the manufacturing plant is carefully checked before packaging for safety and functionality on our testing facilities. As a remainder of this control may be the presence of filament inside the nozzle or on its outer surface.

The 3D Printers Team is constantly working on the development of their products and reserves the right to make changes without prior notice. You can download the latest version of the Operating Manual from manufacturer's website at www.hbot3d.com.

1.1. CONVENTIONS USED IN THIS OPERATING MANUAL

Below you will find explanation of conventions used in this Manual.



Important information, instruction which must absolutely be followed or dangers or dangerous actions which may lead to serious personal injuries and/or damage to property



Tip, important information

1.2 COPYRIGHT

© All rights reserved. The contents of the manual, logos, pictures, photos, trademarks as well as other its elements are subject to copyright of 3D Printers sp. z o.o. in Wrocław

The User has the right to print and store this Operating Manual, as well as to save and retrieve the computer file with a copy hereof in computer's memory or other electronic equipment designed to receive and process digital content, for the purposes of operating and maintaining the device.

Without express permission from 3D Printers sp. z o.o. duplicating, reproducing, adapting, translating, copying, processing, promulgating, selling, or distributing this Operating Manual (including portions hereof) is prohibited.

1.3 TRADEMARKS USED IN THIS MANUAL

DimaFix – is a registered trademark of DIMA 3D Printers

Simplify 3D – is a registered trademark of SIMPLIFY3D LLC

Microsoft, Windows, Windows NT, Windows Server and Windows Vista 64, Windows 7, Windows 8, Windows 8.1 and Windows 10 – are registered trademarks of Microsoft Corporation

Mac and macOS – are registered trademarks of Apple Inc.

Linux – is a registered trademark of Linus Torvalds

Any other products referred to in the Manual may be registered trademarks of their respective owners.
3D Printers sp. z o. o. shall not claim any right to the said trademarks.

1.4 MANUFACTURER'S WARRANTY AND RESPONSIBILITY

3D Printers sp. z o. o. grants a 12-month guarantee regarding the device on the basis of a Warranty Card, unless otherwise provided for in the contract with the buyer, or other documents issued by the manufacturer.

3D Printers sp. z o. o. shall not be liable for damages arising out of the use, storage, modification, abuse and transportation of the device not conforming to this Manual.

3D Printers sp. z o. o. shall not be liable for damages arising out of the use of additional accessories, consumables, ancillary equipment, computer software and other items or additions which may accompany the device, or be consumed by the device during its usage, operation, maintenance or transportation, but which are not manufactured by 3D Printers sp. z o. o.

1.5 INTENDED USE OF THE DEVICE

HBOT 3D F300 is designed to materialise different models directly from three-dimensional CAD documentation, without using machining or any additional tools. The possibilities of additive technologies, also known as "3D printing", are invaluable when designing new products. The HBOT 3D F300 was created for industry, to optimize production processes mostly by reducing its time and costs. FFF (Fused Filament Fabrication) technology works with a wide range of plastics to build up for the construction of three-dimensional objects.

Areas of application



prototypes



tools



small-scale production



moulding forms



final products



production line maintenance

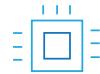
Key industries



automotive



aerospace



electronic



military



manufacturing



foundries

Action scheme

preparing 3D cad model ► export to .stl ► creating .gcode in provided Simplify 3D software ► transferring the .gcode file to the printer's sd card ► filament insertion ► starting the printing process.

This product is not intended for use in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm, or any military or defence application, or any governmental procurement to which special terms or provisions may apply.

2. Operational Safety

2.1 GENERAL PRINCIPLES

Basic safety precautions must be followed at all times during device operation. Glasses and protective gloves accompanying the device must always be worn when carrying out manual operations at the device. Any and all operating and handling activities must be performed in accordance with this Manual, and using only tools recommended by the manufacturer.



The device is a sophisticated manufacturing tool, and therefore may only be operated by authorized and properly trained personnel.



The device is not intended for use by children under 13 years of age, or by persons of impaired manual, motor, or psychomotor capacities.



The device must be stored out of the reach of the children and animals.



Whenever a device malfunction is found, cut off power supply to the device and immediately contact the Technical Department of the manufacturer.



Do not make any modification and change to the device by yourself. Otherwise you will lose the manufacturer's guarantee, or a personal injury or damage to the device may result.



During the printing process do not leave the device unattended.



In order to prevent potential malfunction, periodically check the condition and operating status of the device. Regularly check the wear status of wearing parts of the device. For detailed device maintenance recommendations refer the chapter "MAINTENANCE AND OPERATION"

2.2 ELECTRICAL HAZARDS

HBOT 3D F300 Printers have been manufactured as a Class I appliance in terms of protection against electric shock and tested for conformance to LVD and EMC Directives.



Before connecting the printer to a power outlet ensure that the available power supply voltage meets the specifications for the device. For power supply specifications, see the device nameplate on the back of the device.



Avoid overloading the power outlet the printer is plugged into.



The device must be properly grounded. Always connect the device to a power supply mains with a fully functional protective earthing conductor PE.



Use only original power cord. Do not damage, cut or make any repairs to it. Damaged cord must immediately be replaced with a new one supplied by the manufacturer.



Cleaning, repairs or maintenance must be made after power has been cut off to the printer. Never expose the device to contact with water or moisture.

2.3 RISK OF INJURY AND BURN

To ensure the highest degree of safety and avoid personal injuries, always wear protective glasses and gloves and follow the instructions. To ensure the highest degree of safety and avoid personal injuries, always wear protective glasses and gloves and follow the instructions.



Touching the print head during operation is prohibited. Contact with hot print head may result in severe burns.



Do not touch hot printing platform during device operation. Contact with hot printing platform may result in severe burns.



Do not put parts of your body, or mechanical parts into operating fans, also prevent your hair or loose parts of your clothing from getting into moving parts of the printer.



For safety reasons the top and front door must be closed during the printing process.



Keep a safe distance when the device is in operation. Direct contact with moving and hot parts may result in a bodily injury to the operator.



The finished print should be removed using protective gloves, the scraper provided for this purpose and after the build platform has been removed from the device.



In the event of burn or bodily injury, follow the general rules of first aid.

2.4 NOISE EMISSION

The sound pressure level at the workplace where the HBOT3D F300 printer is operated does not exceed 70 dB (A).

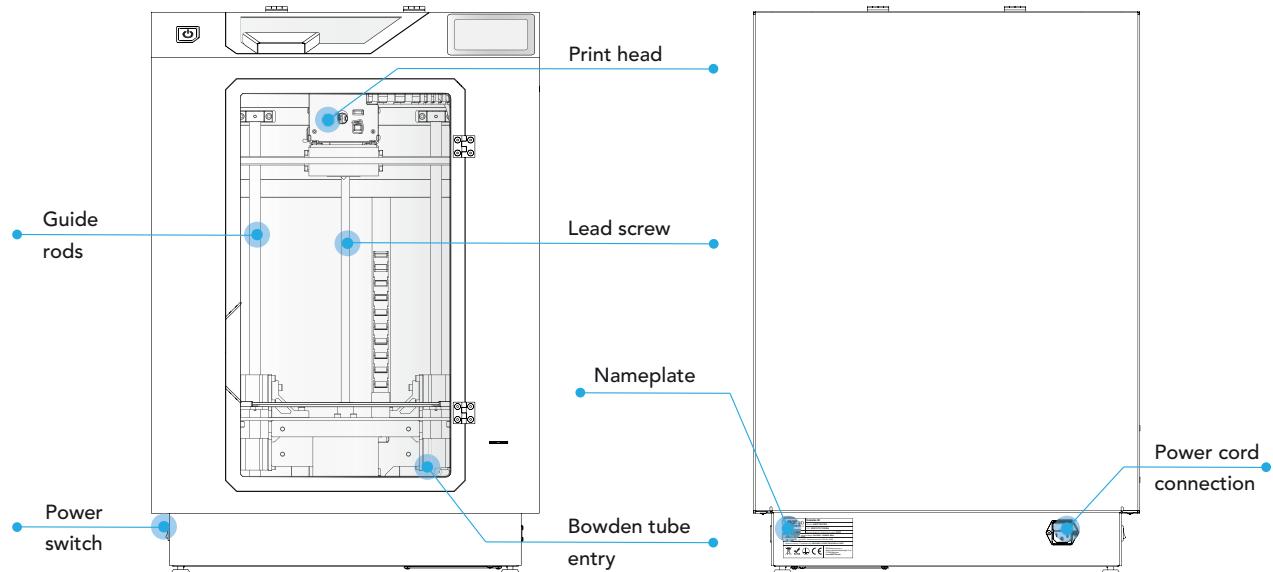
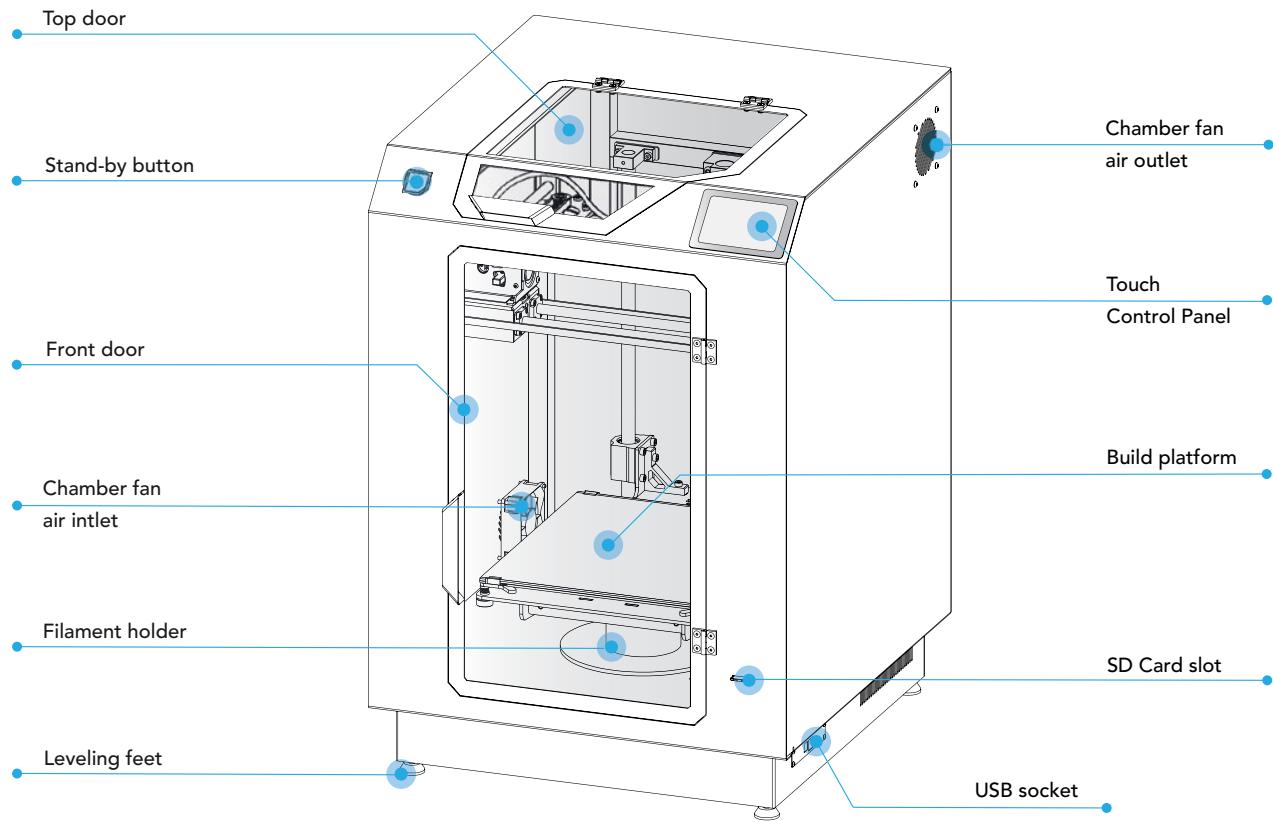
2.5 SAFETY MARKING ON DEVICE

The device has "HOT SURFACE" warning labels on relevant parts of the device. Always exercise special care when handling hot parts. Wearing protective gloves is obligatory. Temperature of some components may reach 300°C.

