

BIO X

User manual



CELLINK AB
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SWEDEN

Welcome to the world of bioprinting!

Not too long ago, the idea of creating living human tissue was no more than a dream. Not anymore. The technology in front of you is the next step on the path of regenerative medicine.

BIO X is designed with your research in mind. By simplifying the 3D bioprinting process, you can focus on your research and dream bigger than ever before.

Featuring unrivalled usability and versatility, BIO X will help take your research to the next level. With interchangeable intelligent printheads, Clean Chamber technology, print chamber sterilization, temperature-controlled print bed and a user-friendly interface, BIO X is ready for the most complex 3D bioprinting challenges.

This manual will serve as your guide to getting started with BIO X. Review the entire manual before using the product for the first time.

Welcome to the future of regenerative medicine!

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1. Safety information

Review the entire manual, as well as the manuals for any accessories, before you start using BIO X. Mishandling can lead to equipment damage and serious injury. The following symbols are used to indicate risk of equipment damage or personal injury:



This symbol indicates risk of injury or equipment damage.



This symbol indicates a heated surface. BIO X has heated surfaces that may cause personal injury or equipment damage if not treated with care. A physical symbol labels these surfaces on the BIO X, and the symbol appears on the BIO X touchscreen when the print chamber is heated.



This symbol indicates presence of UV light. Keep the BIO X door closed and wear proper safety attire during UV sterilization and UV curing. This symbol appears on the touchscreen when a UV light source is active.

Manufacturer

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1.1 General safety information

If BIO X acts in a way that is not described by this manual, turn it off and contact CELLINK.

Use BIO X for its intended purposes only. Do not modify its instruments, subcomponents or accessories. Do not open BIO X, disassemble BIO X or attempt any service other than the instructions described in the manual.



Never place your fingers near the machine until all parts have stopped moving. Moving parts can cause injury.



Never clean or service BIO X while the machine is on. Always turn off the power and disconnect any external sources of power and air pressure before cleaning or servicing BIO X.



BIO X uses UV light for sterilization and curing. Never look directly at UV light. Never expose skin to UV light. Eye or skin exposure can result in serious personal injury.



BIO X has heated surfaces that can reach temperatures up to 250 degrees Celsius. Never touch heated surfaces when using the heating function. Always let printheads and print bed cool after using the heating function.



Always ensure that equipment is correctly mounted before use. Improperly mounted print beds, printheads, cartridges, cables, liquid spouts and air spouts can be dangerous. If any equipment appears damaged, turn off the machine, unplug all external connections and contact CELLINK before further use.

Never tamper with any safety interlocks. Tampering risks equipment damage and personal injury.

1.2 Unpacking, lifting and carrying

Read how to safely unpack and setup BIO X in Chapter 3.



BIO X is heavy. Always use a minimum of two people to unpack and move the machine.

1.3 Electrical information



Always connect BIO X to a grounded socket and use the voltage described in the specifications. Improper electrical handling can cause equipment damage and personal injury.

1.4 Protective equipment



Always wear gloves and eye protection during bioprinting, UV curing and sterilization.



Always wear gloves and eye protection while handling hazardous materials, including materials that are toxic, corrosive and carcinogenic.



Read the material safety data sheets, packing labels and the manufacturer or distributor's catalog before using the BIO X.

1.5 Hazardous materials



Consult material safety data sheets, packaging labels and the manufacturer or distributor catalog before handling hazardous dispensing materials, such as flammable and corrosive materials. Ensure any operators are informed of the material's characteristics and compatibility with the dispensing unit. Always use appropriate safety equipment and attire. If you are unsure of a material's compatibility, contact CELLINK.



After using ethanol to clean BIO X, wait at least 60 seconds before bioprinting to ensure that all flammable vapors are removed.

1.6 Compliance

By using BIO X, you agree to the terms stated here and in the warranty (Chapter 6.) Except for the express warranty set forth in the warranty information and in our software license terms as applicable, all equipment and software provided hereunder are provided "as is," and CELLINK makes no warranty as to its use or performance. Except for any warranty, condition, representation or term the extent to which cannot be excluded or limited by applicable law, CELLINK and its suppliers make no warranty, condition, representation, or term (express or implied, whether by statute, common law, custom, usage or otherwise) as to any matter including, without limitation, noninfringement of third party rights, merchantability, integration, or fitness for a particular purpose. You assume responsibility for selecting the solution to achieve your intended results, and for the installation of, use of, and results obtained from the equipment and software. Without limiting the foregoing provisions, CELLINK makes no warranty that the equipment or software will be error-free or free from interruptions or other failures or that the software or equipment will meet your requirements. Under no circumstances and under no legal theory, whether in tort, contract, or otherwise, shall CELLINK or its suppliers be liable to purchaser or to any other person for loss of profits, loss of goodwill, or any indirect, special, incidental, or consequential damages, or damages for gross negligence of any character. Under no circumstances can CELLINK be responsible for consequences of misuse of the instrument or for use of the instrument outside the use specified in this user manual, be they material or personal.

1.7 Electrostatic discharge (ESD) protection protection

1.7.1 Introduction

The BIO X print chamber is ESD-sensitive. Use the following procedures to ensure that no damage is caused to the BIO X or its accessories.

1.7.2 Procedures

Review the procedures to follow when using the BIO X print chamber and handling printheads. Always discharge yourself before touching any ESD-sensitive parts.

1.7.2.1 Discharging yourself

To discharge yourself, touch a grounded metal surface. Discharge yourself before touching printheads or installing them in the BIO X. Examples of grounded metal surfaces include:

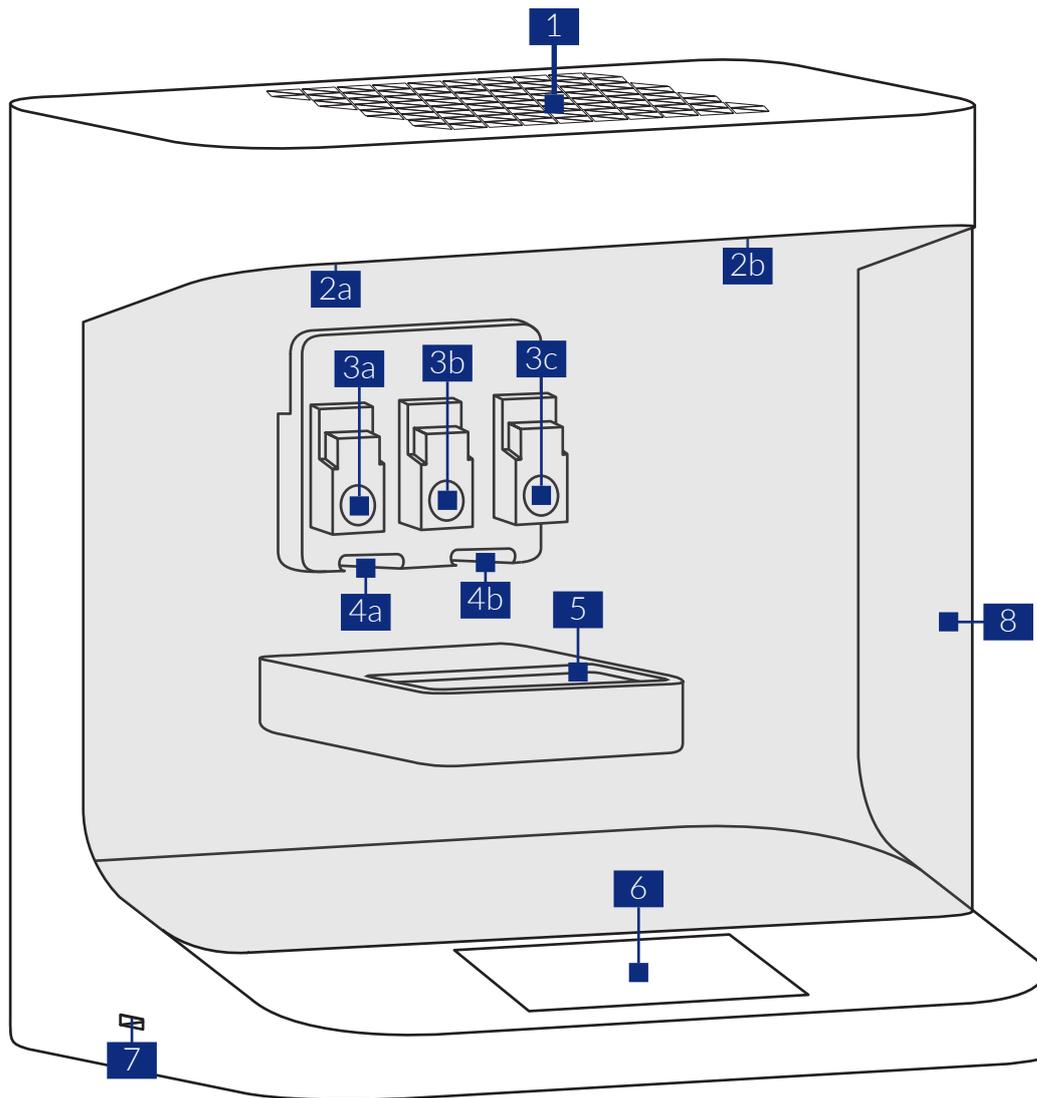
- Any metal surface in a laminar flow hood.
- Any metal sink.
- The frame of the BIO X when connected to a grounded power outlet, as well as any exposed screws, including the screws on the left-side door hinges.

1.7.2.2 Using proper clothing

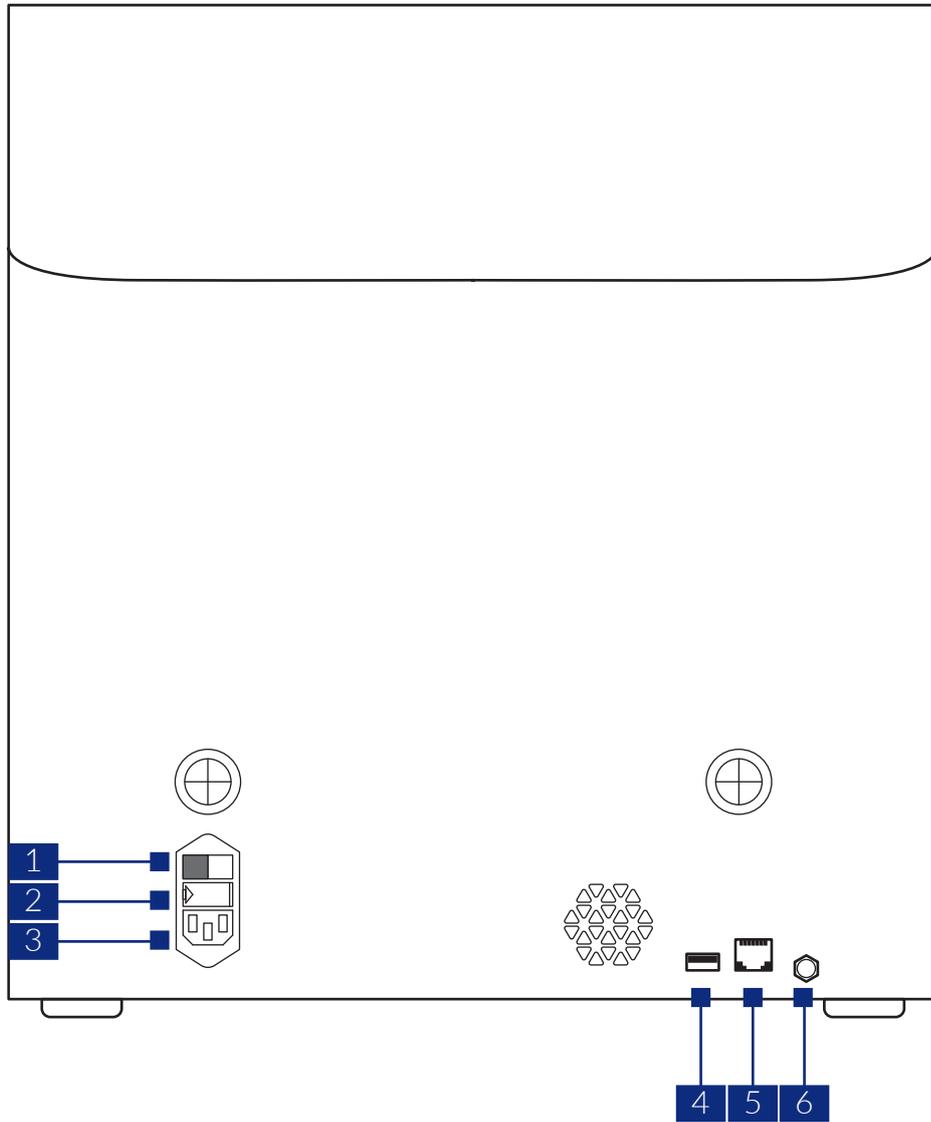
Avoid charging yourself to ensure ESD protection. Wear clothes made out of cotton when appropriate.

2. Specifications

2.1 Product map



1. Clean Chamber™ unit
- 2a. UV sterilization LED 1
- 2b. UV sterilization LED 2
- 3a. Printhead mount 1
- 3b. Printhead mount 2
- 3c. Printhead mount 3
- 4a. Photo-curing module mount 1
- 4b. Photo-curing module mount 2
5. Print bed
6. 7-inch touchscreen
7. USB port
8. Protective door



1. Power switch
2. Fuse
3. Power socket
4. USB port
5. Ethernet port
6. Pneumatic port

2.2 Technical specifications

Power input:	100-240 VAC, 50-60 Hz, 600 W
Fuse:	250VAC, T8A
Air pressure input:	0-700 kPa
Weight:	17 kg
Height:	477 mm
Width:	441 mm
Depth:	365 mm
Filter class:	HEPA 14

Operate BIO in a room with a temperature between 20 and 23 degrees Celsius. In normal operating conditions, the chamber temperature will rise between 2 and 3 degrees, and the standard pneumatic printheads will rise between 4-5 degrees. For precise temperature control, use a temperature-controlled printhead and ensure the room temperature is between 20 and 23 degrees.

3. Getting started

3.1 Unpacking BIO X

Follow these steps to unpack BIO X.

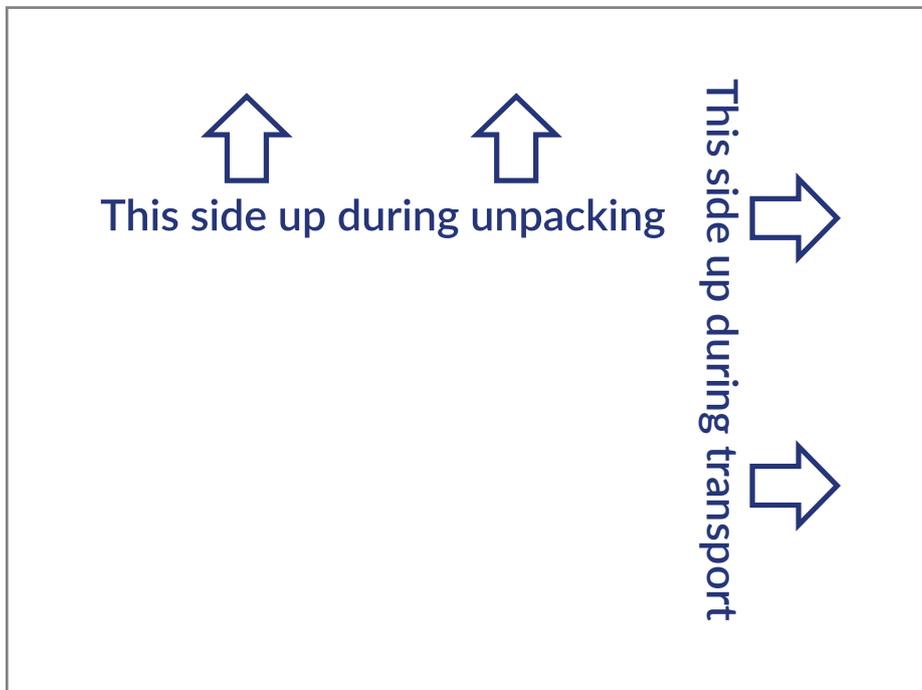


Do not attempt to unpack BIO X without reviewing the procedure below. Doing so risks personal injury and equipment damage.



BIO X is heavy. Always use a minimum of two people to unpack and move the BIO X.

1. Clear a steady table and floor space of at least two by three meters.
2. Place the box on its side according to the arrows on the surface.



3. Carefully remove the tape on the top of the box.
4. Use the packaging handles to remove the contents of the box and place them on the floor.
5. Lift the packaging carefully to turn the BIO X so it is standing on its correct side.
6. Remove the top piece of the packaging. Grab it at the bottom edge to lift BIO X out of the bottom piece of packaging. Place BIO X on the table.
7. Remove any remaining packaging material from BIO X.
8. Remove the remaining contents of the box and check that you have received all equipment listed below.