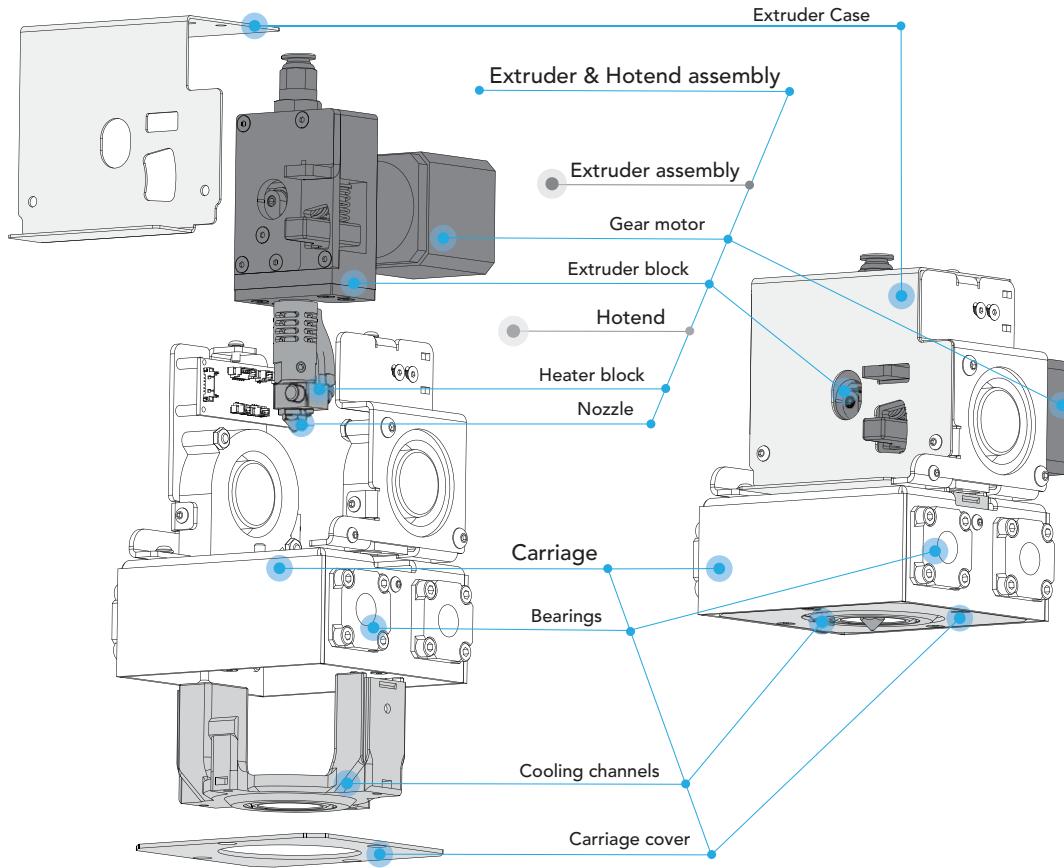
3. Device Description

Before operating the device be sure to familiarize yourself with all device parts. Your failure to familiarize yourself with their locations and functions may result in misoperation of the device and/or its damage due to user's fault.

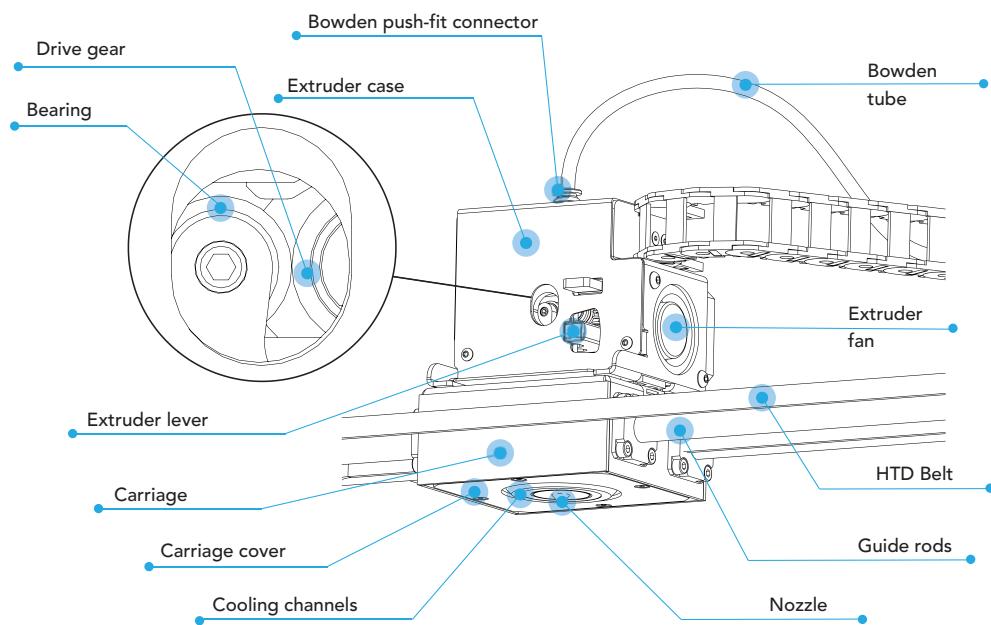
3.1 ESSENTIAL COMPONENTS



3.2 EXTRUDER AND CARRIAGE ASSEMBLY

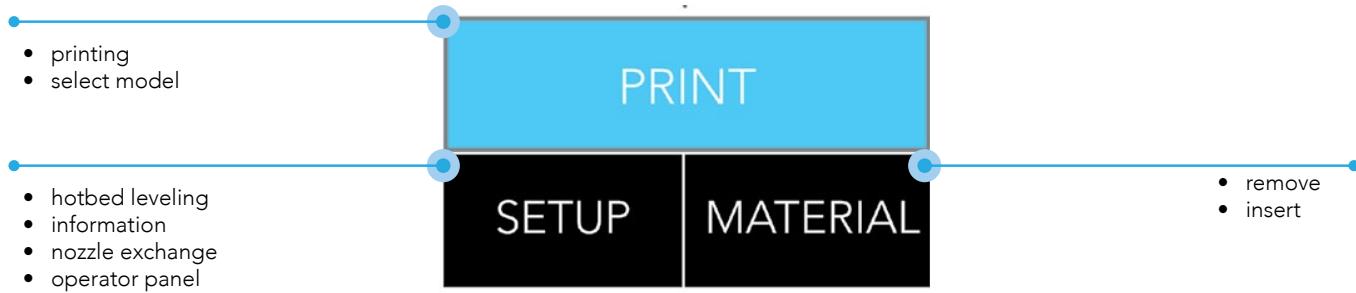


3.3 EXTRUDER ASSEMBLY



3.4 CONTROL PANEL

The device is equipped with a capacitive touch LCD panel for operating the printer. Below you will find a diagram of available screens and functions supported by the display.



3.5 TECHNICAL SPECIFICATION

General information	
Technology	FFF
Build volume	300 x 300 x 300 mm
Build chamber	Closed, with forced ventilation
Build platform	Heated, borosilicate glass covered with kapton foil
Hotend positioning	Automatic
Build platform leveling	Semi-automatic
Extruder	Single
Maximum hotbed temperature	120°C
Maximum hotend temperature	260°C
Nozzle diameter	0.2 mm, 0.4 mm, 0.6 mm, 0.8 mm, 1.0 mm
Coordinate system	Cartesian XY
Printing accuracy	
Single layer height	0.05 – 0.70 mm
Minimum wall thickness	0.4 mm
XY Resolution of single printable point	0.01 mm
Print accuracy	+/- 0.1 mm (excludes material shrinkage)
Overall dimensions	
Device dimensions	540 mm x 570 mm x 820 mm
Dimensions with the packaging	650 mm x 710 mm x 1020 mm
Weight / weight with packaging	35 kg / 50 kg

Electrical parameters	
Mains Power	100-240V AC 50-60Hz
Fire safety	Class I
Maximum absorption power	450 W
Average absorption power	250 W
Hotbed heating power	300 W
Print head heating power	40 W
Software	
Operating system	Windows Vista 64, 7, 8.x, 10; Mac OC X; Ubuntu Linux
Firmware	Original
PC Software (slicer)	Simplify 3D
Compatible file formats	STL, OBJ
Compatible CAD software	All available
Electronics	
Control Electronics	Sunbeam 3.0
Processor	ARM Cortex M3 32bit
Control Panel	Colour touch panel 4,3"
External communication	SD Card, USB 2.0
Materials	
Container	Spool (1kg, 2.3 kg, 4.5 kg, 8 kg)
Diameter	2.85 mm
Maximum extrusion temperature	260°C
Filaments	PC-ABS, ABS-X, PP, PLA-X, PLA, ASA-X, PET-G ESD, PET-G, HIPS, TPU, H-GLASS
Alternative**	Compatible
** The manufacturer does not guarantee the quality and may refuse warranty repair if you use materials not provided by 3D Printers sp. z o.o.	
Other	
Warranty	12 months
Certification	CE Declaration
Operating costs	from 0.5 EUR/h (incl. filament & energy)

3.6 DEVICE IDENTIFICATION

Your device is identified by a serial number. It is printed on:

1. The nameplate located on the back panel of the device
2. In the Warranty Card accompanying the device

Serial number is composed of 13 characters split into 3 parts separated by slash marks: H3D/YYYY/123456.
Example of a serial number: H3D/2015/130234



Always quote the serial number of your device when contacting the Technical Department.

4. Printer Installation

The chapter contains information about steps to be taken before the initial commissioning of the device. Before proceeding with printer installation read the PREFACE chapter. You should read through this chapter even if the printer has been correctly installed and commissioned in accordance with the Short Manual accompanying the printer.



Before and during unpacking the device it is recommended to make a visual inspection to check for possible transport damage. Pay particular attention to loose parts, dents, scratches etc.