3.2 Contents of the box

[1x] BIO X 3D printer.....	□
[3x] Pneumatic-based printheads.....	□
[3x] Pneumatic adapter for 3cc cartridge.....	□
[1x] 365 nm UV module.....	□
[1x] 405 nm UV module.....	□
[1x] Power cord.....	□
[1x] USB memory drive.....	□
[1x] Surface probe adapter.....	□
[1x] Petri dish holder kit.....	□

Bioink consumables box containing:

[2x] 3 mL CELLINK bioink (sterile).....	□
[1x] Material safety data sheet and Application note.....	□
[2x] 3 mL CELLINK GelMa bioink (sterile).....	□
[1x] Material safety data sheet and Application note.....	□
[2x] 3 mL CELLINK START bioink (sterile).....	□
[1x] Material safety data sheet and Application note.....	□
[2x] 3 mL CELLINK PLURONICS bioink	□
[1x] Material safety data sheet and Application note.....	□
[2x] 3 mL CELLINK GelMA C bioink (sterile).....	□
[1x] Material safety data sheet and Application note.....	□
[2x] 3 mL CELLINK GelMA A bioink (sterile).....	□
[1x] Material safety data sheet and Application note.....	□
[1x] CELLINK START non-sterile kit.....	□
[2x] 50 mL of CELLINK Start.....	□
[5x] Female to female luer lock adapters.....	□
[20x] 3 mL empty cartridge with piston and end caps.....	□
[2x] STARTINK kit (sterile), each containing:.....	□
[2x] Cell syringe.....	□
[2x] Syringe with 3 mL of CELLINK Bioink.....	□
[2x] Dispensing unit.....	□
[2x] Mixing unit.....	□
[2x] Filling cartridge.....	□
[8x] Crosslinking solution.....	□
Application note.....	□

Nozzles and consumables box containing:

[1x] Sterile empty 12 mL syringe.....	□
[1x] Sterile nozzle kit.....	□
[1x] Non-sterile High precision conical nozzles, 50 pcs (Blue, GA 22).....	□
[1x] Non-sterile High precision conical nozzles, 50 pcs (Red, GA 25).....	□
[1x] Non-sterile High precision conical nozzles, 50 pcs (Clear, GA 27).....	□
[1x] Non-sterile Blunt needles 20G, 50 pcs.....	□
[1x] Non-sterile Blunt needles 22G, 50 pcs.....	□
[1x] Non-sterile Blunt needles 25G, 50 pcs.....	□
[1x] Non-sterile Blunt needles 27G, 50 pcs.....	□
[2x] Glass petri dish.....	□

3.3 Setting up BIO X

Before connecting BIO X to a wall socket, ensure that the socket is grounded. Next, connect BIO X to the power outlet (see 2.1 Product map) and the grounded wall socket with the included power cable.

BIO X has an internal air supply capable of supplying 200 kPa to the printheads. To use a higher pressure, connect an external air supply to the back of BIO X (see 2.1 Product map.)

Turn on BIO using the power switch on the back (see 2.1 Product map.)



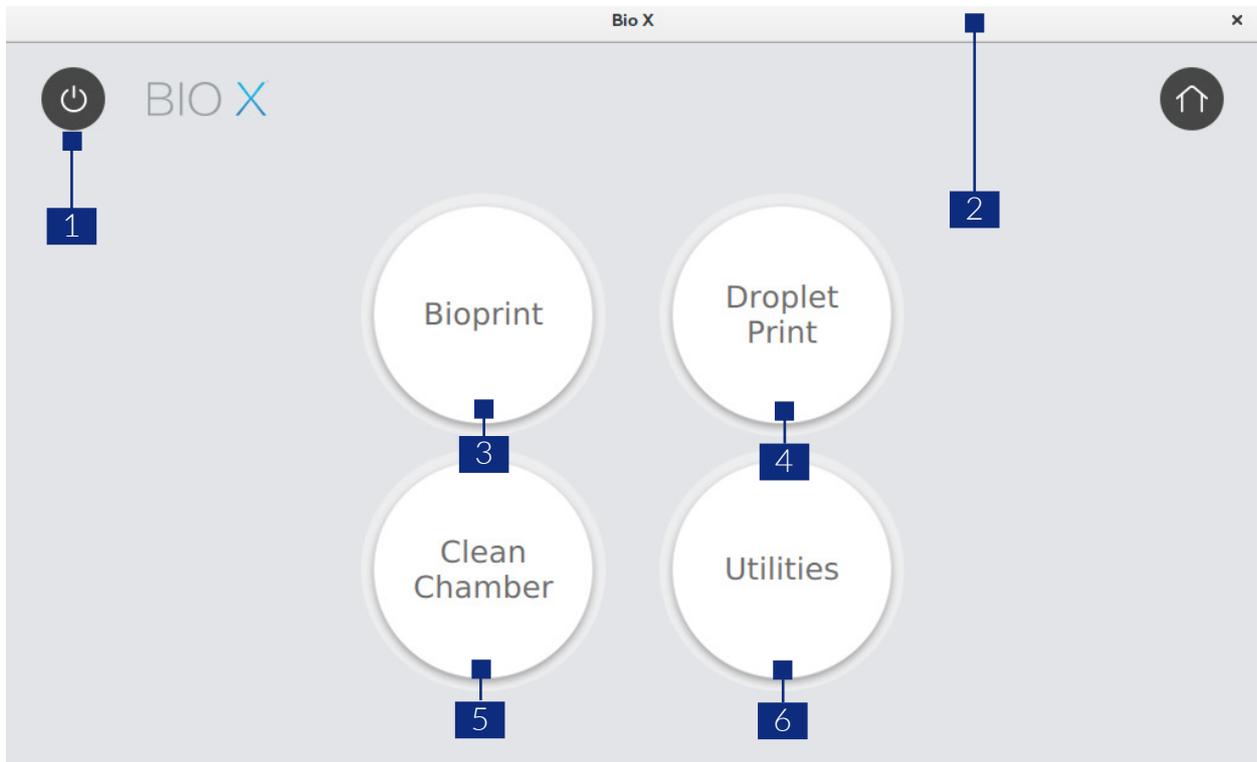
Always connect BIO X to a grounded outlet. Connecting to an ungrounded outlet can cause equipment damage and personal injury.



Ensure that the external air supply does not exceed the specifications outlined in Chapter 2.2, Technical specifications. Improper use can cause equipment damage and personal injury.

3.4 Starting BIO X for the first time

When you start BIO X for the first time, you will be prompted to review a license agreement. After accepting the agreement, you will be taken to the home screen.



1. Standby – Tap to put BIO X in standby mode. To start BIO X from standby mode, turn off the power using the power switch on the back, wait 30 seconds and turn it back on.
2. Status bar – Symbols in this area will alert you of potential hazards such as heated surfaces or active UV lights (see the symbols below.) Use caution when these symbols are displayed.



3. Bioprint - Tap to start a 3D bioprinting process
4. Droplet Print - Tap to access the droplet menu. Select the well plate to print droplets.
5. Clean Chamber - Tap to toggle the Clean Chamber settings, or to start UV sterilization.
6. Utilities – Tap to open the utilities menu. The utilities menu contains advanced settings and troubleshooting functions.

4. Bioprinting with BIO X

4.1 Clean Chamber

Sterilizing with UV light

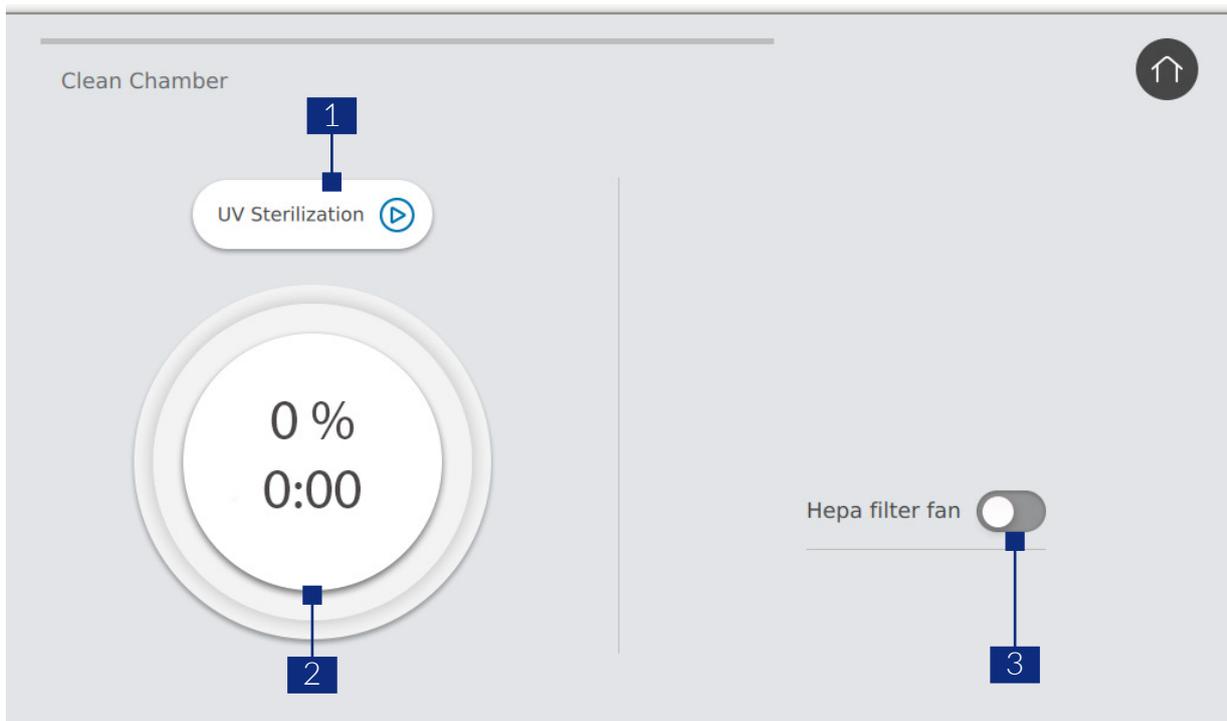


Do not look directly at UV light and do not expose your skin to UV light. UV light can cause serious personal injury.

Attention! The UV sterilization procedure will kill or damage any living organisms inside the print chamber. Remove any of your cells or tissues from the print chamber before initializing the UV sterilization procedure.

BIO has a UV sterilization system to ensure a sterile environment. The system sterilizes the print chamber, and Clean Chamber technology maintains the system's sterility. Run the UV sterilization procedure before each bioprinting.

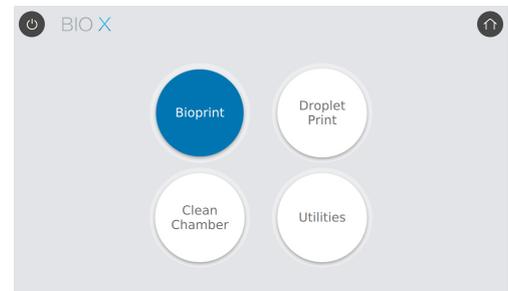
To begin the UV sterilization procedure, select "Clean Chamber" from the home screen and confirm.



1. UV Sterilization - Tap to start or abort the UV sterilization procedure.
2. Progress indicator.
3. HEPA filter fan - Tap to turn the HEPA filter fan on or off. You can turn the HEPA filter fan on or off during UV sterilization and during bioprinting.

4.2 Bioprinting from a 3D model

Choose this option to start a new bioprinting process using a 3D model. BIO X will guide you through the process of setting up your bioprint.

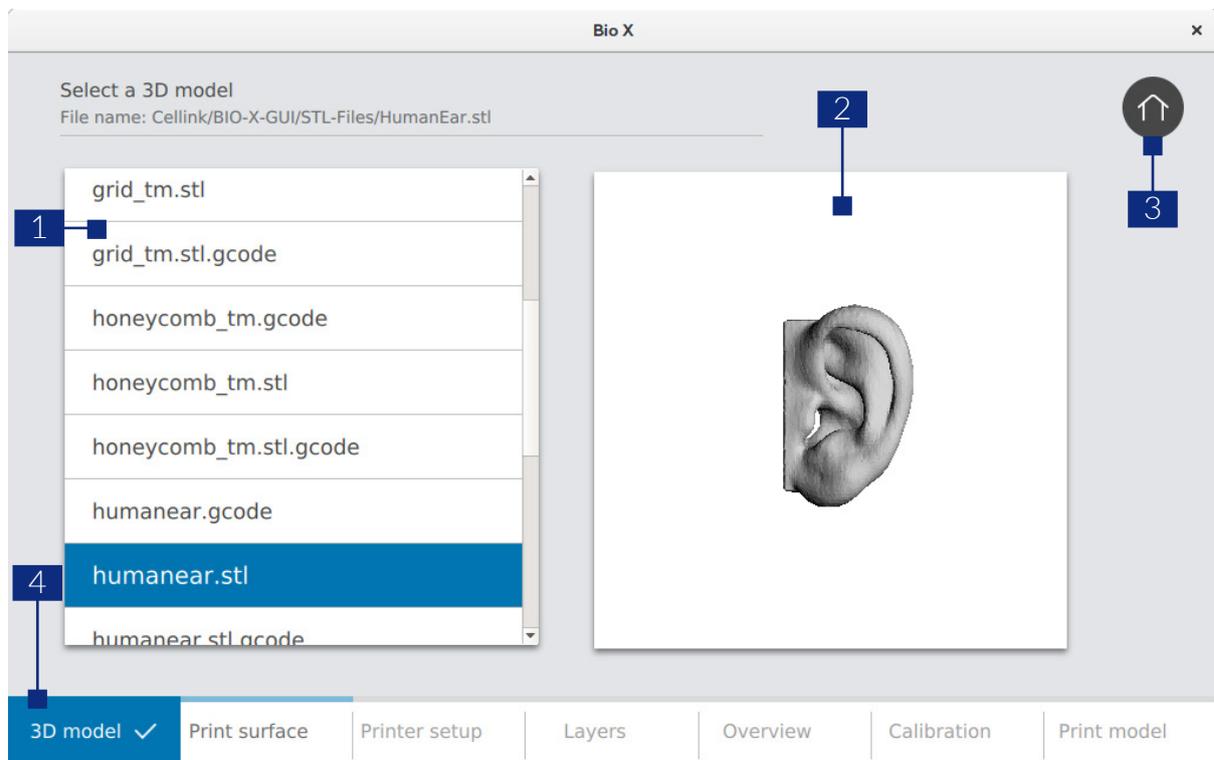


4.2.1 Open file

Insert a USB drive containing your 3D model and any custom profiles you would like to use into the USB port on the front of BIO X. Keep the USB drive connected until the bioprinting process starts.

Note: The USB drive needs to be *readable* and *writable*.

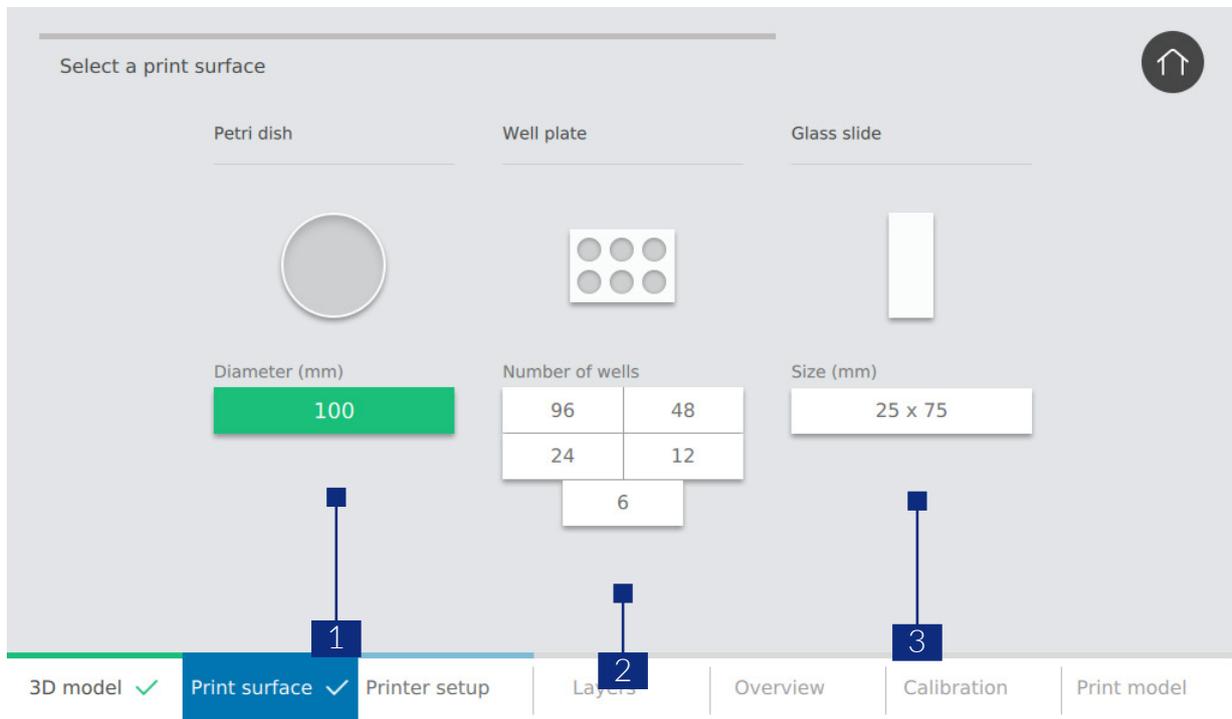
Next, choose the model you wish to bioprint. BIO X accepts the file formats .stl, .obj, .amf, and .BIOX.