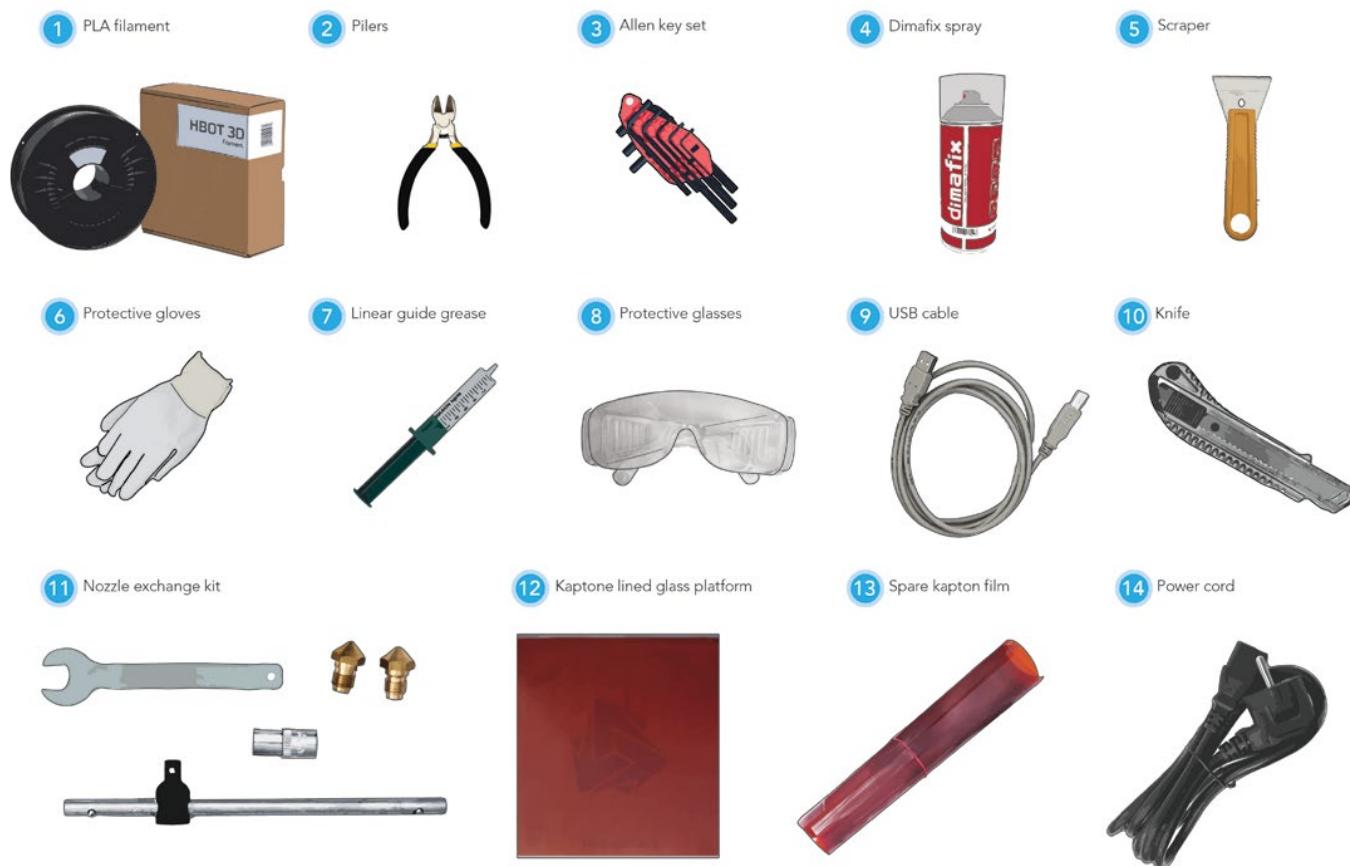


Damage, if any, should immediately be notified to the distributor, or the manufacturer. In the event of a damage claim, a detailed description including a picture is required, as well as device particulars (serial number).

4.1 PACKAGE CONTENT

The Kit contains the HBOT 3D F300 printer (with 0.4 mm nozzle installed and SD Card inserted) and a kit of accessory tools. Also, the device is accompanied by a Warranty Card and the Short Installation and Commissioning Manual.

First, remove all elements from the top package compartment and check if the following parts are included. If any part of the kit is missing, contact either the Customer Service Department of 3D Printers, or directly your vendor.

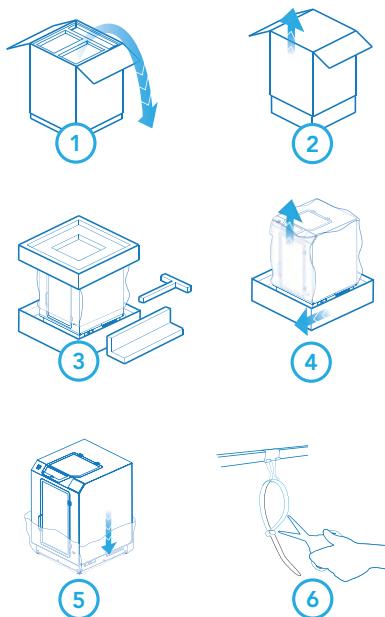


4.2 REMOVING THE TRANSPORT LOCKS

After removing all items and placing them in a safe place, remove other transport locks.



Weight of the device exceeds 30 kg. For safety reasons, it is recommended that these operations be performed by at least 2 persons.



STEP 1 Open the box

STEP 2 Remove the carton by lifting it upwards.

STEP 3 Remove the protective foam pads (one upper and four on each corner).

STEP 4 Lift the device and remove protecting pads under the printer (foam and carton).

STEP 5 Carefully remove the protective bag.

STEP 6 Remove strap protecting clips (inside the printer).

4.3 SELECTING LOCATION

To ensure operational safety and obtain best printer performance by minimizing vibration or uneven distribution of its weight, the printer must be erected on a firm surface.

Before installing make sure that the location where the device is to be installed:

- Has a firm and even surface;
- Is located clear of elements that may block the ventilation holes;
- Is clear of direct sunlight;
- Is properly ventilated;
- Is not exposed to negative temperatures (below 0 °C),
- Is located clear of sources of heat and water;
- Provides sufficient footprint to enable full opening of printer doors (front and top);
- Supply outlet and SD Card slot are easily accessible.



The printer may not be installed on table top, or structures with inadequate support.



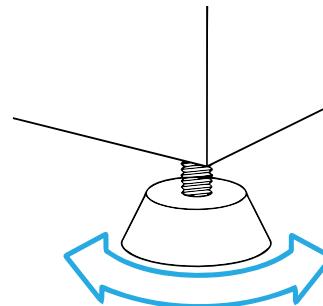
Please note that dangerous toxins may be released from the hot material, so the device must be located in a well-ventilated area.

4.4 LEVELING

Once the printer is erected on an even and stable surface, it must then be leveled. There are 4 adjustable feet at the bottom provided specifically for this purpose.

Level the device by screwing the feet by hand in the appropriate direction so that the device is perfectly level both in the x-axis (width) and y-axis (depth).

Check if the printer is resting on all four feet and stable, by pressing at each corner one after another.



! Correct placement and leveling of the device is a must to ensure fault-free operation.

4.5 POWER SUPPLY CONNECTION

STEP 1

Locate the power cord connection on the back panel of the device.

STEP 2

Locate the power switch on the right-side panel and before you power up your printer make sure that the switch is set in the "0" position (power off).

STEP 3

Unwind the power cord and plug one end to the power cord connection of the printer. Plug the other end of the power cord to a power outlet provided with an earth pin.

! Plugging the device to a power outlet without a fully functional protective earthing is prohibited

STEP 4

Now, when the device is plugged into the power supply mains, set the power switch to the "on" ("1") position.

STEP 5

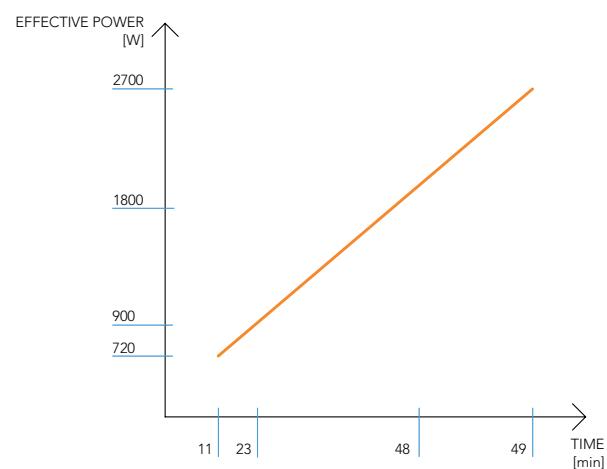
Now, the area around the "Stand-by" button should be backlit in soft blue.

4.6 CONNECTION TO EMERGENCY SUPPLY

Your HBOT 3D F300 is suitable to operate in continuous service. However, in the event of a long-term power outage the printing operation is interrupted with no option to resume the process.

In environments where long-term power outages occur, the device may (optionally) be connected to an emergency power supply (UPS) in order to prevent such situations from happening.

The diagram shows the recommended effective power vs. expected back-up time.



4.7 INITIAL COMMISSIONING

This chapter focuses on the initial commissioning process and a test print. Before commissioning the printer be sure to carefully read all previous chapters of this Manual.

Build platform installation

STEP 1

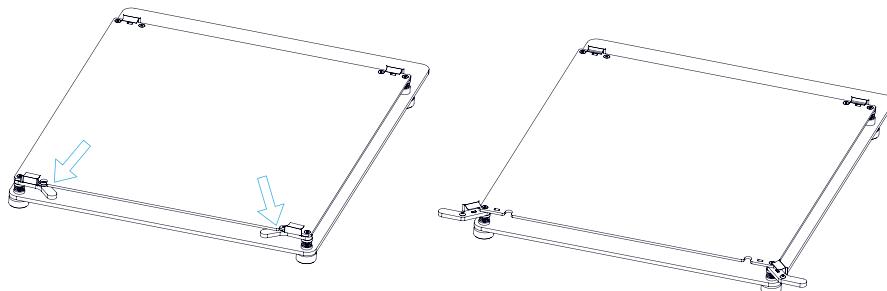
Unpack the build platform by removing the protective foam pads and make sure that the platform has not been damaged in transportation.



The build platform included in the kit is a glass platform. It is lined with an exchangeable Kapton film and a layer of DIMAFIX adhesive is applied.

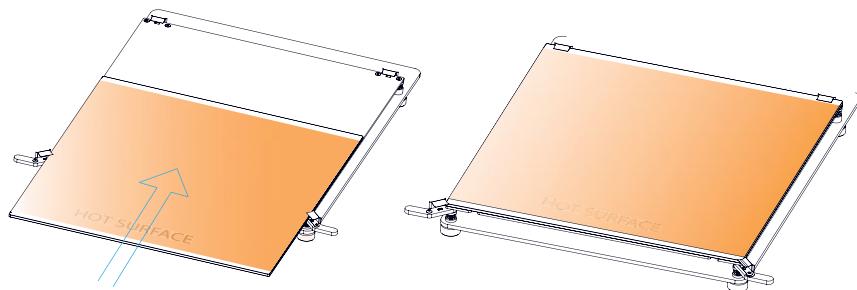
STEP 2

Open the hinges holding the glass plate in place.



STEP 3

Slide the glass in the retainer clips, the side with the Kapton film facing upwards.

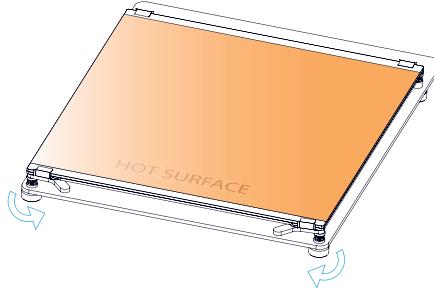


STEP 4

Close the hinges holding the glass plate in place.



Make sure that the glass plate does not project beyond the table border (either on the left or on the right).



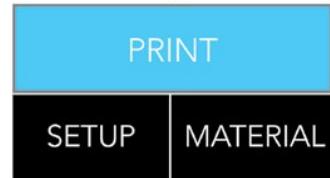
Powering up the device



Make sure that the device is plugged to a correctly rated supply and the power switch is set to "1". Otherwise go to Chapter 3.5 "Power Supply Connection".

To power up the device, press and hold the "Stand by" switch for 2 seconds, until the entire rim of the switch is backlit in blue and the home screen is displayed on the screen.

If the build table was not in its lowest position before power was last turned off, the printer starts from homeing its position. Before you proceed to next step wait for the device to finish operation.



Printing platform leveling



This procedure must be carried out to ensure correct device operation.

STEP 1

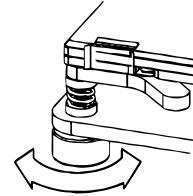
On the control panel select **SETUP ▶ HOTBED LEVELING ▶ START** in succession.

STEP 2

The device start calibration from checking the first corner, and making a series of 3 measurements.

STEP 3

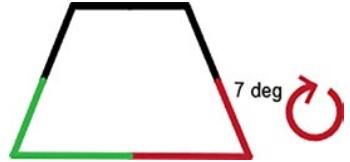
- If the corner is shown in green on the display, it means that the adjustment is not necessary and the extruder moves to the next corner.
- If the corner is shown in red on the display, it means that you should turn the adjustment nut by hand in the direction indicated on the display, and then press **CHECK**. The device repeats the series of measurements.



In the example shown on the right, turn the front right-hand nut by 7 degrees counterclockwise and press **CHECK**.



If any corner require adjustment by more than 45 degrees, the leveling process must be repeated.



Loading material

STEP 1

The device comes with a 1 kg package of PLA filament. Before proceeding to next steps:

1. Remove the protective foil of the carton;
2. Unpack the filament from the carton;
3. Remove the vacuum packaging foil;
4. Remove desiccant from inside the spool.

STEP 2

On the control panel select **MATERIAL INSERT PLA ▶ OK** in succession.

STEP 3

Once the carriage reaches the preset position, the message "Pull out bowden tube from extruder entry" is shown on the screen, remove the Teflon guide tube from extruder entry by pressing the push-fit connector collet and confirm by selecting **OK**.

STEP 2

On the control panel select **MATERIAL INSERT PLA** ► **OK** in succession.

STEP 3

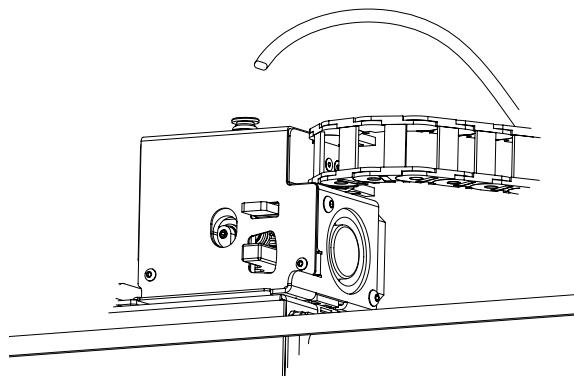
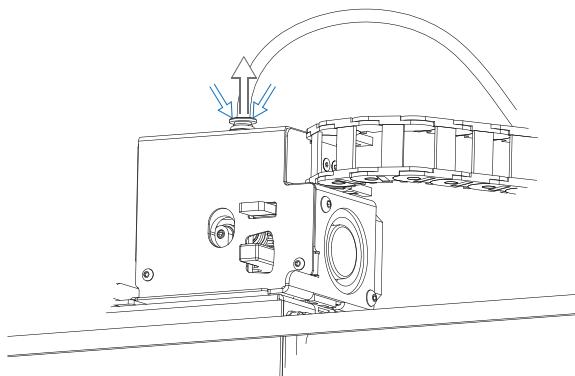
Once the carriage reaches the preset position, the message "Pull out bowden tube from extruder entry" is shown on the screen, remove the Teflon guide tube from extruder entry by pressing the push-fit connector collet and confirm by selecting **OK**.



For easier access to the extruder, open the top door.



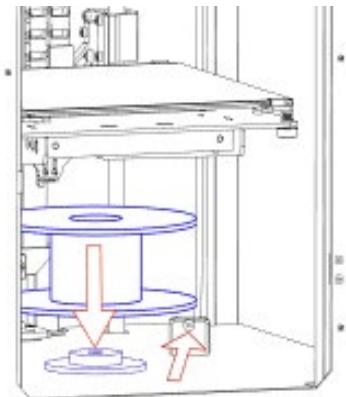
The Print Head starts to heat up. Do not touch!

**STEP 4**

Once the Build Table has reached the preset position, place the filament spool in the holder located in the bottom of the working chamber, insert its end to the feeder.



Make sure to put the spool with the filament in the right direction, so that the material is unwound in the counterclockwise direction and the spool can move freely when feeding the filament.

**STEP 5**

Continue pushing the filament until its end appears on the other side of the feeder.



Do not allow filament coils to fall off the spool! The material may be jammed in the feeder entry or material feed into the print head may be interrupted!

STEP 6

Cut filament end with pliers (included) at an angle of ca. 45 degrees and gently straighten the filament core a bit.

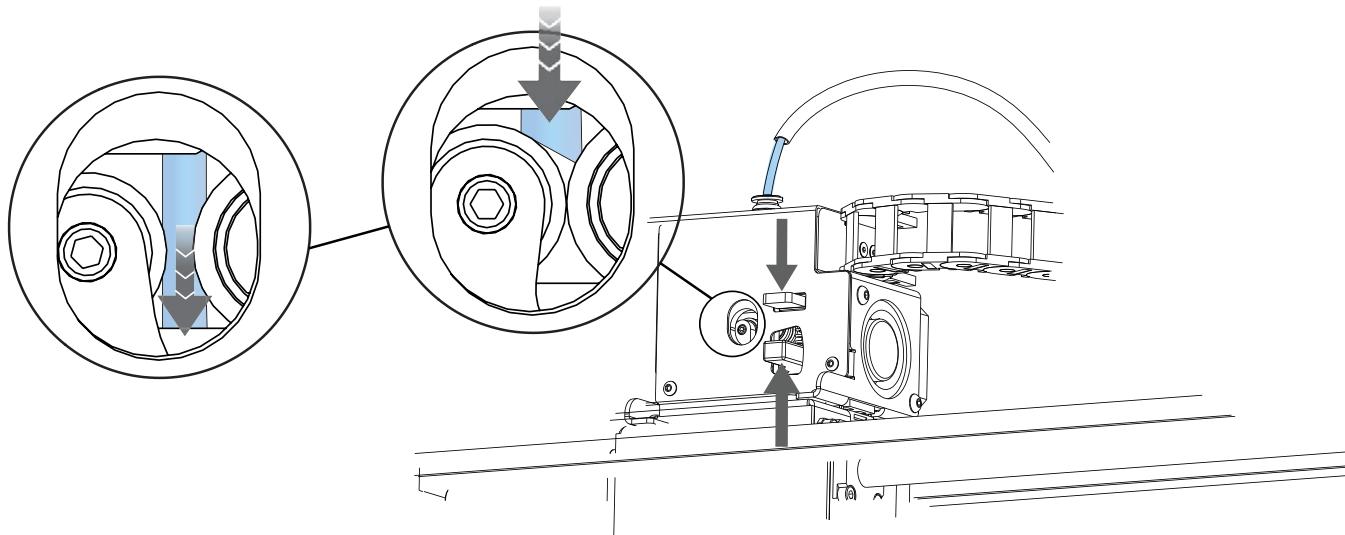


Make sure that the filament end is not bent or torn. Otherwise the material may be jammed in the print head!

STEP 7

Once the print head has heated up to the correct temperature, the following message appears on the display: "Push new filament into the extruder entry until it is grabbed by extrusion mechanism." feed the filament into the extruder until it is grabbed between the knurled wheel and pressure bearing.

Once you feel resistance, open the pressure lever and push filament into the print head bushing.

**STEP 8**

Once the message "Is new filament extruded?" appears on the screen, keep selecting **NO** until a continuous filament thread exits the print head. Confirm on the screen, by selecting **YES**.

STEP 9

By pressing the blue push-fit connector collet, couple guide tube to extruder by sliding it inside.

Starting a print**STEP 1**

Select the **PRINT** command from the control panel

STEP 2

Select the "**test_print_PLA**" option

STEP 3

The device starts operation from heating up the print head and the build table.



Monitor the start of the printing process.

Once the printing is finished, the message "Finished printing" appears on the screen and the printing time. Select the **OK** option. Open the door and remove the build platform. Carefully remove the print using the scraper included in the kit



Be careful not to damage the print and the Kapton film.

Clean Dimafix adhesive and filament residues from the build platform.

5. Description of use

This chapter describes all steps and workflows for correct use of your printer.

5.1 PREPARING THE BUILD PLATFORM

The build platform is supplied with Dimafix spray applied thereon. Before printing another print be sure to apply an adhesive layer onto the platform.

STEP 1

Shake the container

STEP 2

Spread a thin layer of product on the entire surface of the build platform. Make sure that the platform has a room temperature!



Never use the Dimafix adhesive inside the device! Remove the build platform from the printer and go to a well ventilated room, preferably outdoors!

STEP 3

Wait until the layer applied has dried. The surface should be visibly dull

STEP 4

Install the build platform For build platform installation instruction, go to chapter PRINTER INSTALLATION – Initial commissioning – Build platform installation on page 14.

5.2 STORING MATERIALS

Most materials used in the 3D printing process are sensitive to moisture and UV radiation, so that they should be stored in a dark place, preferably in an airtight container with a desiccant.

5.3 LOADING MATERIAL

For tips for loading filament refer to chapter PRINTER INSTALLATION – Initial commissioning – Loading material, on page 15.

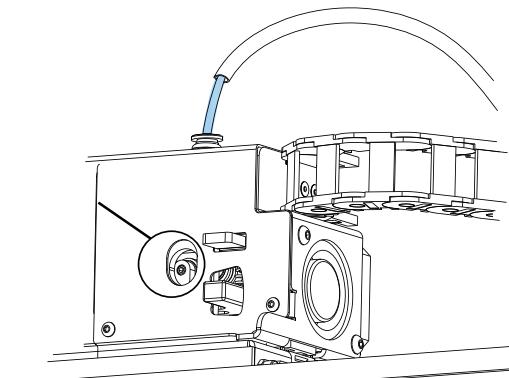
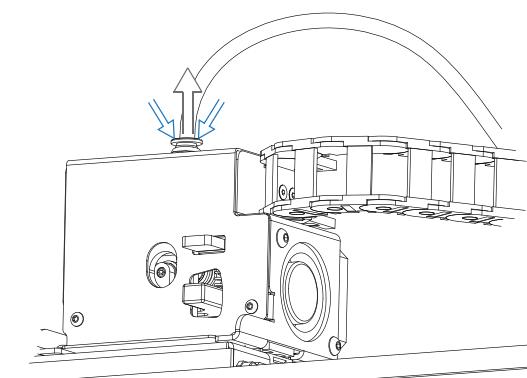
5.4 REMOVING MATERIAL

STEP 1

Select the **REMOVE** option from the **MATERIAL** menu

STEP 2

Once the message "Pull out Bowden tube from extruder entry" appears on the screen – unclamp and pull out the Teflon filament guide from extruder push-fit connector and confirm on the screen, by selecting **OK**.



STEP 3

The print head is heated up to the transition temperature („Preheating nozzle for filament injection”), material is injected and then backed out from the print head (Removing material).



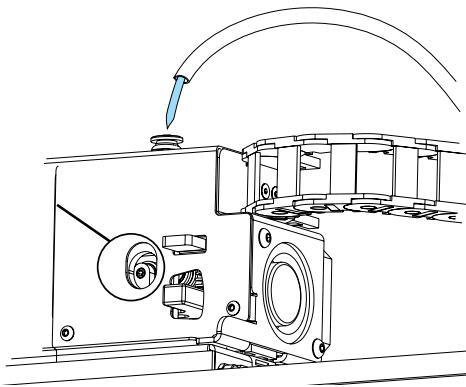
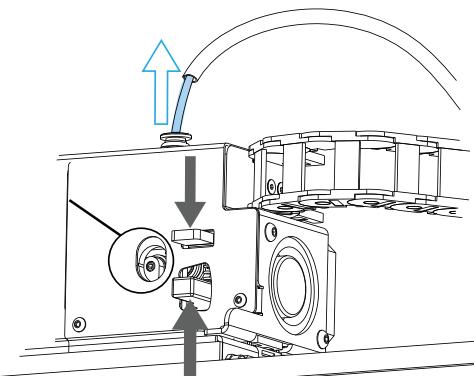
For easier access to the extruder, open the top door.



The Print Head starts to heat up. Do not touch!

STEP 4

Once the printer has finished the printing process and the message “Pull the lever on the extruder and manually pull out the filament” appears on the screen, immediately open extruder lever, remove filament and confirm the operation by selecting **OK**.