1. File list - Tap to select the model you wish to bioprint.
2. Preview - The model currently selected will appear in this window.
3. Home - Use this button to abort the setup process and return to the home screen.
4. Navigation bar - Use this bar to navigate to the next and previous step. A check mark will appear once a step is completed.

4.2.2 Print surface

Select the surface to bioprint on. BIO X can bioprint on a range of surfaces, including petri dishes, well plates and glass slides. Choose the surface and indicate the surface size.

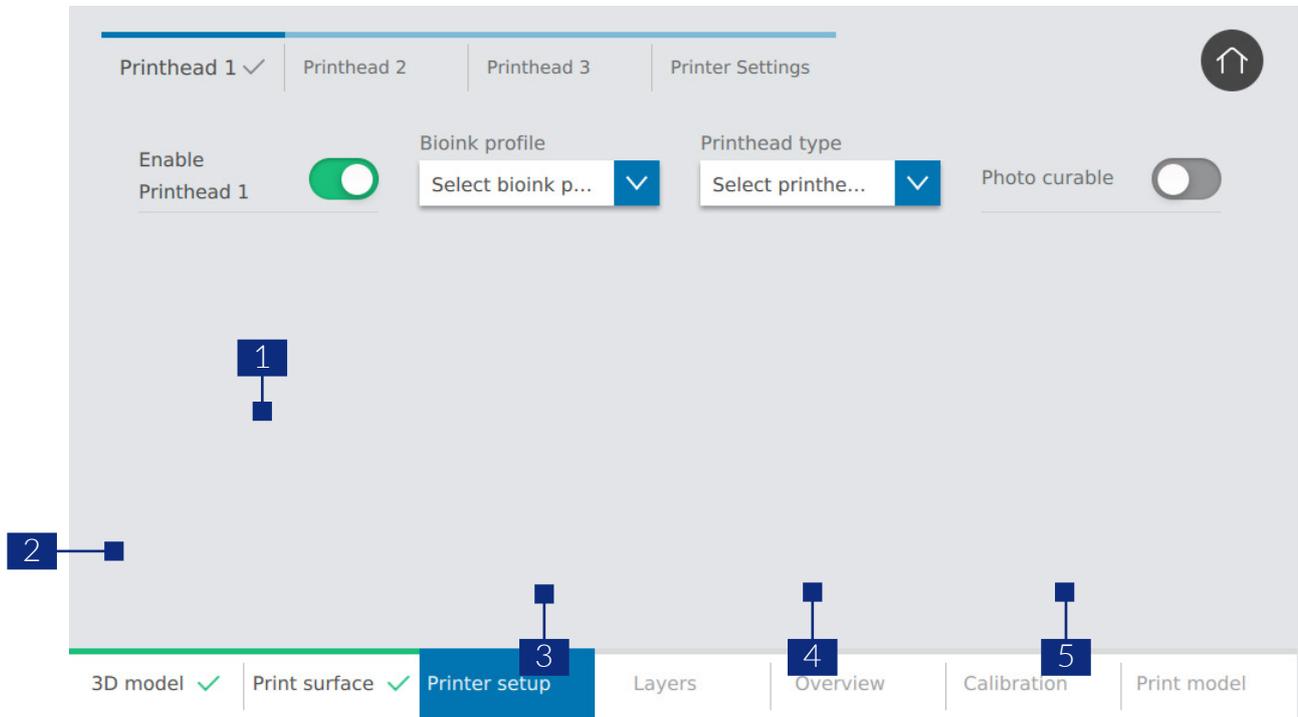


1. Petri dish - Select to bioprint on a petri dish.
2. Well plate - Select to bioprint in a well plate.
3. Glass slide - Select to bioprint on a glass slide.

4.2.3 Printheads and printbed

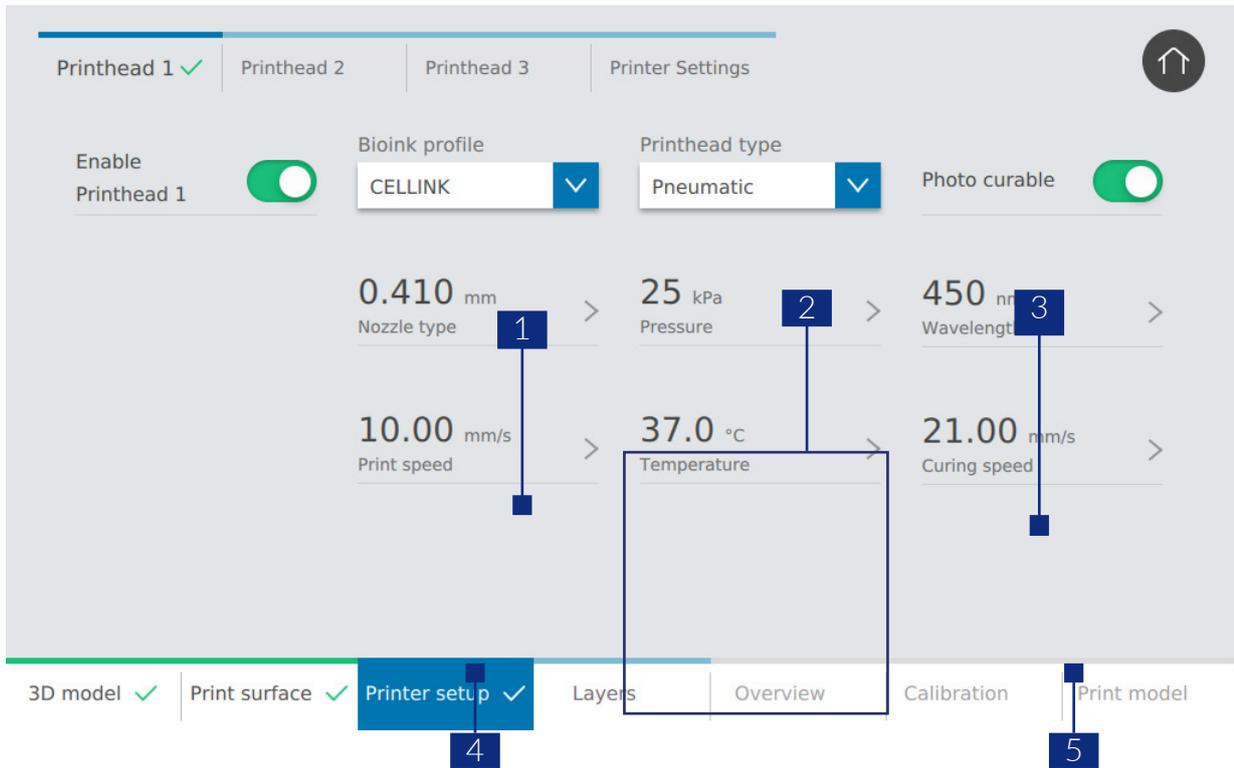
Depending on the printhead, different settings are required for configuration. Details are outline in a separate printhead manual.

BIO X can use three different printheads to print the same construct.



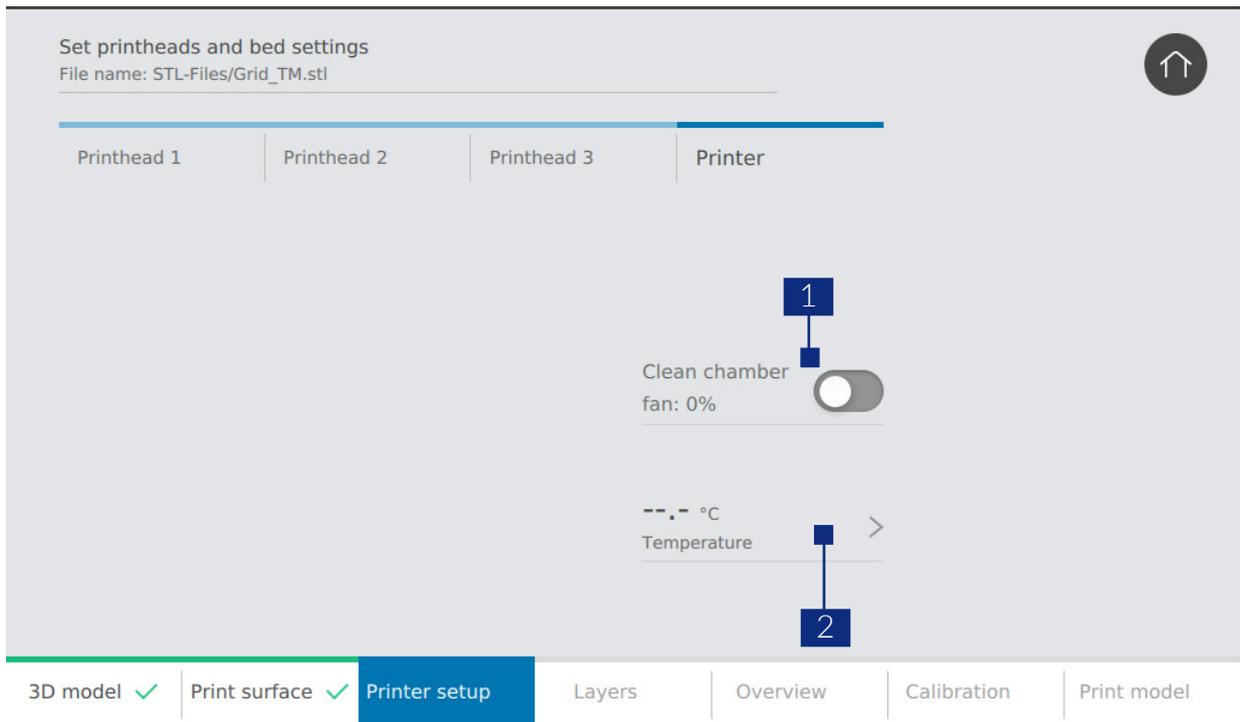
1. Navigation bar – Use this to toggle between the settings for the different printheads and the print bed.
2. Toggle printhead – Tap to indicate if you want to use the printhead or not. If you select the printhead, you will be prompted with more settings.
3. Bioink profile – Select the bioink profile you want to use. BIO X comes preloaded with profiles for all CELLINK bioinks.
4. Printhead type – Select the type of printhead you want to use. Different settings will appear below depending on what type of printhead you select. BIO X comes preloaded with profiles for all of CELLINK’s intelligent printheads.
5. Photo curing – Choose whether to use UV to crosslink the model. If using UV crosslinking, more settings will appear.

Calibration settings appear after selecting a printhead. Use or modify an existing profile, or create a new one. Bioink and photo-curing parameters are the same for all bioinks and printheads, but the printhead parameters change depending on the printhead selected.



1. Nozzle type – Select the nozzle type and size.
2. Printhead settings – These settings change depending on which intelligent printhead you use. Consult the manual for the specific printhead for more information.
3. Photo-curing wavelength – Tap to select which wavelength to use for photo curing.
4. Print speed – Tap to select the speed of the printhead.
5. Curing speed – Tap to select the speed of the movement of the photo-curing module.

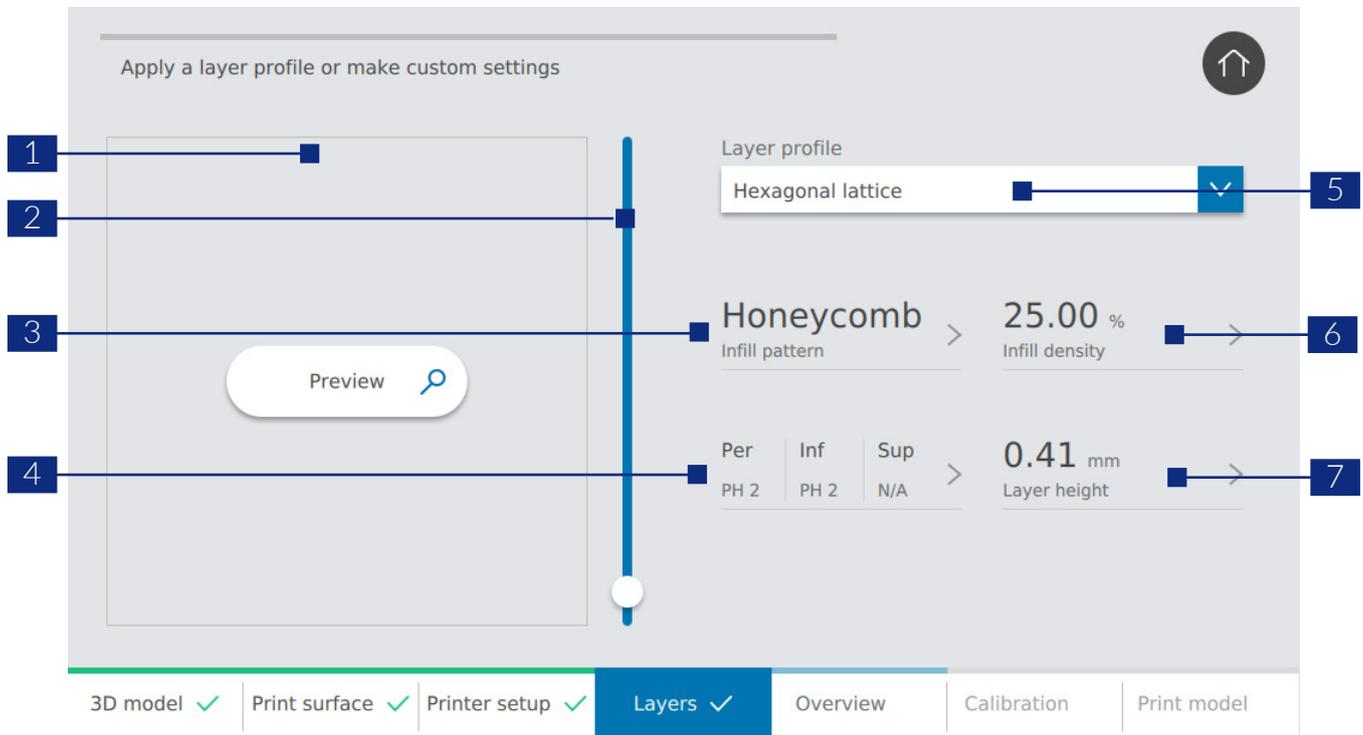
Adjust the print-bed temperature in the print-bed settings. Use temperature control to keep the print bed at a certain temperature, or turn temperature control off to print at room temperature.



1. Clean Chamber fan – Turn the Clean Chamber fan on or off.
2. Adjust temperature – Adjust the temperature of the print bed.

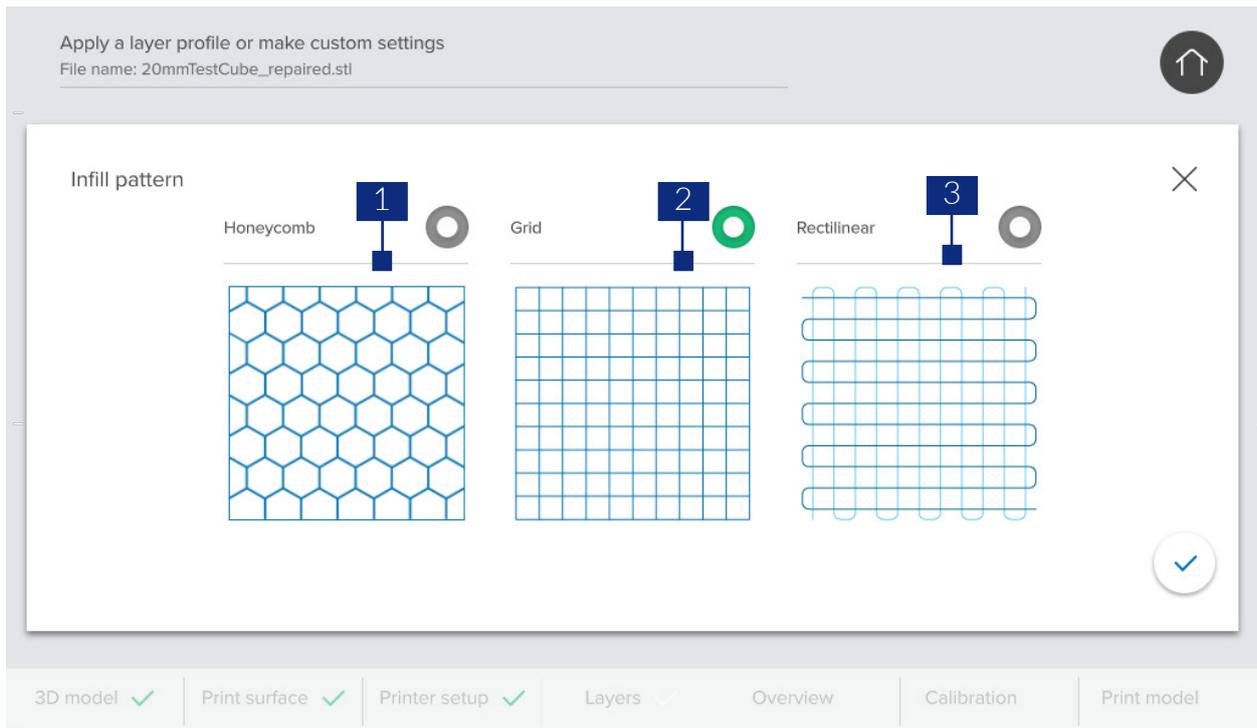
4.2.4 Layer settings

Modify options to define the 3D model's layers and how BIO X should bioprint the model. Use the predefined settings or create custom settings.