Once the message has appeared, remove filament without delay. Do not allow the filament to cool down inside the extruder.

STEP 5

Using pliers cut the damaged filament tip (ca. 50 mm).

STEP 6

Rewind material back onto the spool, while controlling its end all the time. Once the end exits the filament guide remove the spool from the device, and insert filament end through a hole in the spool rim.

STEP 7

Confirm the successful removal of material by reselecting **OK**.

5.5 CHANGING MATERIAL

To switch between different materials you need to combine the material removal procedure (see chapter “Removing material” on page 18) with the material loading procedure (see chapter Initial commissioning - Loading material”, on page 15).



In the event of switching between materials of different types, or between colored and neutral materials it is helpful to print a small item to completely remove the residues of the previous color in the nozzle.

5.6 REPLENISHING MATERIAL

In the event of changing filament color during printing, or if the amount of material on the spool is too small to build the entire model, it is possible to swap the material during the process.

STEP 1

During printing choose the right moment and click **CHANGE**. The printer stops once commands cached in the memory are completed.

STEP 2

Once the print head has stopped go to menu **OPERATOR PANEL** as soon as possible, and select **DOWN** several times until the Build Table travels down by ca. 50 mm.

STEP 3

Using the four **FRONT, BACK, LEFT, RIGHT** buttons position the carriage in a place convenient to change materials.

STEP 4

Follow the changing material procedure. Decouple the extruder push-fit connector and remove the Teflon filament guide tube, then press extruder lever and remove material from the print head. (Refer to chapter "Changing material" on page 23).



Extruder may be hot! Be sure to wear protective gloves!

STEP 5

While holding the pressure lever and with decoupled filament guide tube, grasp filament a few centimeters above the extruder and push it in through the print head until a continuous thread exits the nozzle.

STEP 6

Remove the pressed filament thread and couple filament guide tube to extruder push-fit connector.

STEP 7

On the display, select **BACK**, then **UNPAUSE**. The printer will resume printing from where it has stopped.

5.7 STARTING A PRINT

We assume that:

1. relevant .gcode file has been saved on the SD card;
2. printing platform is clean and Dimafix spray has been applied;
3. correct material has been loaded;
4. the device has correct nozzle installed in it.

To start a print, select the relevant print file from the list in menu **PRINT**, then confirm your selection by pressing **OK**. Now, the carriage is reset to the home position and the build table starts resetting to zero.



Every time you touch the extruder or carriage when homing the build table may result in its early stoppage and error in starting print!



Before selecting the print file make sure that no filament residue remains on the nozzle. If the nozzle is crusted you must clean it.

Once resetting the printer is finished, the device is warmed up to an appropriate printing temperature and thermally stabilized. It can take several minutes. Then, the printing process starts automatically.

5.8 PAUSING AND RESUMING PRINT

To pause the print with the option for resuming, on the "PRINT" screen, choose the **CHANGE** option. Once the cached commands are completed, the printer will stop. Now, you have the option to move the carriage (select **OPERATOR PANEL** and then travel the build table by selecting **DOWN** and use the **FRONT, BACK, LEFT, RIGHT** buttons), or change/replenish the material (see page 26).

To resume printing, exit the OPERATOR PANEL screen by pressing the **BACK** button, then select **UNPAUSE**. Now, the printer travels back to the position where the print was interrupted and resumes printing.



Before resuming printing, remove the filament thread which escaped from the print head under gravity.



The print may not be paused before the warming procedure is finished.

5.9 ABORTING PRINT

To interrupt print without the option for resuming, on the "PRINT" screen, choose the **ABORT** option and confirm print cancellation by means of the **OK** button. Now, the printer completes printing and the carriage travels to the home position and the build table travels to the bottom of the working chamber.

5.10 FINISHING PRINT

Once the print is finished, the "Finished printing" message is displayed together with the total printing time. Device carriage travels to the home position and the build table travels to the bottom of the working chamber.

5.11 REMOVING PRINT FROM THE BUILD PLATFORM

STEP 1

Make sure that the temperature of the build platform is below 30°C. You can check the current print head temperature by selecting **SETUP** from main menu and then **INFORMATIONS**.

STEP 2

Slide the platform from the device and place it on a flat surface.

STEP 3

Use a knife or scraper (included) to gently pry the print and unstick it from the printing platform.



Scraper corners are very sharp! Be careful not to damage the Kapton film when unsticking the print!

STEP 4

Carefully remove filament residues from the printing platform (skirt and brims around the model) and refill the footprint of the removed model with DIMAFIX adhesive.



Only handle DIMAFIX in well-ventilated areas, never inside the printer!

5.12 REMOVING SUPPORT STRUCTURES

For sophisticated geometry models the printer also prints support structures, i.e. parts of the print which are not parts of your model and should be removed mechanically. In most cases simple tools such as pliers, flat screwdriver, or tweezers will do.



For safety reasons, it is recommended to wear protective gloves and glasses included in the kit.

5.13 NOZZLE REPLACEMENT

STEP 1

Prepare the necessary items included in the kit:

1. Protective gloves
2. Nozzle Kit (Special 10 mm flat wrench, 8 mm socket adapter, ratchet or adapter handle)
3. 2 mm Allen key
4. Replacement nozzle

STEP 2

If filament have already been loaded, remove it (refer to chapter Removing filament on page 18).

STEP 3

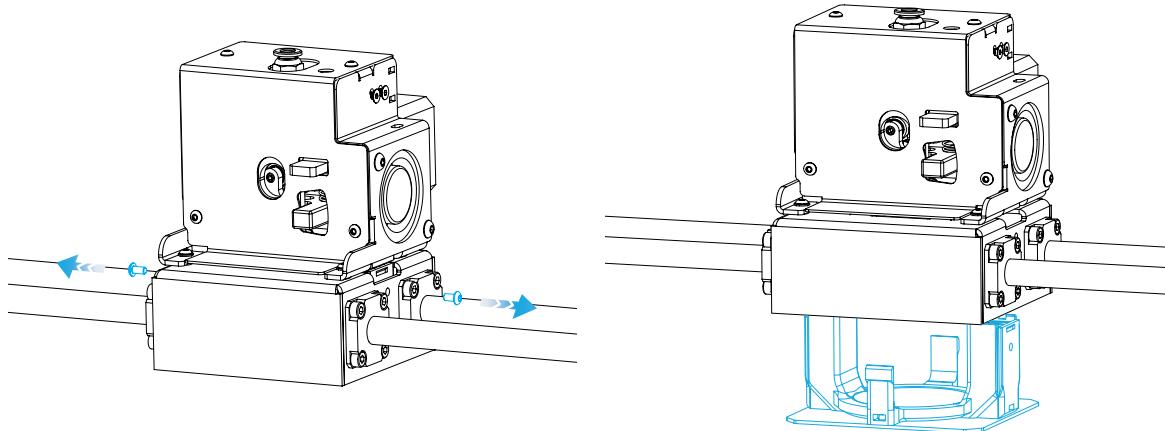
In the SETUP menu select the **NOZZLE EXCHANGE** option and confirm by selecting **OK**. The carriage will travel to the middle position and the print head will start warming up to the nozzle exchange temperature.



The print head is hot! Be sure to wear protective gloves!

STEP 3

Once the message "Change nozzle now" appears on the screen, use the 2 mm Allen key to remove two M3 screws located between bearings on both sides of the carriage and remove the carriage cover with cooling channels.

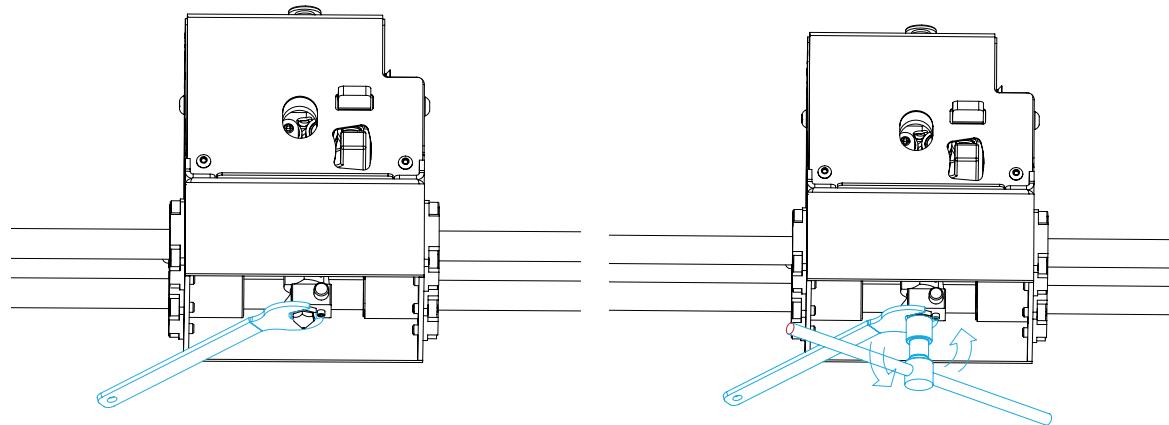


STEP 4

Using the 10 mm flat wrench hold the print head block, then using handle with the 8 mm socket adapter remove the nozzle.



Firmly hold the heater block using the 10 mm wrench! Do not allow the block and head to rotate around its axis!

**STEP 5**

Using the 10 mm wrench to hold the block, screw the replacement nozzle into the heater block, then tighten the nozzle using the 8 mm socket adapter until you feel resistance.



Adapt the nozzle tightening torque to eliminate the clearance between nozzle and the heater block.

STEP 6

Reinstall the carriage cover with cooling channels

STEP 7

Replace two M3 screws.

6. Preparing files

Your HBOT 3D F300 builds a real model on the basis of instructions saved on an SD Card in the format of a .gcode file. Every printing process needs an individual .gcode file, which stores all printing data and model coordinates. A .gcode file is generated using the Simplify 3D Software included in the kit. This chapter describes the software program installation process, its essential features, and steps to be followed to correctly prepare files for your printing job.

For additional information we encourage you to refer to the knowledge base on the manufacturer's website at: www.simplify3d.com

6.1 INSTALLATION OF SIMPLIFY 3D

STEP 1

Log in to your account at: www.simplify3d.com in the Account tab using the credentials provided by Simplify3D Support Team to the e-mail address specified when purchasing the device.

If you did not receive an e-mail with login credentials, contact our Technical Department by email at: serwis@hbot3d.com

STEP 2

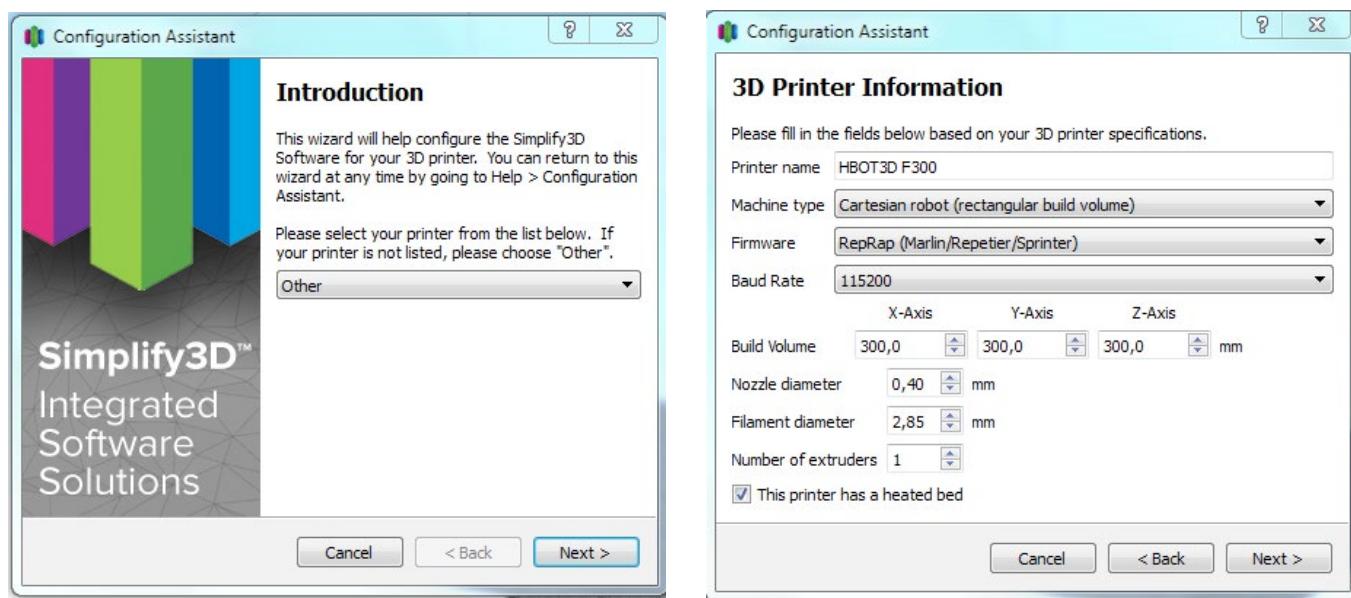
Change the default access password

STEP 3

Download the software installation file by selecting a version appropriate for your operating system from the Download Software tab.