1. Preview – View a preview of the chosen layer profile.
2. Preview slider – Drag this to select which layer to preview.
3. Infill pattern – Tap to choose infill pattern.
4. Printhead use – Tap to select which part of the model each printhead should bioprint.
5. Layer profile – Select one of the saved layer profiles or choose to create a new one.
6. Infill density – Indicate how dense the model should be.
7. Layer height – Indicate layer height. CELLINK advises to set the layer height equal to the nozzle diameter.

4.2.5 Layer settings - Infill pattern



1. Honeycomb pattern – The honeycomb pattern is suitable as an infill for tissue constructs that must be mechanically rigid, such as bone. The pattern is most relevant for constructs to withstand compression.
2. Grid pattern – The grid pattern is a suitable infill for tissue constructs with isotropic mechanical characteristics. This pattern prints solid at every layer, resulting in solid walls between the pores and good compressive strength. This pattern is most applicable for tissues like bone and cartilage.
3. Rectilinear pattern – The rectilinear pattern is a suitable infill for tissue constructs with isotropic mechanical characteristics. This pattern is most applicable for tissues like skin, fascia and cartilage.

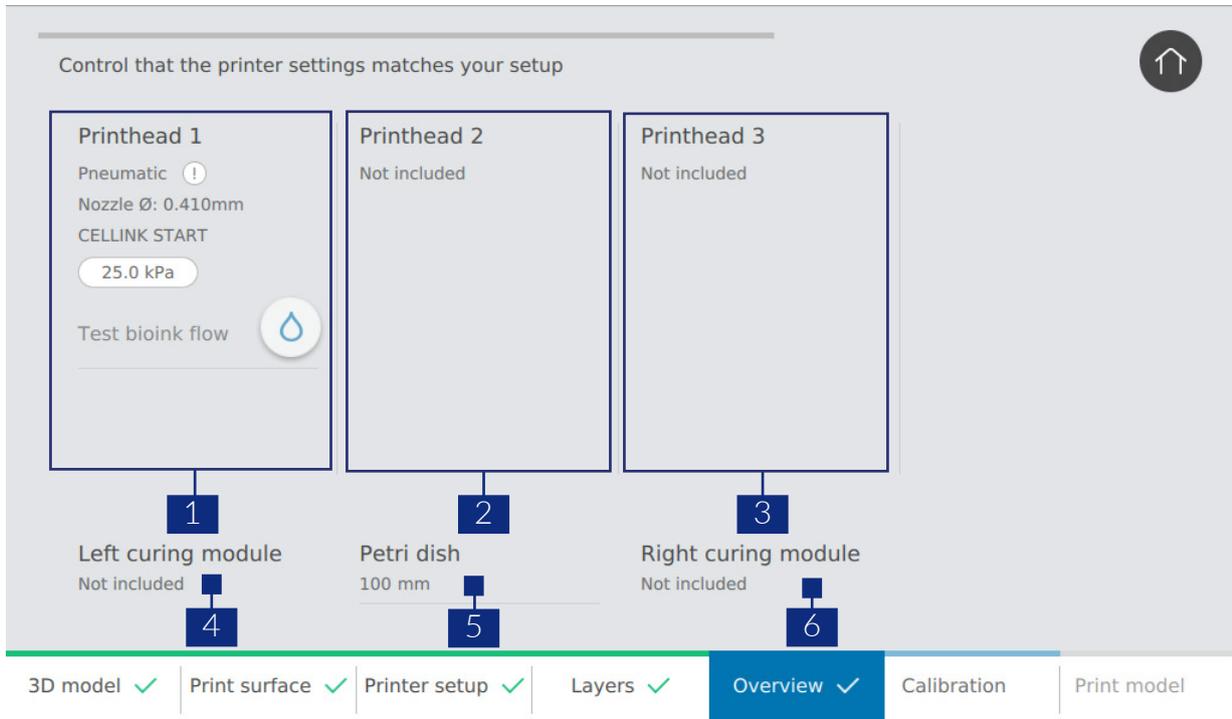
4.2.6 Layer settings - Printhead use

Indicate which printhead should bioprint each part of your structure in the “Printhead use” settings. These settings enable you to use support structures while bioprinting and use multiple infill materials to create complex structures. Three different modes are available:

1. Infill – If enabled, BIO X will use the selected printhead to bioprint the infill pattern of your 3D model.
2. Perimeter – If enabled, BIO X will use the selected printhead to bioprint the perimeter of your 3D model.
3. Support – If enabled, BIO X will use the selected printhead to print a support structure for your 3D model. Use this option if you are planning to bioprint a structure which cannot support itself.

4.2.7 Overview and mounting of bioprinting equipment

Review all of your selected settings. If a setting or value is incorrect, use the navigation bar at the bottom of the screen to navigate back and correct it.

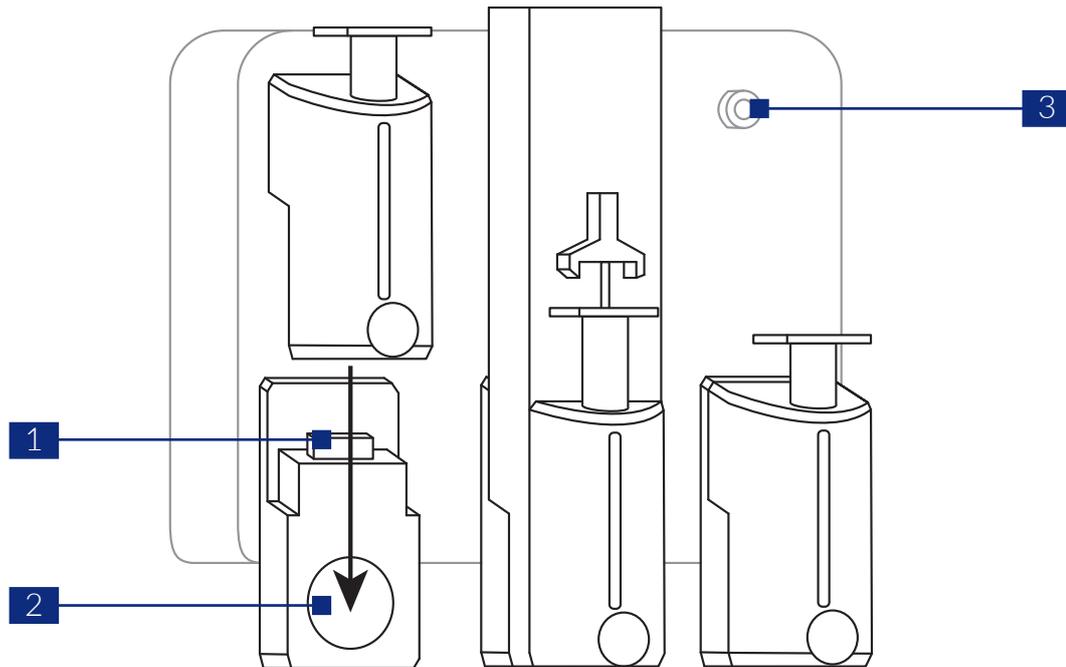


1. Printhead 1 - Settings for printhead 1.
2. Printhead 2 - Settings for printhead 2.
3. Printhead 3 - Settings for printhead 3.
4. Settings for the left UV-curing module.
5. Print surface settings.
6. Settings for the right UV-curing module

4.2.8 Overview and mounting of bioprinting equipment

Ensure you have correctly mounted the printheads, print surfaces and bioink cartridges before bioprinting.

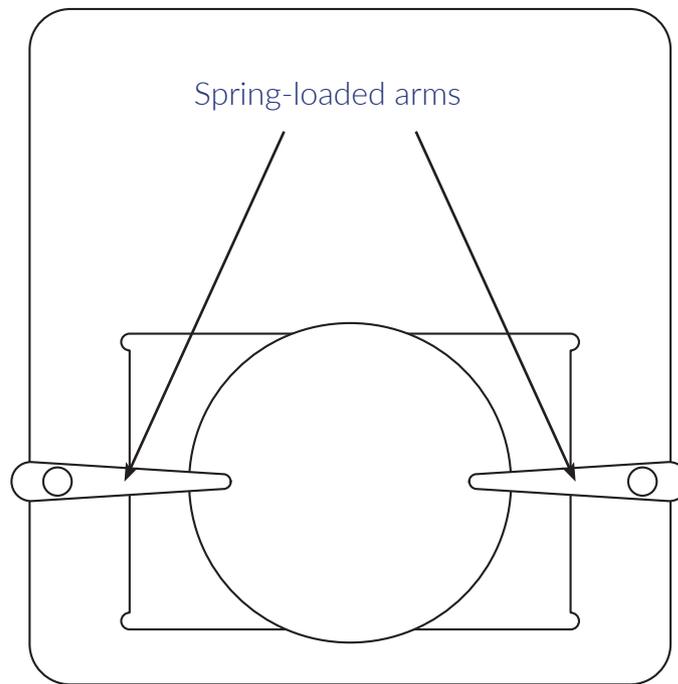
Refer to the specific printhead manual for instructions on how to mount a cartridge. To mount the printhead in BIO X, move the printhead straight down toward the printhead holder. Press it until you feel the magnet snap into place. Remember to connect pneumatic printheads to the pressure connector.



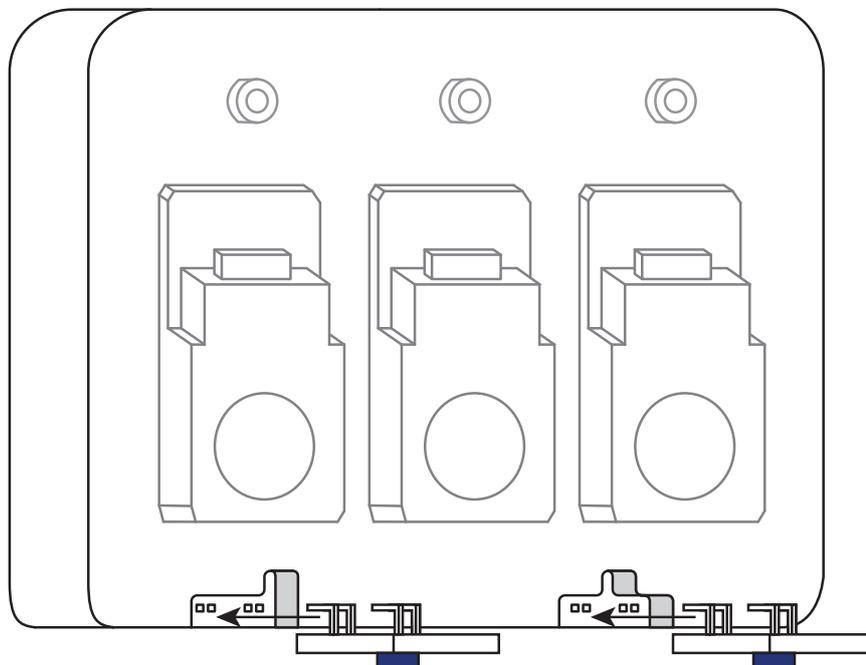
1. Intelligent printhead connector – This connector connects the intelligent printhead to BIO X.
2. Magnet – The magnet holds the printhead in place.
3. Pressure connector – The pressure connector delivers air to intelligent pneumatic printheads.

4.2.9 Overview and mounting of bioprinting equipment

Use the spring-loaded arms to securely fasten the print surface according to the diagram below. Turn the arms to the sides when using a well plate. Ensure the outer dimensions of the well plate equal 128 x 85 millimeters.



When mounting UV modules, mount them with the UV LED facing down and the contact facing up, as shown in the diagram below.



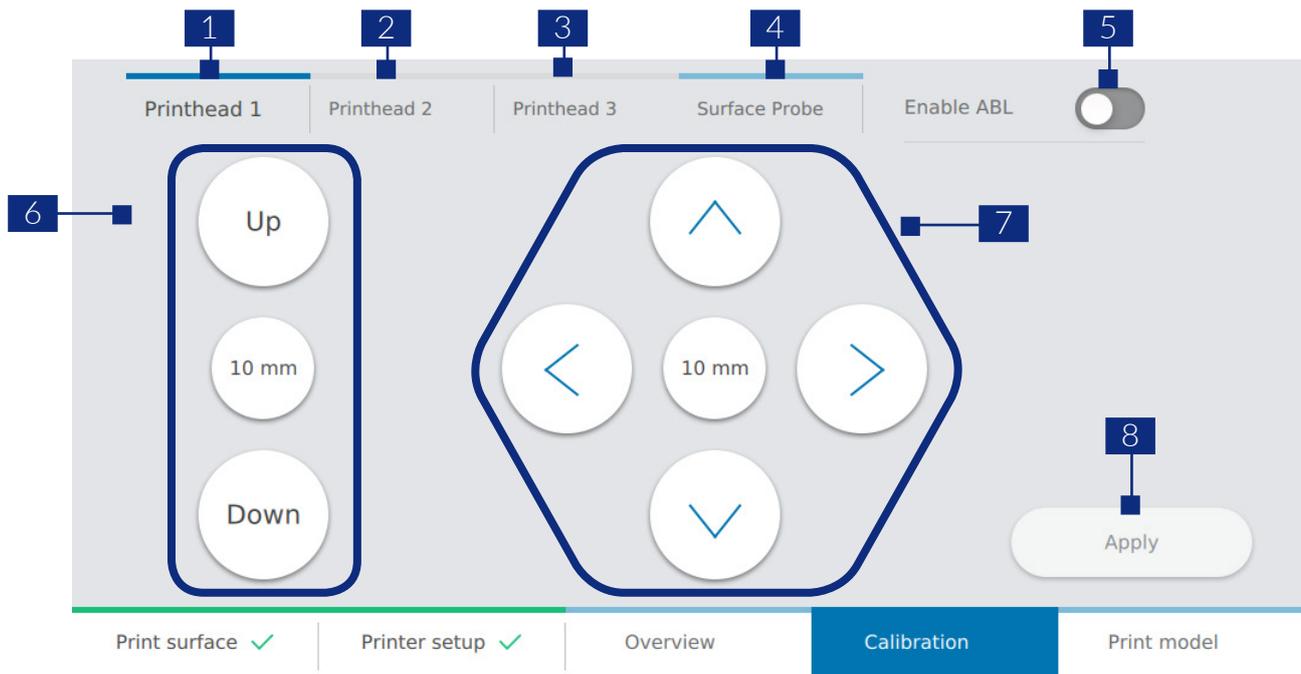
After mounting all printheads, print surfaces and cartridges, tap "Bioprint" to start bioprinting.

4.2.10 Calibration and Auto Bed Leveling (ABL)

Navigate to the calibration settings to calibrate the printheads and surface probe. The surface probe is used for ABL.

ABL probes the bed at three points to enable bed-leveling compensation. It uses a matrix to compensate for tilt in the bed or print surface.

The surface probe only needs to be calibrated once. The printer will remember this calibration and apply it for each print. You must enable ABL before printing.



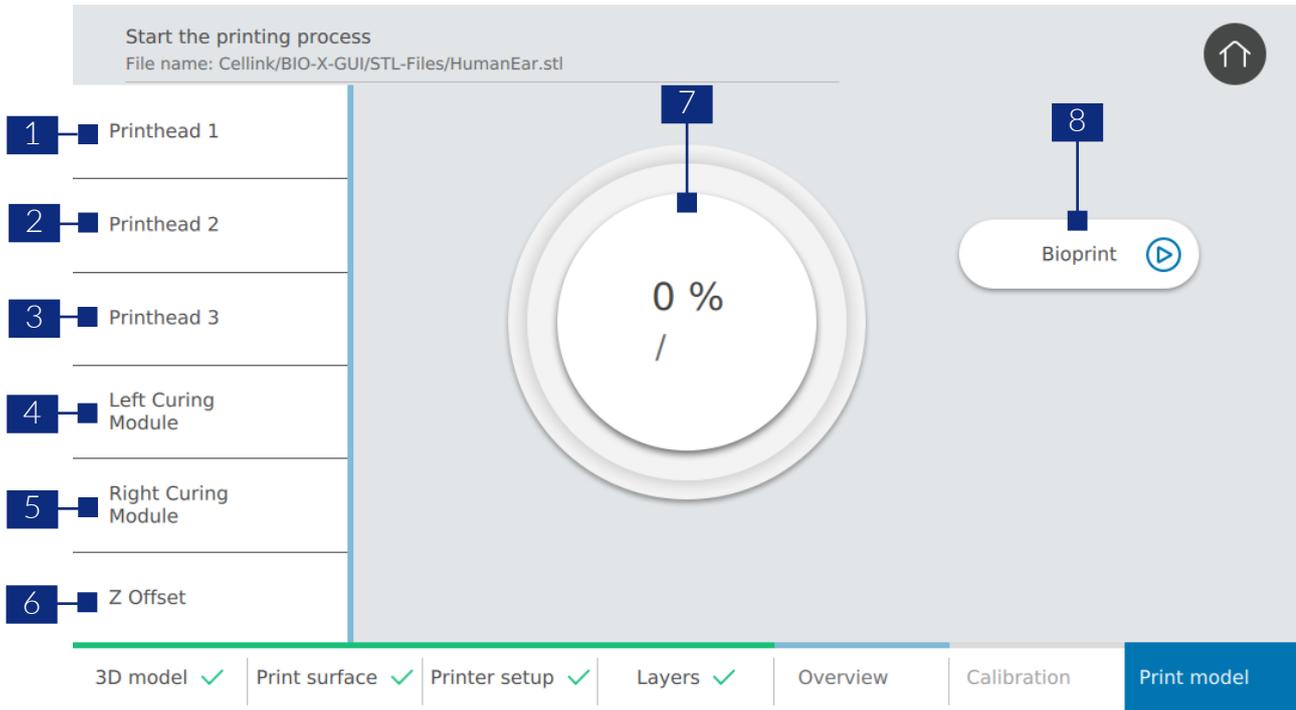
1. Printhead 1 - Calibration tab for printhead 1.
2. Printhead 2 - Calibration tab for printhead 2.
3. Printhead 3 - Calibration tab for printhead 3.
4. Surface probe - Calibration tab for the surface probe.
5. Enable ABL - Turn ABL on or off. ABL is enabled after calibrating the surface probe and going back to the Printhead 1 tab.
The ABL should be enabled after calibrating the surface probe and going back to the Printhead 1 tab.
6. Z axis command - Controls the position of the print bed along the Z axis.
7. X, Y axis command - Controls the position of the printhead and the surface probe along the X and Y axis.
8. Apply command - Register the calibration settings.

4.2.11 Print model

This screen summarizes the bioprinting process. You can monitor the activity of each printhead and curing module while printing.

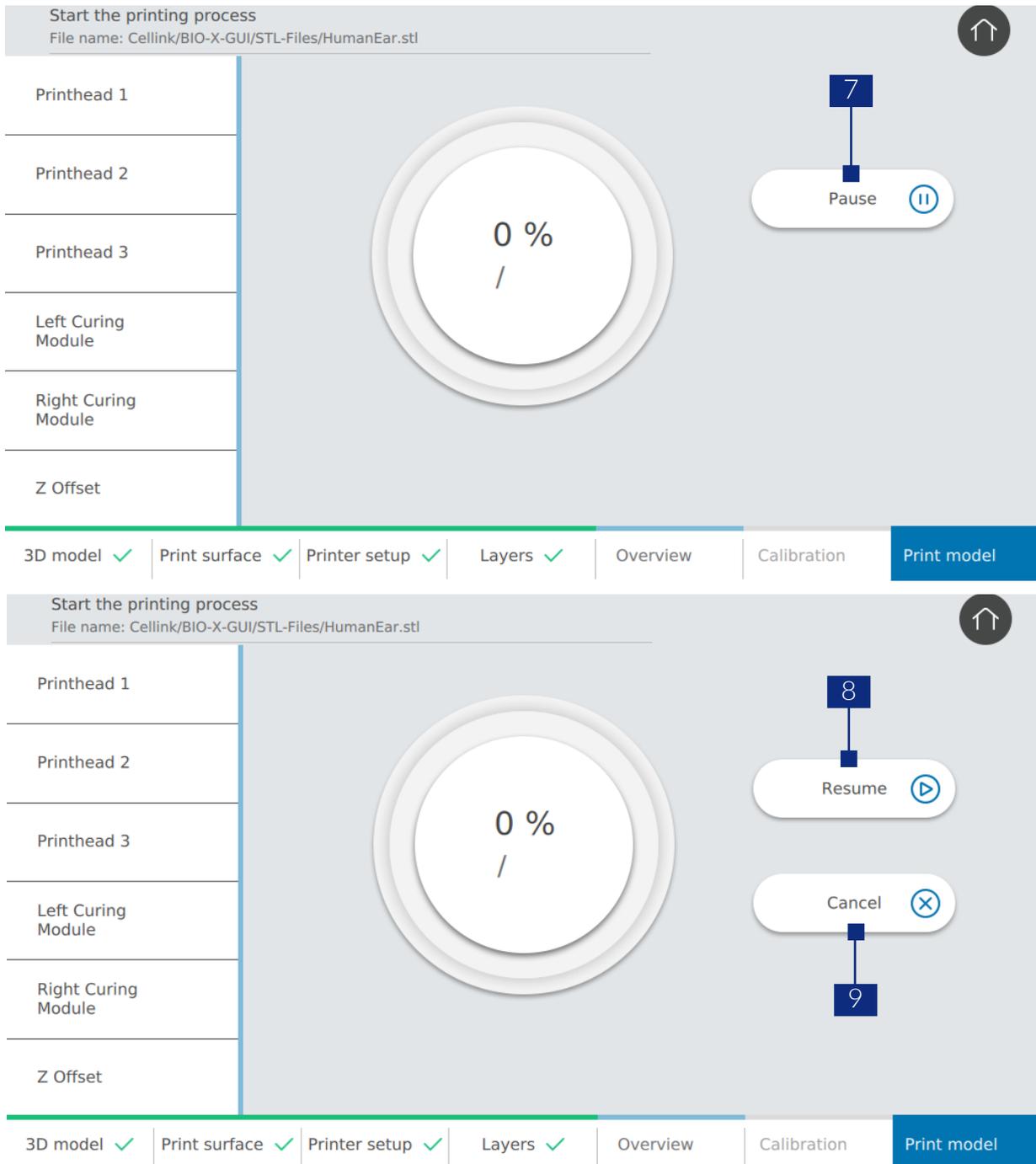


Always pause bioprinting before opening the door. Do not remove printheads before bioprinting has stopped. Doing so risks aborting the process and compromising your cells.



1. Printhead 1 – Allows you to monitor the specific properties of printhead 1.
2. Printhead 2 - Allows you to monitor the specific properties of printhead 2.
3. Printhead 3 - Allows you to monitor the specific properties of printhead 3.
4. Left photo-curing module – Allows you to monitor the specific properties of the left photo-curing module.
5. Right photo-curing module – Allows you to monitor the specific properties of the right photo-curing module.
6. Z Offset - Adjust printbed position during printing.
7. Progress indicator – Displays progress and time left to completion.
8. Bioprint - Tap to start the bioprinting process.

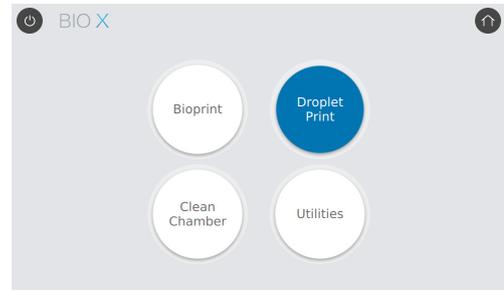
You can pause printing at any point. After pausing, you can resume or cancel printing.



9. Pause – Tap to pause the bioprinting process.
10. Resume - Tap to resume the bioprinting process. This option is only available when the bioprinting process is paused.
11. Cancel – Tap to cancel the bioprinting process. This option is only available when the bioprinting process is paused.

4.3 Bioprinting droplets

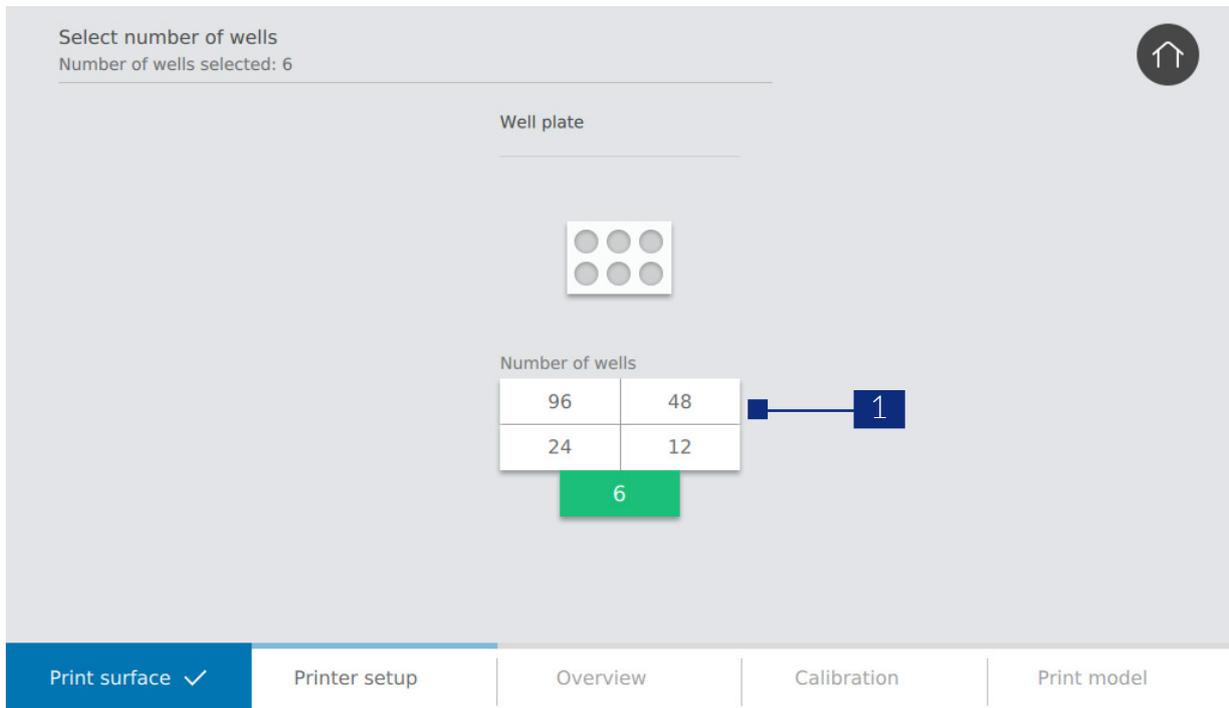
Choose this option to start bioprinting droplets without a G-code. BIO X guides you through the setup process.



4.3.1 Choose Print surface

Select the well plate to bioprint on.

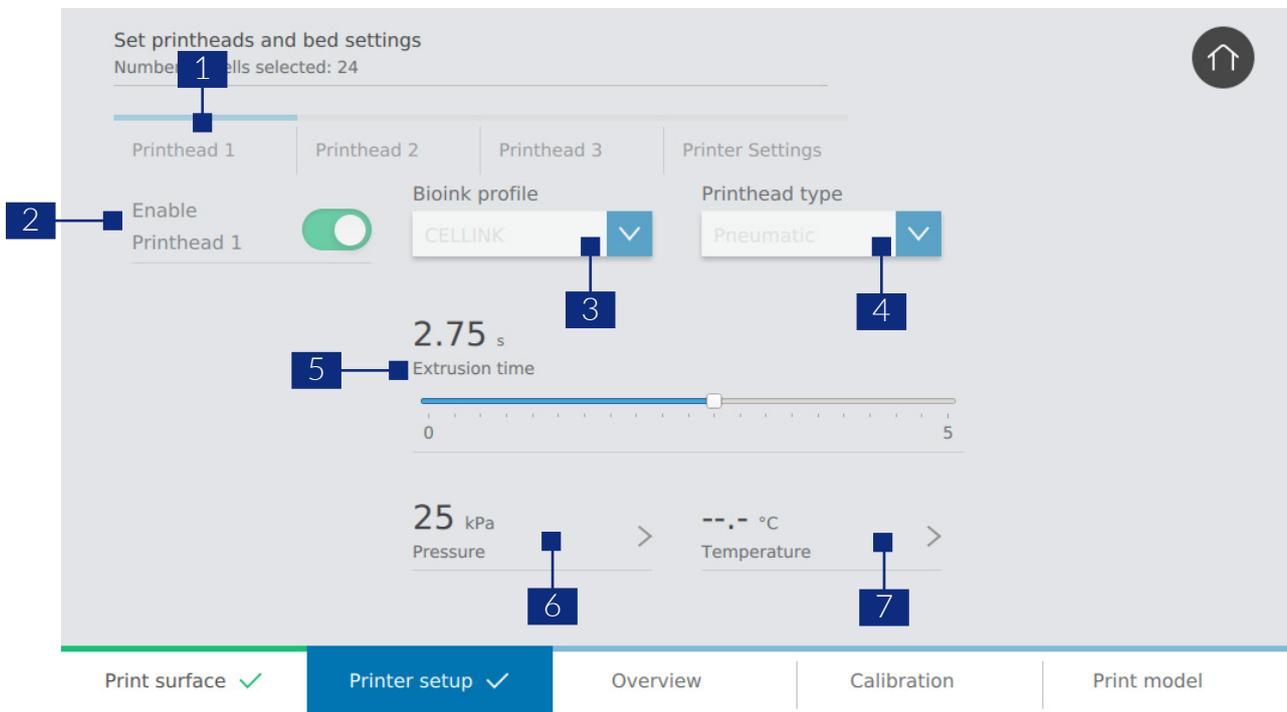
BIO X can bioprint on a range of well plates, from 6 to 96 wells.



1. Select a number to choose a well plate to print in.

4.3.2 Choose printer setup

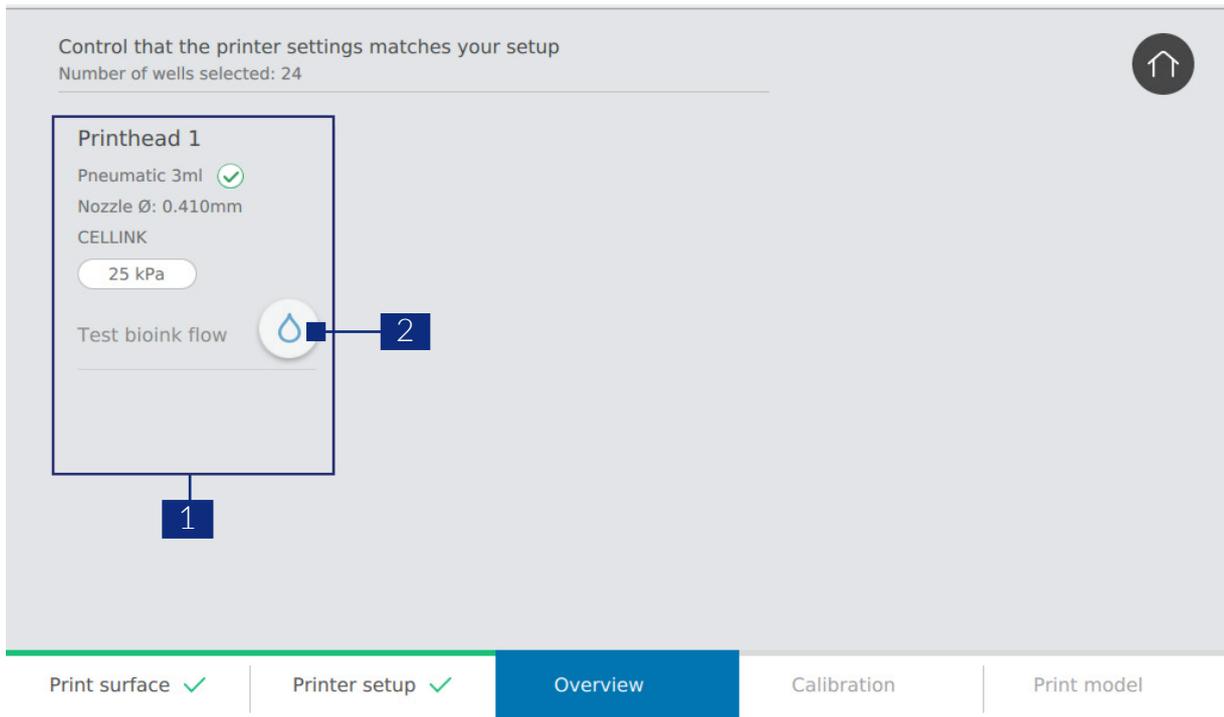
Configure printhead, bioink and printer settings. Customize your print according to the needs of your experiment.



1. Navigation bar – Toggle between printhead and print bed settings.
2. Toggle printhead – Tap to select if you want to use the printhead or not. If you select to use the printhead further settings will appear.
3. Bioink profile – Select a predefined bioink profile or create a new one. BIO X comes preloaded with profiles for all CELLINK bioinks.
4. Printhead type – Select the type of printhead to use.
5. Extrusion time – Drag the slider on a graduated scale to choose the extrusion time for printing droplets.
6. Pressure - Choose the pressure to use during extrusion.
7. Temperature - Choose the temperature of the printhead.

4.3.3 Overview and mounting of bioprinting equipment

Review all the print settings. If a setting or value is incorrect, navigate back and correct it using the navigation bar at the bottom of the screen.