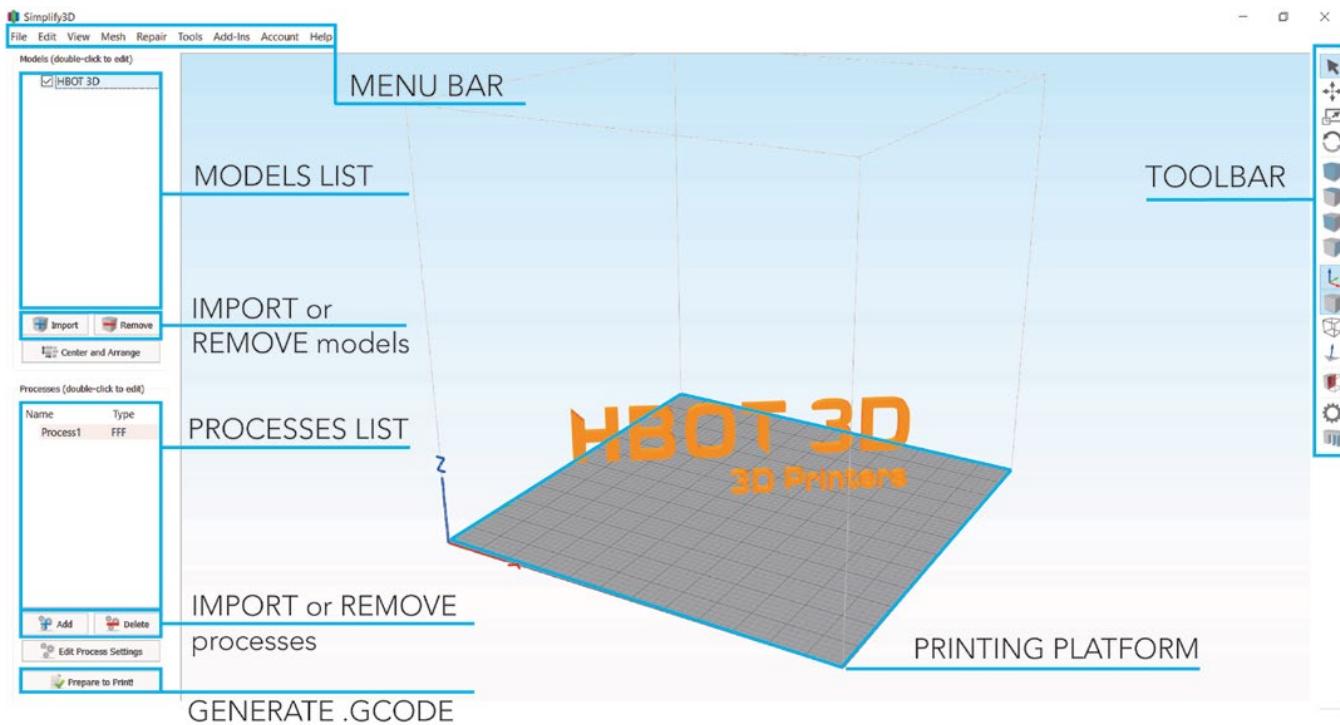
STEP 4

Follow the instructions in the wizard. Once you go through standard settings and the "Introduction" screen appears, select Other from the drop-down list and fill in the fields as shown in the following diagram.



6.2 GRAPHICAL USER INTERFACE

You should familiarize yourself with elements of graphical user interface of Simplify 3D. Names used on the following illustration are often referred to later in this manual and without knowing them you will not be able to properly prepare your file for printing.



6.3 IMPORTING MATERIAL CONFIGURATIONS

To correctly generate a print file you have to import the material configurations prepared by us. Correct completion of this operation enables you to correctly configure basic parameters of your machine.

STEP 1

Download the latest package of material configurations from manufacturer's website at www.hbot3d.com and save in the selected location on your computer disk.

STEP 2

Unpack all files. Make sure that five files with the *.fff extension have been unzipped to the Configurations folder.

STEP 3

From the menu bar select **File** ► **Import FFF Profile**, locate the folder with the saved files, select all and choose **OK**. After a while a message appears confirming that the configuration has been imported into the program memory.

6.4 MODIFYING THE DEFAULT SETTINGS

In order to improve the comfort of working with Simplify 3D it is recommended to modify some settings.

From the menu bar select **Tools** ► **Options** and modify your settings in accordance with the following guidelines:

Tab	Parameter	Setting
Preferences	Speed Display Units	mm/s
	Middle mouse button resets view	deselected
	Always show full 3D transform gizmo	selected
Visualization	Use orthographic camera with no perspective	selected

6.5 IMPORTING MODELS AND ORIENTATION

Importing

Import ► select one or several files to be imported into your project.



Supported file formats: *.STL i *.OBJ.

Automatic orientation

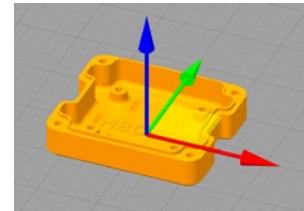
Center and Arrange

To bring your model dropped below the build platform to the build table, select **Edit** ► **Drop Model to Table**.

Moving

From the menu bar select **Translate models**

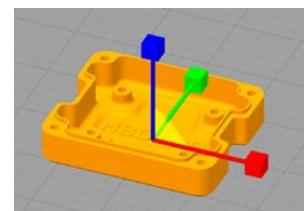
Catch your model and move it freely in the XY plane. By selecting appropriate arrows move your model towards a given axis.



Scaling

From the menu bar select **Scale models**

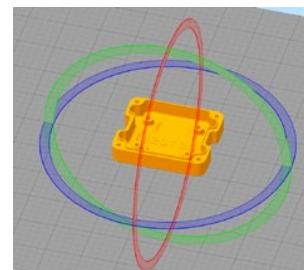
If you want your model to be scaled up or down while maintaining a uniform scaling, click on the model and drag in any direction. If you want to stretch or shrink your model along just one axis, catch and drag the cube of the relevant axis.



Rotating

From the menu bar select **Rotate models**

To rotate your model around a given axis, click on the respective ring and drag.



Free transformation

To set the exact position, scale and rotation of your model, double-click on the model. It will pop up a menu bar on the right. In the first field you can change the name of your model in the project.

Change Position allows you to enter the exact position of the center of the model coordinate system in relation to the center of the build platform coordinate system.

Change Scaling allows you to change your model dimensions by entering new dimension or a scale value. Also, it is possible to disable the scaling factor (Uniform scaling)

Change Rotation rotates your model by a precise value in degrees.

Each section has a reset button for resetting position, scale and rotation to your default settings.



Orientation relative to the surface

From the menu bar select **Edit** ► **Place Surface on Bed**

Click on the selected triangle of your model.

Copying

From the menu bar select **Edit** ► **Duplicate Models**

In the window enter the number of copies and confirm by clicking **Copy**

Mirroring

From the menu bar select **Edit** ► **Mirror Mesh**

Select the axis in which you want your model to be mirrored.

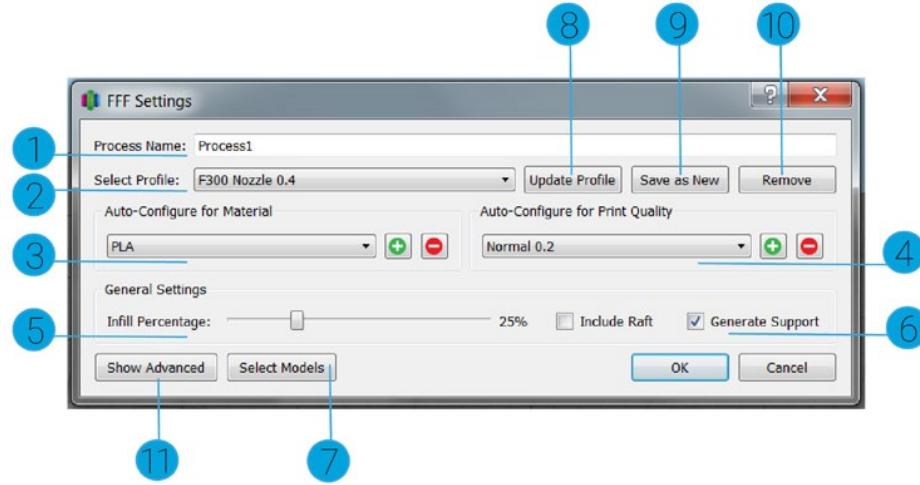
Visibility

To hide or unhide your model on the project printing platform, either select or deselect the checkbox next to the name of the model in the list of downloaded models.



Deselecting a checkbox and hiding the model will not delete the file from your project.

6.6 CONFIGURING PRINTING PARAMETERS



1. Naming the process
2. Selecting configuration (one of five previously imported, depending on the diameter of the currently installed nozzle).
3. Selecting filament
4. Setting layer height (print quality) . Different layer heights are available depending on nozzle diameter
5. Model interior fill percentage The higher the interior fill percentage, the more resistant model, but higher material consumption and longer print time.



If the interior fill percentage is too low, pillowing can occur on the upper surfaces of your model! Using the interior fill percentage lower than 15% is not recommended.

6. Generating support structures.



This option may only be deselected in special cases! We recommend that the Generate Support option should be enabled (selected)

7. Selecting models affected by the process
8. Saving changes to the configuration
9. Adding new configuration
10. Removing configuration
11. Advanced process parameters

6.7 DISPLAYING PRINT PREVIEW AND EXPORTING CONTROL COMMANDS

Once the model is correctly oriented on the build platform and basic process parameters have been configured, you can proceed to generating control commands.

Use the **Prepare to Print button**. The program will start generating control commands for your 3D printer. It may take between a few seconds to several minutes, depending on the complexity of your model, the accuracy of the triangle infill pattern of the STL file and the computing power of the computer. Once the travel paths are generated the program will proceed to print preview.

Section 1 contains information regarding the estimated print time, length and weight of material necessary to print your model and the cost of consumed material.

In **section 2** you decide which elements of the print preview are shown:

- Build table – a preview of the build platform
- Toolhead – a preview of the print head
- Travel moves – showing idle movements of the print head
- Retractions – showing retraction points
- Coloring – options for colors used to represent different features of your model (movement speed – depending on the print head linear speed, active toolhead – depending on the currently selected print head, feature type – depending on the type of model feature that is printed)

Slider (5) allows you to keep track of the building of your model, line-by-line or layer-by-layer.