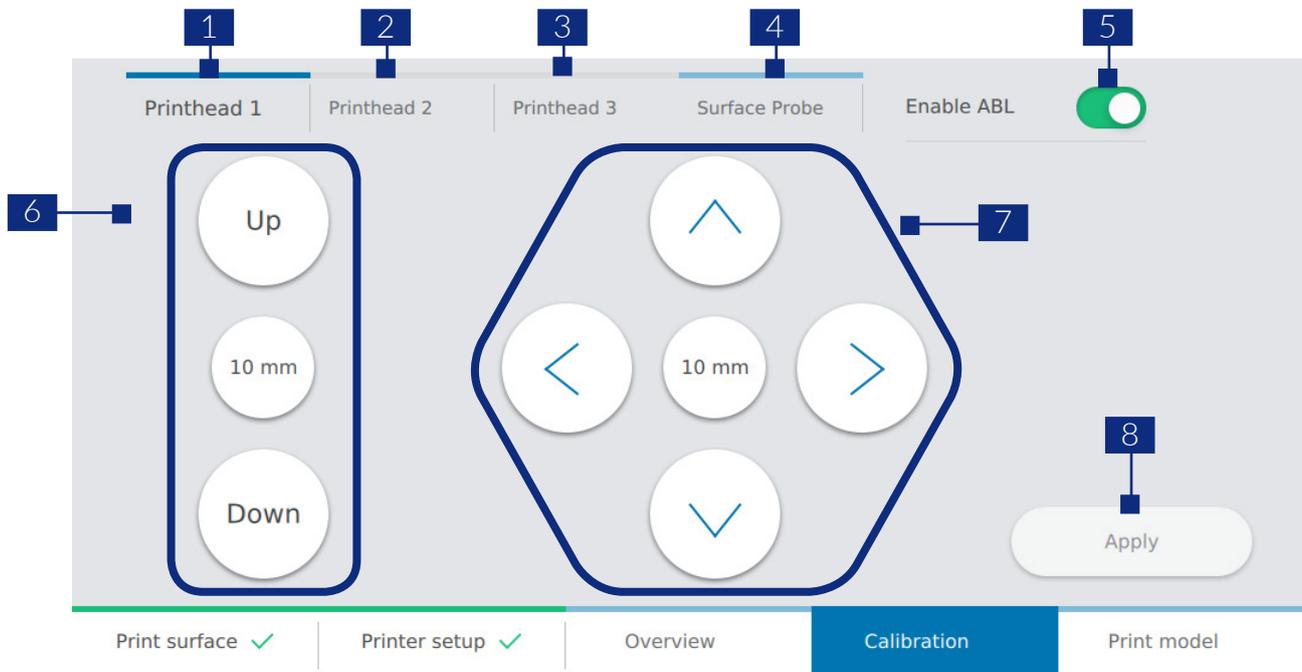
1. Printhead 1 - Settings for printhead 1.
2. Test bioink flow - Press the droplet button to assess the bioink flow.

4.3.4 Calibration and Auto Bed Leveling (ABL)

Calibrate the printheads and surface probe. The surface probe is used for ABL.

ABL probes the bed at three points to enable bed-leveling compensation. It uses a matrix to compensate for tilt in the bed or print surface.

The surface probe only needs to be calibrated once. The printer will remember this calibration and apply it for each print. You must enable ABL before printing.



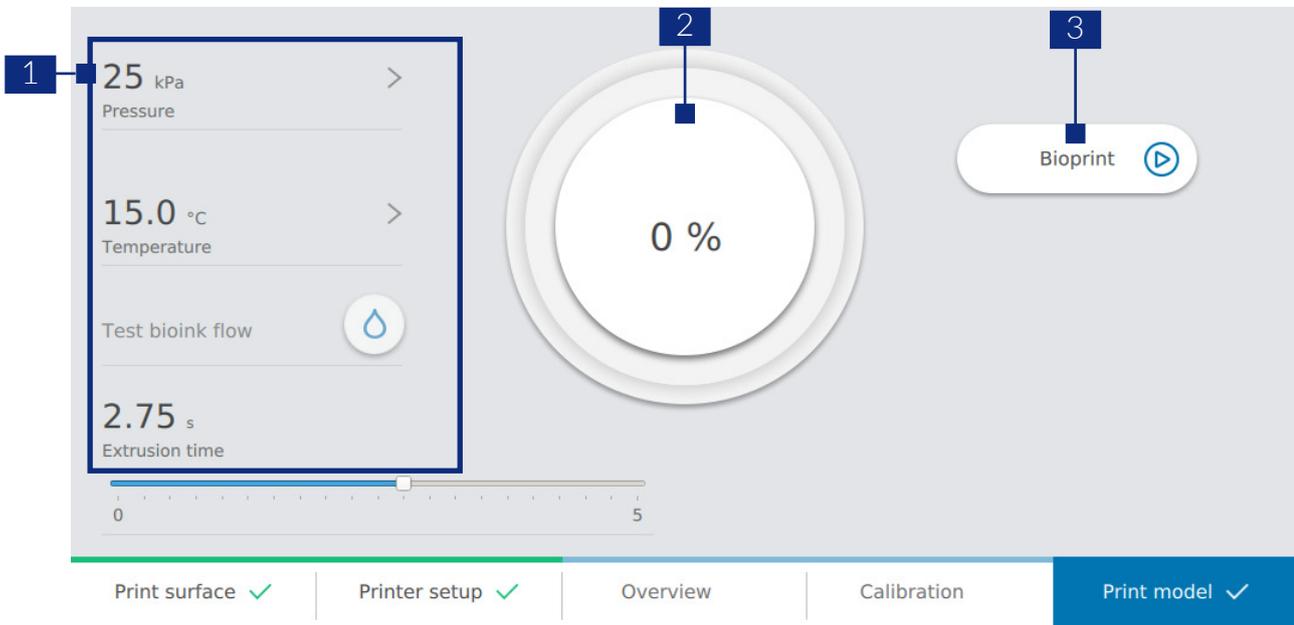
1. Printhead 1 - Calibration tab for printhead 1.
2. Printhead 2 - Calibration tab for printhead 2.
3. Printhead 3 - Calibration tab for printhead 3.
4. Surface probe - Calibration tab for the surface probe.
5. Enable ABL - Turn ABL on or off. ABL is enabled after calibrating the surface probe and going back to the Printhead 1 tab.
The ABL should be enabled after calibrating the surface probe and going back to the Printhead 1 tab.
6. Z axis command - Controls the position of the print bed along the Z axis.
7. X, Y axis command - Controls the position of the printhead and the surface probe along the X and Y axis.
8. Apply command - Register the calibration settings.

4.3.5 Print model

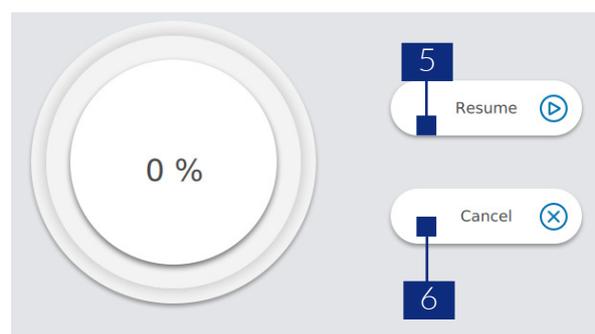
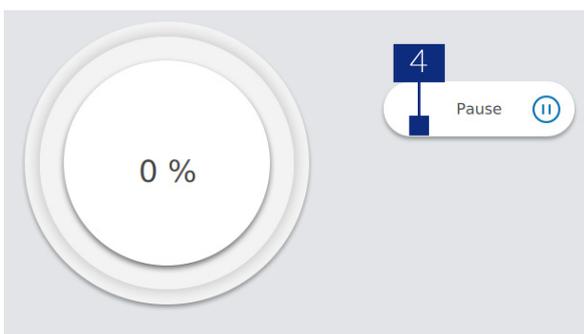
This screen summarizes the bioprinting process. You can monitor the activity of each printhead and curing module while printing.



Always pause bioprinting before opening the door. Do not remove printheads before bioprinting has stopped. Doing so risks aborting the process and compromising your cells.



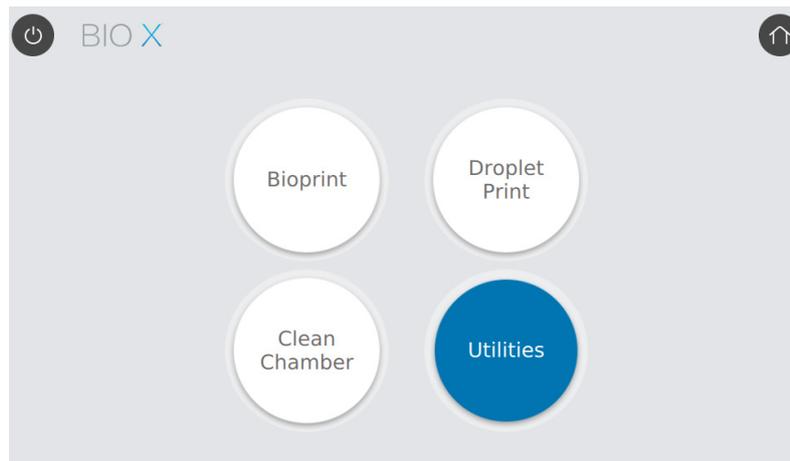
1. Printing setups - You can control the setup of your printing during the whole process.
2. Progress indicator – Allows for an overview of how far the bioprinting process has come and how long it will take until it is completed.
3. Bioprint - Tap to start the bioprinting process.



4. Pause – Tap to pause the bioprinting process.
5. Resume - Tap to resume the bioprinting process.
6. Cancel – Tap to cancel the bioprinting process.

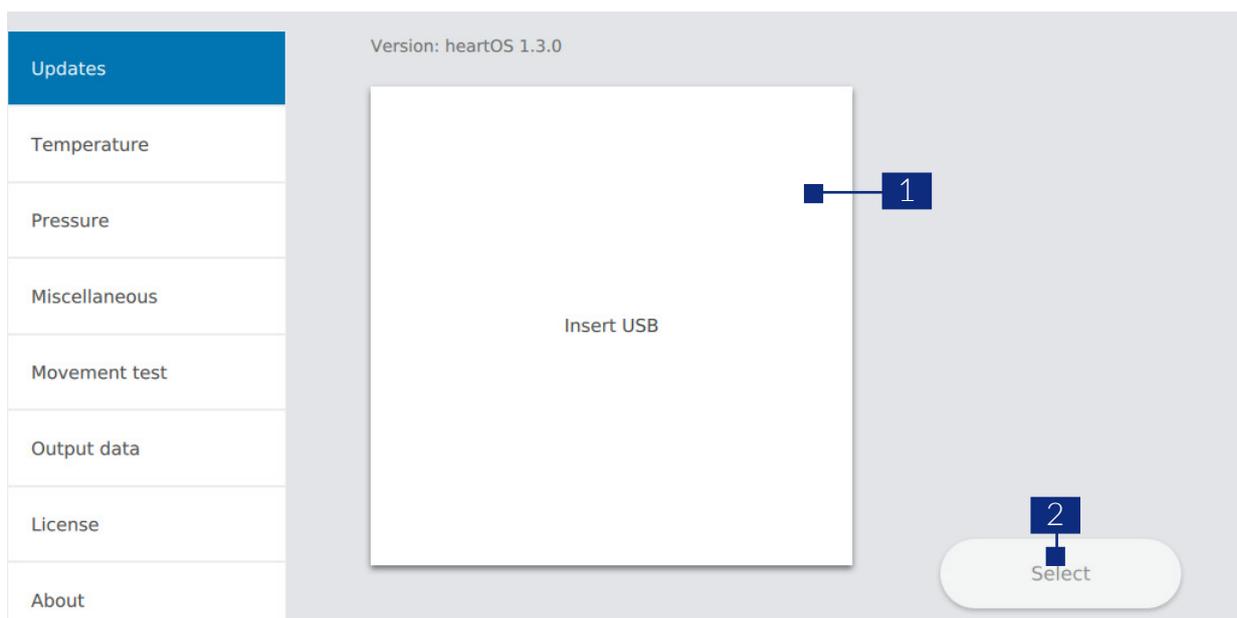
These options are available when the bioprinting process is paused.

4.4 Utilities



4.4.1 Update your software version

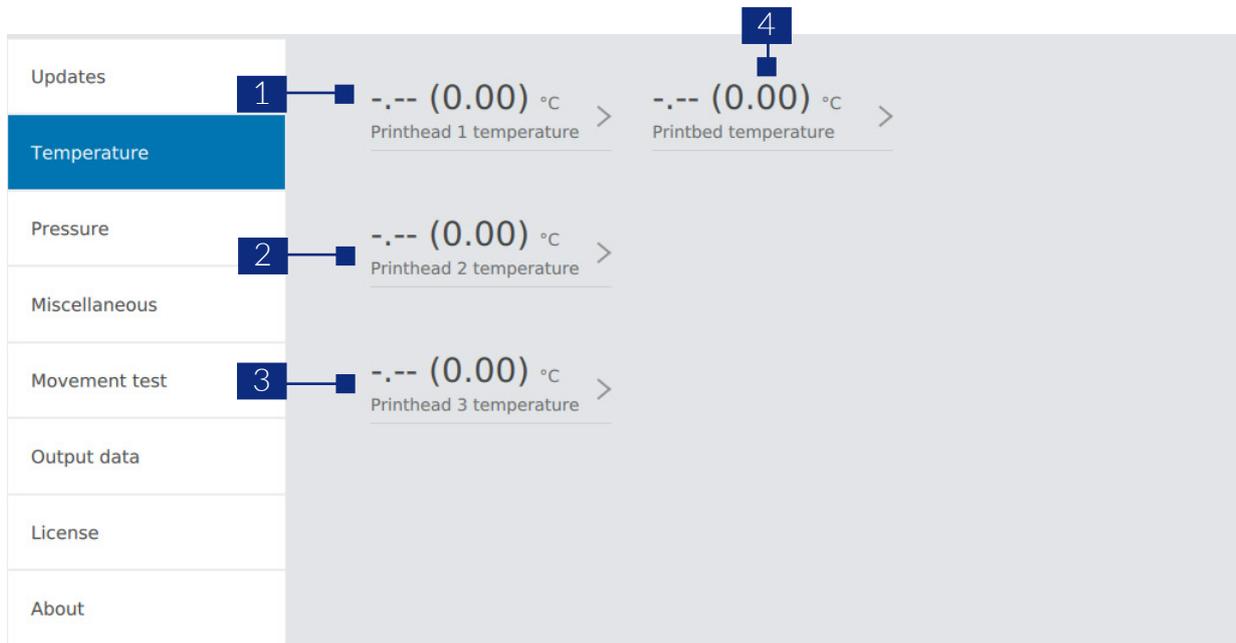
Download the software update onto a USB drive and insert the USB drive into the BIO X. Navigate to the first tab of the “Utilities” menu to access the update.



1. USB content list – Select the software update from the list.
2. Select – Press “Select” to begin the software update.

4.4.2 Printhead and print bed temperature control

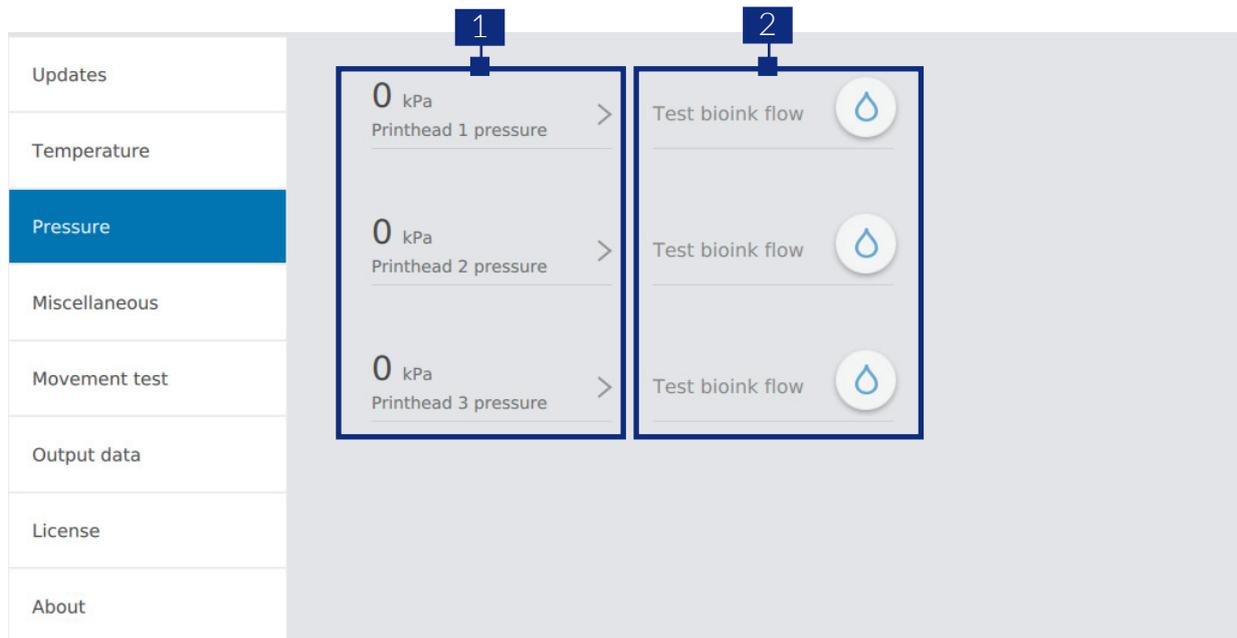
Use the second tab of the “Utilities” menu to control printhead and print bed temperature. You have the option to pre-heat or pre-cool your equipment.



1. Printhead 1 temperature – Set the temperature of the printhead 1.
2. Printhead 2 temperature – Set the temperature of the printhead 2.
3. Printhead 3 temperature – Set the temperature of the printhead 3.
The temperature range for the pneumatic printhead is between room temperature and 65° Celsius.
4. Printbed temperature – Set the temperature of the printbed between 4-60°.

4.4.3 Printhead pressure control

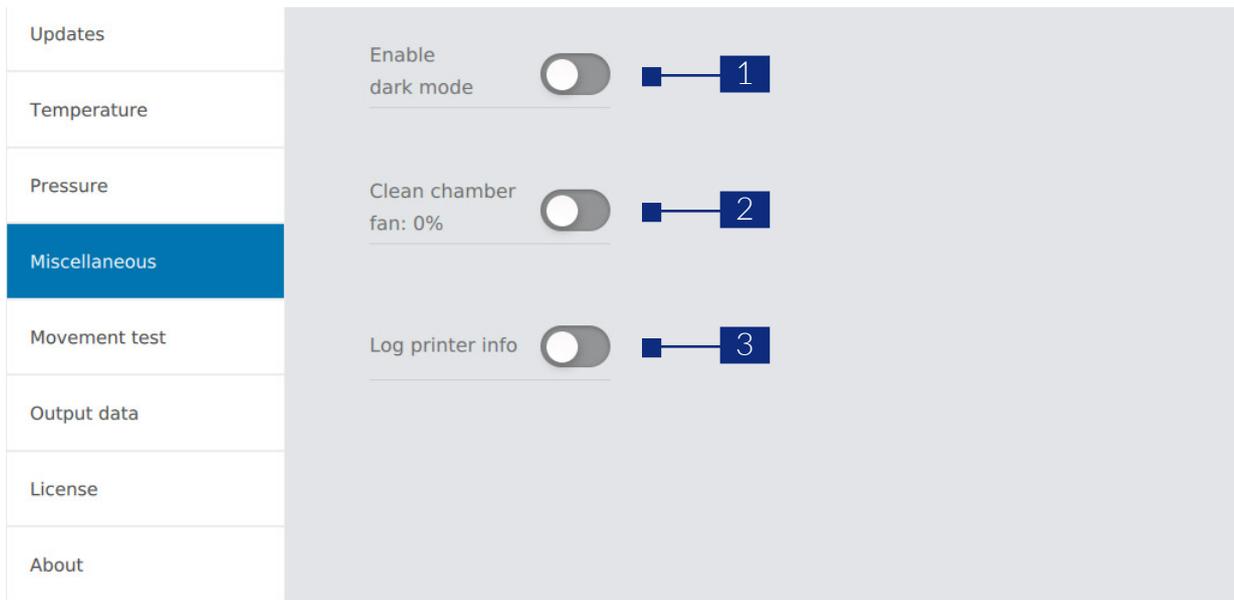
Evaluate the pressure necessary for extruding the biomaterial. Extrusion pressure depends mainly on material viscosity.



1. Set printhead pressure. (Pressure should be between 0-200 kPa with an internal air compressor and 0-700 kPa with an external air compressor.)
2. Test bioink flow - Press the droplet button to assess the bioink flow. There is one droplet button for each printhead.

4.4.4 Miscellaneous tab

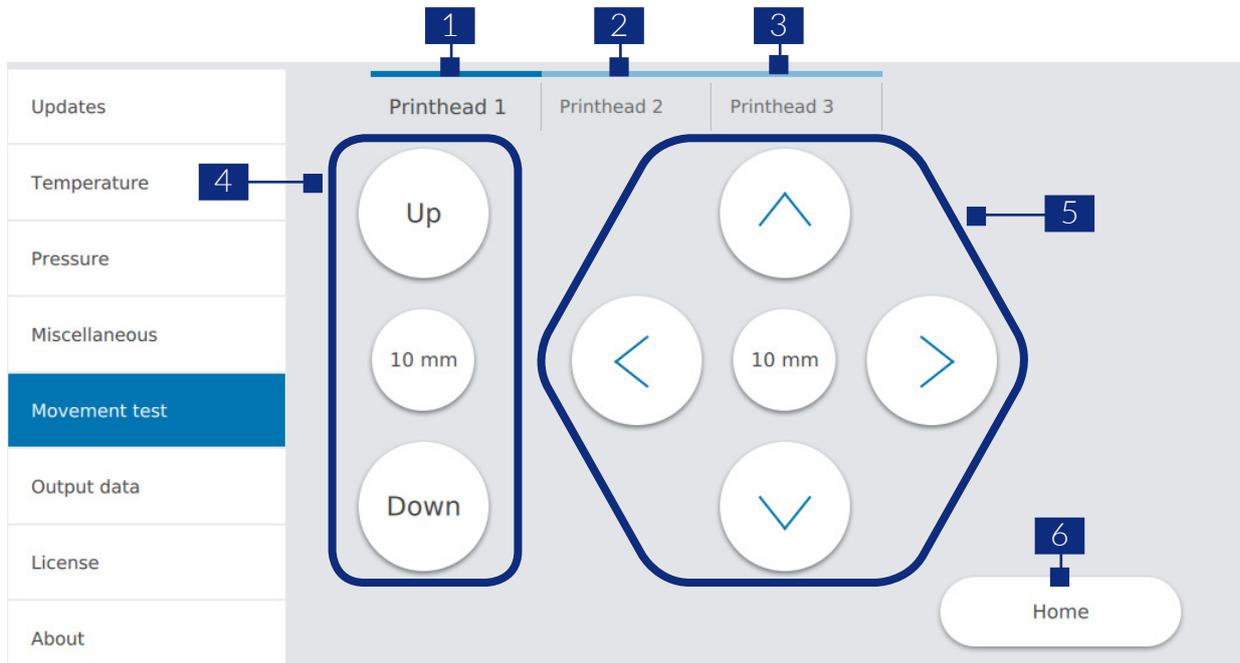
Use this tab to enable special features for experimental purposes.



1. Enable dark mode - Turn off all chamber lights. Use this to work with photo-sensitive material.
2. Clean Chamber fan - Turn the Clean Chamber fan on or off.
3. Log printer info - Log all relevant print information. This option is generally used for performing customer support.

4.4.5 Printhead movement test

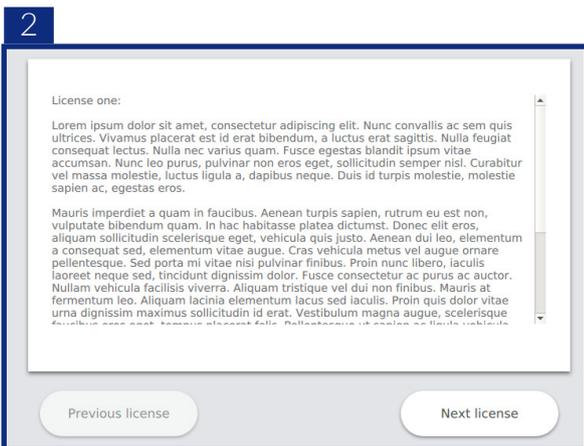
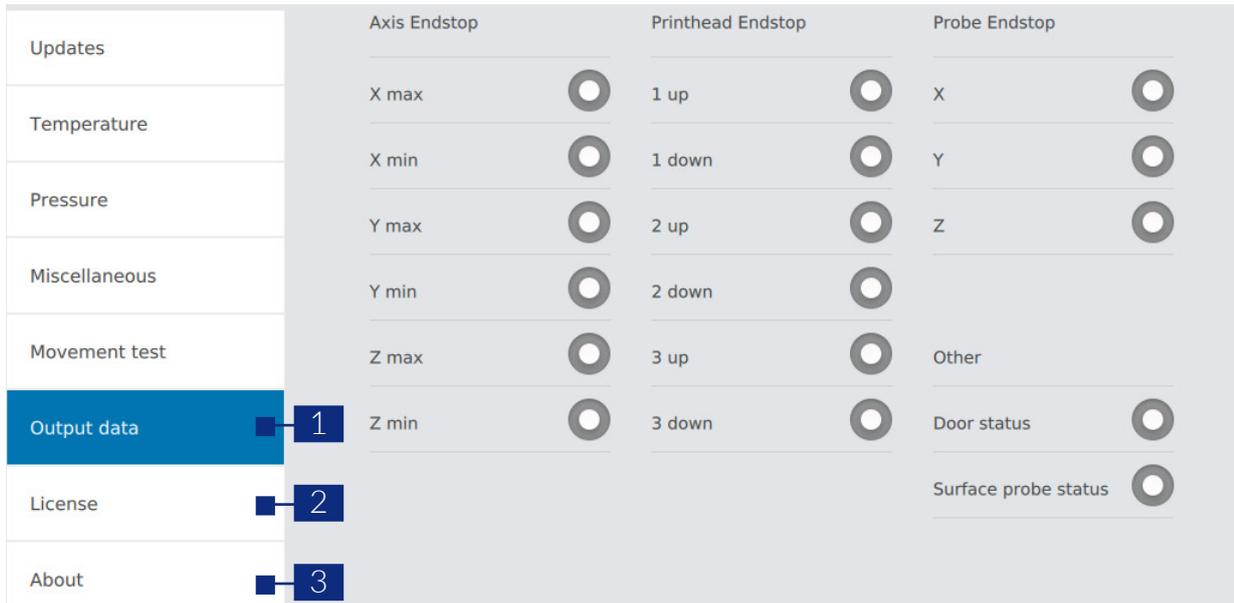
Use this tab before printing to test printhead movement along the X, Y and Z axes.



1. Printhead 1 - Test movement for printhead 1.
2. Printhead 2 - Test movement for printhead 2.
3. Printhead 3 - Test movement for printhead 3.
4. Z axis command - Controls the position of the printhead along the Z axis.
5. X, Y axis command - Controls the position of the printheads and the surface along the X and Y axis.
6. Home command - Home the printer.

4.4.6 Customer support tabs

The output data tab is used for customer support. CELLINK uses this tab to perform sensor testing.



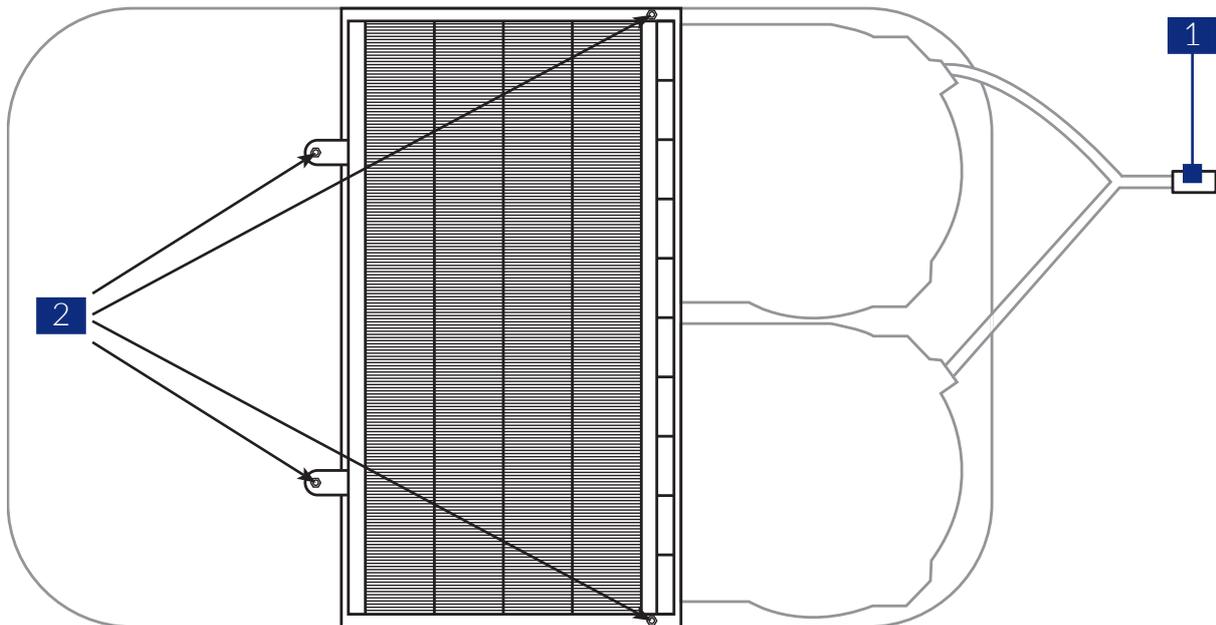
1. Output data - Allows customer support to check and test the different sensors.
2. License - Provides the printer and software license.
3. About - Provides customer support contact information and the software version.

5. Maintenance

5.1 Changing the HEPA filter

The HEPA filter is part of CELLINK's patented Clean Chamber™ technology, ensuring a sterile print chamber for your research. Change the HEPA filter after 160 hours of runtime using the instructions below.

1. Turn off BIO X and disconnect the power cable.
2. Remove the Clean Chamber unit. Reach into the print chamber and push the HEPA filter up until the Clean Chamber unit releases from the BIO X.
3. Disconnect the cable powering the fans (1).
4. Put on a pair of gloves and sterilize them using >70% ethanol.
5. Remove the four screws holding the HEPA filter in place (2).
6. Replace the HEPA filter with a clean one. Fasten the clean HEPA filter with the four screws and plug in the cable powering the fans.
7. Remount the Clean Chamber unit in the top of BIO X.



5.2 Manually cleaning or sterilizing BIO X

BIO X has a chemically resistant coating. Clean or sterilize it with ethanol. Before using ethanol, turn off and unplug BIO X. Spray the surface and wipe it with a soft cloth.



After using ethanol, wait at least 60 seconds before starting BIO X. Ethanol is flammable, and this ensures that all remaining ethanol vapor is ventilated. Failure to wait can cause equipment damage and personal injury.

6. Terms and conditions

6.1 General Terms and Conditions

These General Terms of Sale (the “General Terms”) applies to all products sold by CELLINK AB and CELLINK LLC (the “Products”), CELLINK AB for European sales at Arvid Wallgrens Backe 20, 413 46 Göteborg, Sweden and CELLINK LLC for U.S sales at 2000 Kraft Dr, Suite 2125, Blacksburg, VA 24060 (“Cellink”).

The General Terms shall constitute an appendix to a purchase agreement, supply agreement, order confirmation or other agreements of a similar nature, which together constitutes the Parties agreement (the “Agreement”).

The purchaser of products from CELLINK is hereinafter referred to as the “Buyer”, and “Party” means CELLINK or the Buyer and “Parties” means CELLINK and the Buyer together.

In the event that the General Terms contradict the Buyer’s general terms and conditions of purchase, CELLINK’s General Terms shall prevail.

Email shall be considered sufficient wherever “written” is used in these General Terms.

6.1.1 Orders and Supply etc.

The Buyer shall order the Products in writing from CELLINK. No order is binding until CELLINK has confirmed an order. CELLINK will state the price and estimated delivery time in such confirmation. Notwithstanding the provisions in the Buyer’s order, each contract of sale shall be subject to these General Terms.

The Buyer is aware and acknowledges that the Buyer’s delivery capacity varies depending on, inter alia, the general market conditions. As soon as CELLINK has reason to assume that a delay in the agreed delivery could occur, CELLINK shall notify the Buyer thereof and shall in such case be entitled to reasonable prolongation of the delivery date of up to twenty (20) business days. Notwithstanding the foregoing, CELLINK shall always endeavour to maintain a delivery capacity that enables CELLINK to deliver the Products in accordance with accepted orders.

6.1.2 Payment

The Buyer shall purchase the Products at the prices set out in CELLINK’s price list applicable at the time when CELLINK has received each respective order. CELLINK has the right to change the price list at any time.

Unless otherwise agreed in writing, the Buyer shall pay for all Products no later than thirty (30) days from the date of CELLINK’s invoice. When purchasing the Products marked with “advance payment” the Buyer shall pay 50 % of the purchase price in advance, in accordance with CELLINK’s invoice.

The Buyer has no right to offset. The Buyer shall not have the right to withhold payments to CELLINK or reduce the amount of payments owed to CELLINK under this Agreement for fees, claims, damages, expenses or other amounts owed, or alleged to be owed, to Buyer from CELLINK under this Agreement or any other agreement.

In the event that the Buyer at any time should fail to make payment in full on the due date CELLINK shall be entitled to claim interest on the sum overdue until payment is made at the rate equivalent to the reference rate of interest (as determined by the Central Bank of Sweden) plus eight percentage points per annum. Title to the Products shall remain with CELLINK until fully paid by the Buyer in accordance with this section.

6.1.3 Service

Unless otherwise agreed in writing, CELLINK shall be solely responsible for, and entitled to, carry out after sales service and repairs on all Products.

4. GENERAL CONDITIONS OF DELIVERY

The Products shall be delivered from CELLINK to the Buyer under the following delivery terms:

- (i) regarding new Products or Products returned after upgrading or repair - CPT - Carriage Paid To (Incoterms 2010);
- (ii) regarding Products returned after warranty actions - DAP - Delivered At Place (Incoterms 2010).

Any delivery from Buyer to CELLINK, e.g. of Products returned for repair or calibration (whether under warranty terms or not), shall be delivered DAP - Delivered At Place (Incoterms 2010).