In **section 2** you change default settings for displaying print preview:

1. deselect the Travel moves option
2. from Coloring drop-down list select **Feature Type**. This allows you a much more clear preview of the printed model.

Button **Save Toolpaths to Disc** (3) exports the control instructions to a .gcode file, which is then saved on the SD card of your printer. To return to the parameter edit mode use the **Exit Preview Mode** pushbutton (4)

6.8 EDITING SUPPORT STRUCTURES

Depending on the requirements of your model, it is possible to manually edit support structures.

From menu bar select **Tools** ▶ **Customize Support Structures**.

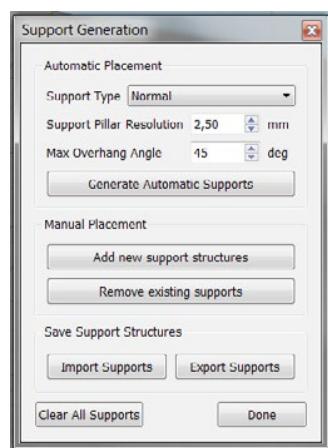
Support Type

In the first field select the type of generated support structures. The first option generates supports everywhere, where model's overhang angle is greater than the allowable one (Max Overhang Angle). The second option From Build Platform Only will only generate supports between the printing platform and the model.

Resolution

In the Support Pillar Resolution field you set the resolution of generating the preview of support structures. This parameter determines how the model exactly will be supported, but without setting the infill density of support structures.

To generate supports use the **Generate Automatic Supports** button.



Editing supports

1. To add a new support use the **Add new support structures** button, then place the pillar in the desired place of your model.
2. To delete a support use the **Remove existing supports** button, then click the support you want to delete.
3. To reset all supports and restore automatic support placement, use the **Clear All Supports** button.

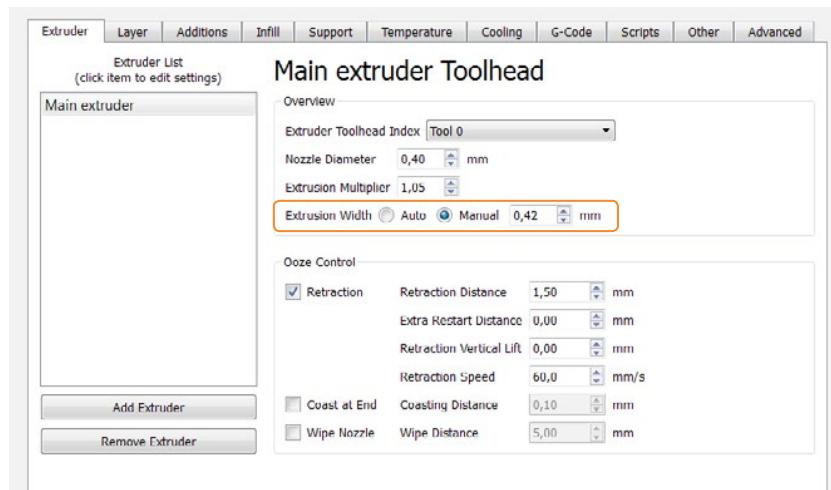
6.9 ADVANCED PRINT PARAMETERS

Simplify3D Software allows you to change more than five basic print parameters. To edit advanced parameters, open the FFF Settings window to edit process parameters (the **Edit Process Settings** button or double-click on the process name) and then select **Show Advanced**.

We recommend you to ONLY edit the parameters described in this Manual. Incorrect configuration of the other parameters may result in a failed print or even a damage to your printer.

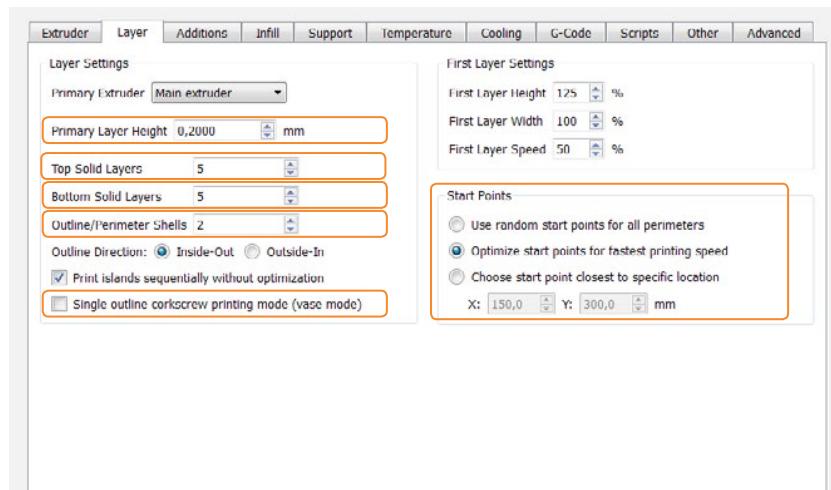
Extruder tab

Extrusion Width – width of the paths laid down during extrusion. This value may be set between 100% up to 120% of nozzle diameter.



Layer tab

The Layer tab contains all layer related parameters. Primary layer height is the basic layer height. You can change this parameter if you need to use other layer height than the one defined in the drop-down list in section Auto-Configure for Print Quality. The minimum layer height is 0.25 and the maximum one - 0.75 of nozzle diameter.



With the change of the layer height, two other parameters must be modified: **Top Solid Layers** and **Bottom Solid Layers** – i.e. the number of top and bottom layers. Their number multiplied by the layer height should be at least 0.8 mm. By increasing the number of layers you increase respectively the thickness of the top or bottom wall of the model.

Side wall thickness is governed by the **Outline/Perimeter Shells** parameter, i.e. the number of outlines forming your model wall. The more outlines, the thicker the wall and therefore the mode rigid and stronger the model.

Single outline corkscrew printing mode (vase mode) – the so-called vase mode. In this mode the printer will not print an infill but the print head moves simultaneously with the build table and prints a continuous “spiral” track. This mode is appropriate for printing models with a single outline (e.g. a bottle, vase). In this mode no supports are produced, so the maximum overhang angle of the model is 45 degrees.

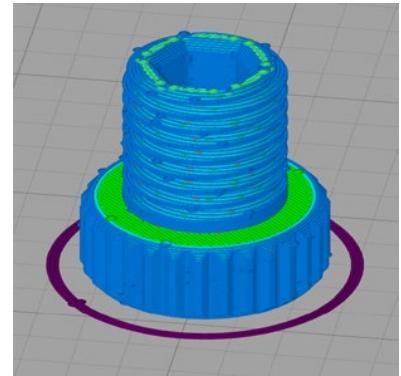
Start points

This section enables you to select start and end points for creating outlines.

The first option “**Use random start points for all perimeters**” randomizes the points around model wall and makes them less visible (picture on the right).

The second option “**Optimize start points for fastest printing speed**” allows the software to optimize the layout of starting points so as to increase the speed the printing process.

The third option “**Choose start points closest to specific location**” allows you to line-up your starting points in a selected coordinate on the printing platform.

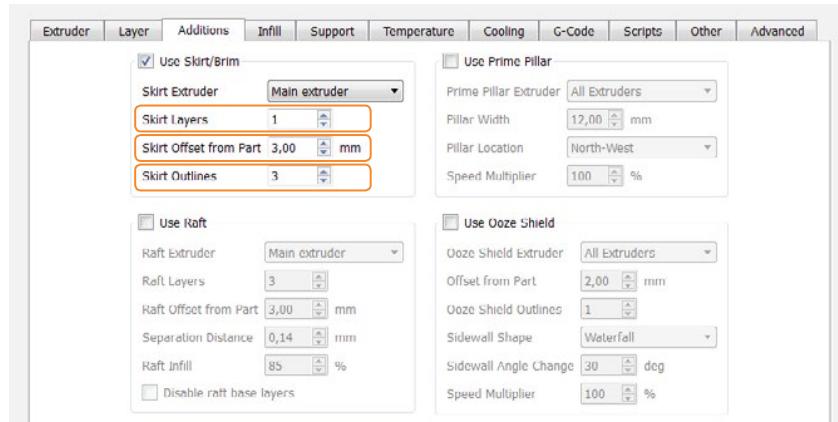
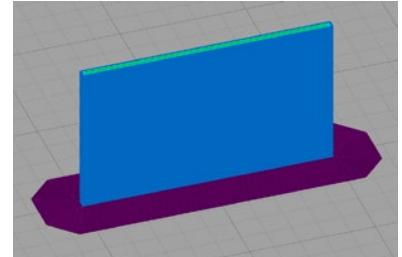


Additions tab

In this tab you can define parameters of the initial outline.

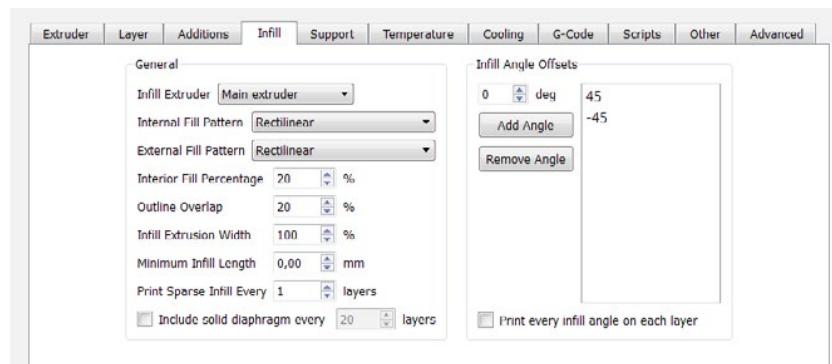
Default outline, the so-called **Skirt** is an outline that does not touch the print and is generated to stabilize the flow of material from the nozzle. For high prints with a small surface area touching the printing platform, it is useful to create a wider first layer (**Brim**) to help with adhesion of the model to the printing platform.

To create a **Brim** around your model, set the **Skirt Offset from Part** parameter to 0 and the **Skirt Outlines** to min. 10 (the more skirt outlines, the wider layer is attached to your model). Also, for tall models and very small surface area of contact with the build platform you can increase the number of **Brim** layers - **Skirt Layers**.



Infill tab

This section enables you to modify interior fill parameters, mainly infill density and infill pattern (Interior Fill Percentage and Internal Fill Pattern).



You have 6 different infill patterns to choose from:

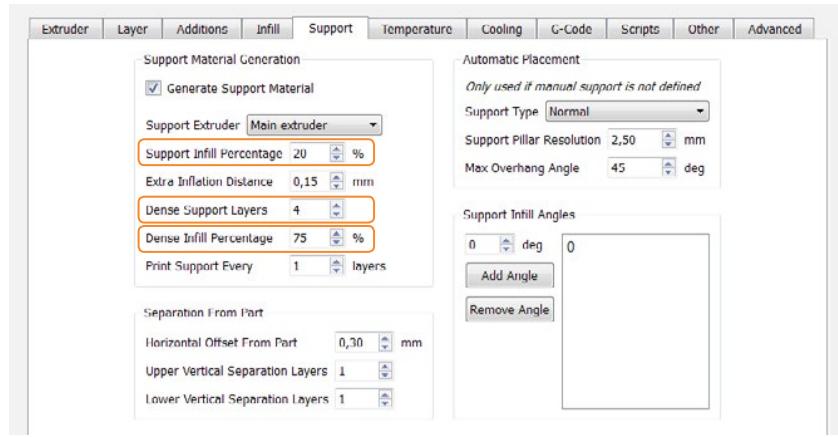
Rectilinear	Grid	Triangular	Wiggle	Fast Honeycomb	Full Honeycomb
Infill pattern with the lowest strength for low infill percentage, highest strength for 80-100% infill percentage. It is the only infill pattern that could be set to 100%. Infill paths do not intersect within the same layer.	Infill pattern with a higher strength for lower infill percentages. Maximum setting which if configured will not cause print problems is 80%, but the optimum one is 20-40%. This shape differs from the Rectilinear one in that the paths intersect one another within the same layer, causing better adhesion of the entire infill.	The same infill pattern as Grid, but infill paths intersect with one another at 60-degrees. This is the most stiff and strongest infill pattern for low infill percentages. Like in the case of the Grid infill pattern, maximum infill percentage is 80% and the optimum one is 20-40%.	Polyline-shaped infill pattern.	Simplified honeycomb. A structure with similar properties to the Triangular one, also stiff but less strong than the full honeycomb. Maximum infill percentage is 80%, and the optimum one is 20-40%.	Full honeycomb. Characteristic for double infill path, making the structure very strong at low infill percentages.

Support tab

Support Infill Percentage – infill density of support structures. The higher the infill density, the more accurately the support structures are filled, but the print time and material consumption significantly increase. Optimum value of this parameter is 20%.

Dense Support Layers – the number of support layers with the dense infill percentage where paths of your model are directly laid down at. The more number of solid layers, the better support for curved and rounded surface. If support structures need to be quickly removed, you may set the number of dense support layers to 0, but the quality of supported surface will be much worse.

Dense Infill Percentage – infill percentage of the dense support layers. The less density, the easier support removal but the lower quality of the supported model surface.



Temperature tab

Parameters in this tab are critical for the print process to run correctly.

Without first contacting our Technical Department **it is not recommended that you modify any parameter in this tab.**

Cooling tab

Parameters in this tab are critical for the print process to run correctly.

Without first contacting our Technical Department **it is not recommended that you modify any parameter in this tab.**

G-code tab

Parameters in this tab are critical for the print process to run correctly.

Without first contacting our Technical Department **it is not recommended that you modify any parameter in this tab.**

Scripts tab

Parameters in this tab are critical for the print process to run correctly.

Without first contacting our Technical Department **it is not recommended that you modify any parameter in this tab.**

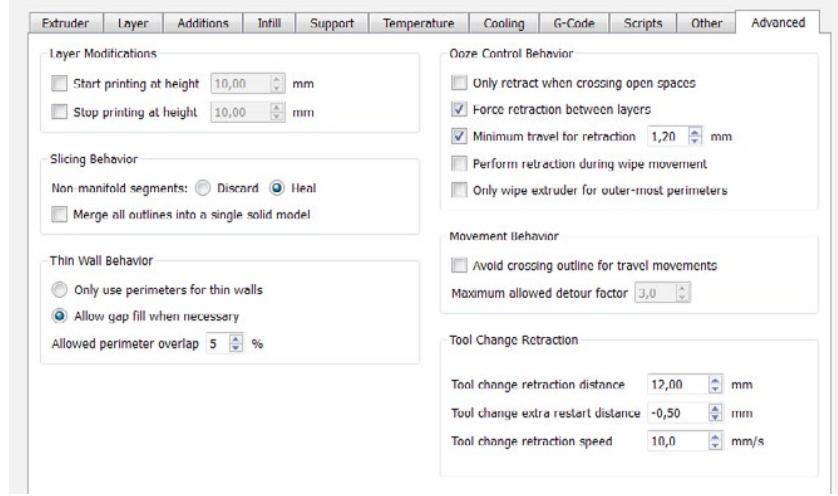
Other tab

Parameters in this tab are critical for the print process to run correctly.

Without first contacting our Technical Department **it is not recommended that you modify any parameter in this tab.**

Advanced tab

Using the **Start printing at height** and **Stop printing at height** options it is possible to start or stop a print at a specific model height. It allows you to combine several processes in the same model and define different settings for your print, e.g. different layer heights or infill percentages. You need to remember that a next process must begin at the same height where the previous one has been completed. Otherwise the print may fail.



6.10 SAVING A PROJECT

Simplify3D Software enables you to save the entire project to a *.factory file. It allows you to save the arrangement of your models on the printing platform and all settings to an external file.

To save a new project choose **File ▶ Save Factory File As...**

To save changes to a previously created project choose **File ▶ Save Factory File.**

6.11 ADDITIONAL SOFTWARE OPTIONS

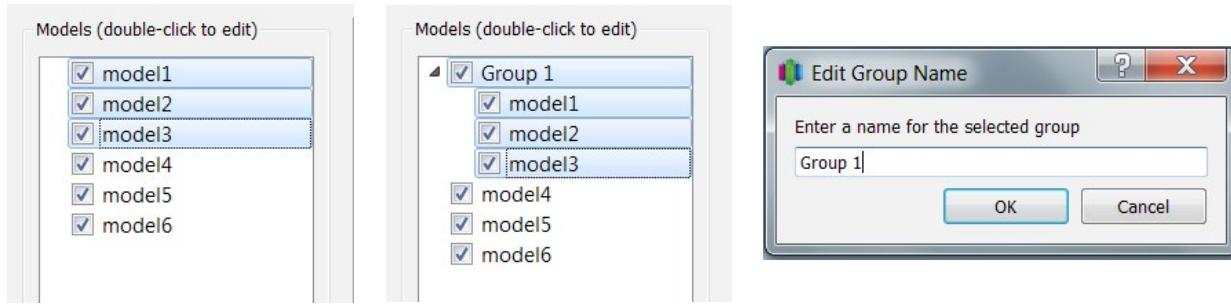
Preview of a generated gcode file

To open a graphical preview of a previously generated .gcode file, select **File ▶ Preview G-Code File...** from the menu bar.

Grouping loaded models

For easier manipulation of the loaded models it is possible to create a group of models. Creating a group of models allows you to move, scale, rotate and copy multiple models at a time.

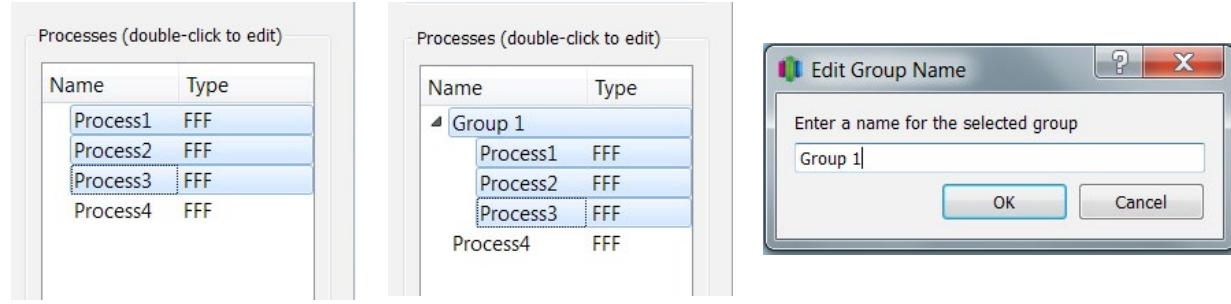
To add models to a group, press and hold the SHIFT key and click model names that you want to group. Then, from the menu bar select **Edit ▶ Group Selection**. Double-clicking lets you edit the name of the new group.



To ungroup multiple models select **Edit ▶ Ungroup Selection**

Grouping processes

Similarly to creating groups of models, it is possible to create groups of processes. To add multiple process to a new group, press and hold the SHIFT key, select the processes and then select **Edit ▶ Group Selection**. To change a name of the created group, double click its name and enter a new group name in the pop-up window.



To ungroup multiple processes select **Edit ▶ Ungroup Selection**

Separating an STL file into individual parts

When generating an .STL file based on a model composed of multiple elements in an external CAD software it may happen that Simplify3D Software generates an incorrect .gcode file when combining these elements. If this is the case, it is necessary to first separate the components of the combined .STL file and then allow the software to combine these elements when generating control commands.

To separate components of an .STL file select the **Mesh ▶ Separate Connected Surfaces** option from the menu bar. Depending on model size and its complexity it can take up to several minutes. Following separation, all components of the .STL file will appear as new models on the list of loaded models.

6.12 USING SD CARD AND USB PORT

To launch the created .gcode file on the printer, save it to your device memory card. There are two options for transferring the file on the printer SD card:

1. Remove the SD card from the device and put it in a SD card reader of your computer and then copy the file directly to the card.
- 2.
3. Connect your computer by USB cable to the printer and copy the file to the SD card without removing it from the device.

Device USB port is located on its left panel (see the "Device Description" chapter), USB cable is included. Once the device is connected to the computer, it should be detected by the computer as a mass storage device.

7. Maintenance and operation

Routine inspection and maintenance of the device will guarantee the highest quality prints and helps you to increase the reliability of your printer. Your failure to perform these operations will speed up the wear of your printer and increased risk of failures.

7.1 RECOMMENDED MAINTENANCE OPERATIONS

Repairs or maintenance must be made after power has been cut off to your printer.

Operation	Frequency	Instructions
Printer cleaning	Before each print	Remove unnecessary items and excessive dust from printer interior and clear air fans
Cleaning the build platform	Before each print	Wash the platform under running water and wipe it dry
Applying Dimafix adhesive	Before each print	Before putting the printing platform back into the printer, apply a thin layer of Dimafix spray on its upper surface (outdoors or in a ventilated room)
Exchanging Kapton film	If damaged	Should either a torn portion of Kapton film, or noticeable scratches be present that would affect print quality, carefully remove the worn Kapton film. Wash and dry the glass platform thoroughly. Unstick, pull off, and hold the first 30 mm piece of adhesive securing film from a new Kapton sheet (shorter edge of the film). Lay the beginning of the Kapton film, the adhesive side down, onto the shorter edge of glass platform so that it overhangs ca. 5 mm beyond the platform edge, then carefully stick the film on platform edge. Hold down the stuck portion of the Kapton film with a squeegee and pressing the film against the glass, slowly move the squeegee along the film so that the entire Kapton film is stuck to the platform. The securing film should unstuck itself as you move the squeegee. To increase slippage of the squeegee, spray the Kapton film with a small amount of glass cleaner. Trim the excess of the Kapton film on longer sides of the glass platform, flush with platform edge. Using a ruler, trim the film on shorter sides of the platform, 5 mm from platform edge, to expose the glass surface.
Nozzle replacement	If damaged	Print nozzle replacement must be made if the nozzle gets overheated or deformed. (Refer to chapter "Nozzle replacement" on page 19).
Print head replacement	Every 12 months* or 4 000 h	Contact the Service Department of the manufacturer
Lubricating guides	Every 1 month* or 300 h	Position the carriage in its middle position (Setup ► Operator panel). Wipe away the old grease from the guides (with a paper towel or clean cloth). Apply an amount of pea sized grease amount to each guide at each bearing (4 carriage bearings, 2 bearings on the right Y-guide and 2 bearings on the left Y-guide). Using the front, back, left and right buttons travel the carriage along the entire operating range to spread the grease along the guides
Belt tensioning	Every 6 months* or 2 000 h	Loosen 4 fixing screws of the left stepper motor. Push the motor back and tighten back the screws while holding the motor.
Printing platform leveling	Once a week* or every 75 h	See the "Printing platform leveling" chapter on page 13
Cleaning the knurled wheel	Once a week* or every 75 h	Clean the knurled wheel by blowing out with compressed air through the hole in the extruder case so as to remove any leftover filament chips.
Firmware update	1 month	Once a month check on the manufacturer's website if an updated software version, or new material configurations are available

* assuming that the average device operating time is 15 h/ day, 5 days/ week.

Contact us!

support@hbot3d.com

+48 71 727 62 04

TECHNICAL SUPPORT

Before contacting our Service Department try to troubleshoot
the problem by yourself (e.g. by restarting the device).

Please prepare the serial number of your printer (S/N) located on the
nameplate on the back panel of the printer or in the Warranty Card
accompanying the device.

WWW.HBOT3D.COM