CELLINK reserves the right to make partial deliveries. Unless otherwise agreed, invoices will be adjusted pro rata. For the purpose of these terms any partial delivery will be regarded as filling a specific order.

6.1.5 Acceptance

The Buyer shall immediately following each delivery of any Product inspect the Product in order to identify any external damage and to ensure that the delivery is in accordance with the order. Any defects or deficiencies which are detected in conjunction with delivery shall immediately be reported in writing to CELLINK.

When a Product is unpacked, and in any event before the Product has been used by the Buyer, the Buyer shall perform a full inspection of the Product where such was not possible on receipt of the Product in question. The obligation to report any defects to CELLINK as set out in section below shall apply in such context.

At the request of CELLINK, the Buyer shall make defective goods available to CELLINK for inspection and control.

If the Buyer does not report defects or deficiencies in Products delivered within the time limits set out above, the Buyer shall have no right to make any claims against CELLINK with regard to the default or defect.

6.1.6 Liability for defects

CELLINK shall remedy any defect in Products delivered, resulting from faulty design, specification, materials or workmanship attributable to CELLINK in accordance with the provisions of this section 6.

CELLINK is only liable for defects that appear under the intended and proper use of the Products, included printing using CELLINK's bioink only. Thus, the liability does not cover defects caused by faulty maintenance, handling or incorrect storage by the Buyer, alterations of the Products carried out without CELLINK's prior written consent, or normal wear and tear and deterioration.

In order to enable the Buyer to bioprint, the Buyer may insert a USB to upload an .STL-file to the Products. CELLINK shall not be liable for any damage or loss caused by the Products on any other software contained on the USB. CELLINK shall neither be liable to remedy any defects to the Products caused by faulty or corrupt software provided by the Buyer.

CELLINK's liability is limited to defects which appear within 12 months from the date when the Products were delivered.

The Buyer shall notify CELLINK in writing of a defect without undue delay after the defect has appeared, and in no case later than two (2) weeks after the expiry of the liability periods as set out above. The notice shall contain a description of how the defect manifests itself. If the Buyer fails to notify CELLINK in writing within the above time limits, the Buyer forfeits its right to make any claim in respect of the defect. If there is reason to believe that the defect may cause damage, notice shall be given forthwith. If notice is not given forthwith, the Buyer forfeits the right to make any claim based on damage which occurs, and which could have been avoided, if such notice had been given. After receipt of a written notice, CELLINK shall, at CELLINK's option, repair or replace the Product or make a reasonable reduction of the purchase price for the Products without undue delay. If CELLINK fails to fulfil its obligations under this section within a reasonable time, the Buyer may by written notice require CELLINK to do so within a final time. If CELLINK fails to fulfill its obligations within that time limit, the Buyer may terminate the purchase of the defective Products in question by written notice.

If the Buyer gives such notice as referred to above, and no defect is found for which CELLINK is liable, CELLINK shall be entitled to compensation for the work and costs which it has incurred as a result of the notice.

All transports in connection with replacement shall be at the Buyer's risk and at CELLINK's expense. The Buyer shall follow CELLINK's instructions regarding how such transport shall be carried out. CELLINK shall have no liability for defects save as stipulated above. This applies to any loss the defect may cause, such as loss of production, loss of profit and other consequential economic loss. The limitation of CELLINK's liability under this section shall, however, not apply where CELLINK has been guilty of negligence.

6.1.7 Software

The software (proprietary software and third party software), documentation, interfaces, content, and any data that came with the Products, which may be updated or replaced by feature enhancements or software updates provided by CELLINK (the "Product Software"), is licensed, not sold, to the Buyer for use in accordance with these General Terms. CELLINK [and its licensors] retain ownership of the Product Software itself and reserve all rights not expressly granted to you.

6.1.8 Granted rights

CELLINK grants the Buyer a non-exclusive, non-transferable, non-sublicensable, perpetual right to use the Product Software in the Products within the Buyer's own business. The Buyer shall not have any right to the Product Software apart from the right to use Product Software in line with these General Terms. Except for the Buyer's right to make back-up copies if this is necessary for the intended use of the Product Software, and to decompile the Product Software to achieve interoperability with other programs, the Buyer is not allowed to modify, copy, disassemble, reassemble, distribute, publish, reverse engineer, build a derivate or duplicate the Product Software, its components, services or features. The Buyer is only allowed to use the Product Software for your own benefit and you are not allowed to make the application available to third parties.

6.1.9 Trademarks and other intellectual property rights

All intellectual property rights and other rights, including without limitation patents, design rights, trademarks, copyright and know how, relating to the Products and any and all documentation related thereto shall be the exclusive property of CELLINK.

Nothing in connection with purchase of Products or in the Agreement shall constitute or be construed as a transfer of ownership of any of CELLINK's intellectual property rights or other rights or to otherwise give the Buyer any proprietary rights to CELLINK's intellectual property rights.

The Buyer shall not remove or change any trademark, trade name, sign or other mark on any Products or its packing, or make any alterations in the construction or design of any Product.

6.1.10 Permitted use of the products

You agree to and warrant that you only will use the Products in:

- (i) accordance with these General Terms and the user manual provided for the Products;
- (ii) a way that does not promote or encourage illegal activity;
- (iii) a way that is not harmful, abusive or offensive, does not infringe the rights of any third party or in any other way can harm CELLINK; and
- (iv) compliance with all applicable laws, including local laws of the country or region in which you reside or in which use the Product.

6.1.11 Product liability

CELLINK is not liable for any damage caused by the Product to any movable or immovable property or the consequences of such damage, which occurs after the Product is delivered to the Buyer.

The Buyer shall indemnify and hold CELLINK harmless to the extent that CELLINK incurs liability towards any third party in respect of loss or damage for which CELLINK is not liable in relation to the Buyer following section 9. For the avoidance of doubt, the Buyer shall have a liability to recourse all costs inflicted on CELLINK, due to any such claims.

Subject to the limitations stated above, CELLINK is liable for claims made by a consumer, in accordance with mandatory law for personal injury or damage to property caused by the Product.

If a claim for damage as described in this section is lodged by a third party against one of the Parties, the latter Party shall forthwith inform the other Party thereof in writing.

A precondition for CELLINK's liability set forth above is that CELLINK has been notified in writing of such claim in accordance with above and given authority to settle the claim or control the defence of any suit and proceeding.

In the event that a Product or parts thereof becomes subject to a recall decided by CELLINK, the Buyer shall participate and assist in such a process in accordance with CELLINK's instructions. The Buyer is entitled to compensation for its reasonable direct and documented costs occurred in relation to the provision of such assistance.

The limitation of CELLINK's liability set forth in this section shall not apply where CELLINK has been guilty of negligence.

Both Parties shall keep and maintain product liability insurance in accordance with customary conditions.

6.1.12 Limitation of liability

Save for what follows from section 11, CELLINK's aggregate liability in relation to any claim of any kind for any loss or damage arising out of, connected with, or resulting from the Agreement or from the design, manufacture, sale, delivery, resale or use of the Products or any part thereof, as the case may be, shall be limited to the refund of the purchase price of the Products with respect to which the loss, damage or breach occurred.

In no event shall CELLINK be liable towards the Buyer for any loss of production or profit, loss of use, loss of data, loss of contracts or for any other consequential, economic or indirect loss whatsoever in respect of the sale, purchase, use or disposition of the Product.

The limitation of CELLINK's liability in this section shall not apply where CELLINK has been guilty of negligence.

6.1.13 Force majeure

The Parties shall be relieved from liability for a failure to perform any obligation under the Agreement during such period, and to the extent that the due performance thereof by either of the Parties is prevented by reason of any circumstance beyond the control of the Parties ("Discharging Circumstance"). If not otherwise shown, war, warlike hostilities, mobilisation, or general military call-up, civil war, fire, flood, or other circumstances of similar importance, shall be considered as Discharging Circumstances.

If a Party wishes to invoke a Discharging Circumstance, it shall give immediate notice to the other Party of the commencement and the cessation of such Discharging Circumstance, failing which, the Party shall not be discharged from liability for any non-performance caused by such Discharging Circumstance.

The time for performance of the relevant obligations of a Party shall be appropriately extended by the period during which a Discharging Circumstance continues, provided, however, that if performance of a contractual obligation is prevented by a Discharging Circumstance for a period of six (6) months or more, each Party shall be entitled to terminate the Agreement.

6.1.14 Confidentiality

The Parties hereby undertake, during the term of this Agreement and thereafter, to hold in confidence and absolute secrecy any and all Confidential Information (as defined below), disclosed by the other Party pursuant to this Agreement and not to disclose to third parties any Confidential Information received. Furthermore, the Parties shall take reasonable steps to prevent an unauthorised disclosure or use of such Confidential Information by employees, subagents or other intermediaries.

For the purpose of this Agreement, "Confidential Information" means any and all information (whether in written or oral form), including but not limited to technical, practical, commercial information and the contents of this Agreement, save as provided under (a) – (d) below:

- (a) information which is known or which becomes known in full detail to the public otherwise than by breach of the obligations herein contained;
- (b) information which the disclosing Party can show was in its possession before receiving it from the other Party;
- (c) information which a Party has received or receives from a third party without restraints as to the disclosure thereof;
- (d) information which a Party is legally obliged to disclose by compulsory law, court order or by order of another authority of competent jurisdiction.

6.1.15 Miscellaneous

The Agreement, including all appendices hereto including the General Terms, contains the final, complete and exclusive agreement of the Parties relative to the subject matter hereof and supersedes all prior and contemporaneous understandings and agreements relating to its subject matter. These General Terms shall be interpreted and construed in accordance with the laws of Virginia. The United Nations Convention on Contracts for the International Sale of Goods shall not apply. Any dispute, controversy or claim arising out of or in connection with this Agreement, or the breach, termination or invalidity thereof, shall be finally settled by arbitration administered by the Arbitration Institute in Virginia. The place of arbitration shall be Blacksburg, United States. The language to be used in the arbitral proceedings shall be English.

6.2 BIO X EULA

CELLINK BIO X 3D BIOPRINTER SOFTWARE END USER LICENSE AGREEMENT

BY CLICKING ON “I ACCEPT” OR BY INSTALLING, DOWNLOADING, OR ACCESSING THE CELLINK 3D BIOPRINTER SOFTWARE (“LICENSED SOFTWARE”), LICENSEE ACKNOWLEDGES THAT IT HAS READ, UNDERSTANDS, AND AGREES TO BE BOUND BY THE FOLLOWING TERMS AND CONDITIONS, AND LICENSEE REPRESENTS THAT IT HAS THE AUTHORITY TO ENTER INTO THIS USER LICENSE PERSONALLY, OR IF ON BEHALF OF A COMPANY TO BIND THAT COMPANY TO THE TERMS OF THIS USER LICENSE. IF LICENSEE DOES NOT AGREE TO ALL TERMS AND CONDITIONS OF THIS USER LICENSE, OR IF LICENSEE DOES NOT HAVE SUCH AUTHORITY, LICENSEE MUST NOT CLICK ON “I ACCEPT” AND MUST NOT USE THE LICENSED SOFTWARE.

CELLINK MAY AT ANY TIME AND AT ITS SOLE DISCRETION MODIFY THESE TERMS BY POSTING REVISED OR ADDITIONAL TERMS AND CONDITIONS ON ITS WEBSITE (<https://cellink.com>) OR WITHIN LICENSED SOFTWARE, INCLUDING WITHIN OR ACCOMPANYING SOFTWARE UPDATES OR REVISIONS. SUCH MODIFICATIONS SHALL BE EFFECTIVE IMMEDIATELY UPON POSTING, AND LICENSEE’S CONTINUED USE OF LICENSED SOFTWARE AND ANY REVISIONS OR UPDATES AFTER THE MODIFICATIONS HAVE BECOME EFFECTIVE SHALL BE DEEMED LICENSEE’S CONCLUSIVE ACCEPTANCE OF THE MODIFIED TERMS.

CELLINK holds all right, title, and interest in and to the CELLINK 3D Bioprinter Software (“Licensed Software”) and all associated websites, platforms, and applications, and is the sole and exclusive owner of <https://cellink.com> (the “Website”).

This CELLINK 3D Bioprinter Software End User License Agreement (“User License”) is entered into by and between CELLINK and users of the CELLINK 3D Bioprinter Software, including their employers and personnel of such employers (collectively “Licensee”).

CELLINK may offer certain Licensed Software in the form of software provided with or embedded on a CELLINK 3D Bioprinter product and/or on and through the Website, and Licensee wishes to access and to use the Licensed Software and the Website in accordance with the terms and conditions set forth in this User License.

6.2.1 License

Subject to these terms and conditions and Licensee’s compliance therewith, CELLINK grants Licensee (each a “Party” and collectively the “Parties”) a non-exclusive, nontransferable, nonsublicensable, limited and revocable license to install, use, and/or access the Licensed Software for commercial or non-commercial use by Licensee only on CELLINK 3D Bioprinter(s) owned or controlled by Licensee in accordance with this User License.

6.2.2 Authorized users

Licensed Software may be installed, used, or accessed only by Licensee, who is responsible for compliance with this User License by its authorized users.

6.2.3 Reservation of rights

Licensee acknowledges and agrees that the Licensed Software is not sold to Licensee, but is only licensed. All rights not expressly granted in this User License are reserved by CELLINK. Licensee acknowledges and agrees that no ownership interest in the Licensed Software is acquired by downloading or using the Licensed Software and that Licensee has only the limited license granted in this User License and no other rights, implied or otherwise. The source code of the Licensed Software and any other materials identified as confidential or proprietary constitute the confidential and proprietary information of CELLINK and shall only be used in conjunction with Licensee's authorized use of the Licensed Software and may not be disclosed to third parties.

6.2.4 Updates or revisions

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6.2.5 Trademarks

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6.3 Warranty

We guarantee that you will receive our product tested, working, fully assembled and ready to use. Every bioprinter is covered under the Conditions of Carriage by FedEx, DHL and UPS and can be read using this links:

http://www.fedex.com/hu_english/services/terms/



http://www.dhl.com/en/express/shipping/shipping_advice/terms_conditions.html



<https://www.ups.com/us/en/help-center/legal-terms-conditions/service.page>



We will also personally insure every bioprinter sent under Declared Value Insurance, also optioned by FedEx. If, in the case there is a problem with the BIO X outside of the FedEx terms, it is not the result of neglect of the purchaser and the incident occurs and is reported within 3 months (90 days) of the purchase date, conforms to all the rules of the warranty hereby included and the customer provides the original proof of purchase/ serial number, then CELLINK will work out the problem on an individual basis as each problem must be addressed this way. In the rare case of a specifically diagnosed and proven DOA (dead on arrival) part (detailed description and documentation required), CELLINK will most likely send a replacement part to you. In the case that a customer has already been through all these previous options stated and is still not satisfied with the results, the customer must have the bioprinter sent back at their own expense. Once a return is received (for example a returned bioprinter), CELLINK will then send back a new unit at our own expense. Proper packaging is required in the rare case of a returned product or part, and the product itself must arrive back in the condition in which it was originally received.

CELLINK is not in any way responsible for any consequential losses or downtime whatsoever caused by a problem in the performance of our products. CELLINK is not responsible for additional customs fees and tariffs. CELLINK is not responsible for delivery delays or the inability to deliver from the carrier. CELLINK is not responsible for damages resulting from improper handling during delivery. The warranty also does not cover any damages brought about because of an accident. All warranties are voided if the product has been moved from the original country of purchase.

The guarantee and warranty does not cover any alterations or repairs made by a second or third party. We are always eager to work with you personally to fix any problem that may arise in the most efficient fashion meeting its specific case, but we do not suggest you to “rig” up something outside of the recommended guidelines in your user manual unless personally instructed by us to do so. CELLINK provides no guaranties on the safety or performance of modified BIO X 3D bioprinters. We are also not responsible for incorrect voltage being used, environmental conditions (moisture, fire, water, flood, lightning, ext.), or any other form of neglect on the customer’s part. If you are unsure about something, feel free to contact us prior to using the BIO X.

CELLINK is not responsible for damages caused by the use of old information. The latest documentation is always available on our website.

The guarantee and warranty covers critical components only. For example CELLINK will not replace a bioprinter because of a perceived blemish in the paintjob. The critical components/replacement parts do not carry a warranty themselves and are only covered in the initial 3 months warranty starting on the purchase date. Components not included in the warranty include: timing belts, linear ball bearings, rods, and the build platform. Moving parts, although of the highest manufactured quality, must be properly maintained, serviced and/or oiled, and the failure to do so will result in progressed wearing and tearing. The heated build platform itself will be subjected to unavoidable scratching and wear upon use. If you wish to order replacement parts, they are available in our online store, or by contacting us personally by telephone or email. There is no warranty issued when exotic printing material is used with the BIO X and doing so is not recommended by us at CELLINK. Foreign materials can damage the system. The warranty does not cover operating the bioprinter at not recommended speeds and settings.

In the case that a repair is determined to be outside of the warranty and the buyer decides to send back the BIO X for repairs, the buyer will ship the BIO X at their own expense. The costs to repair the BIO X will also be at the buyer's expense.

Concerning unauthorized returns:

Returns not pre-authorized will not be eligible for repair, replacement or refund. Do not send it back to CELLINK unless you have contacted us first and we have authorized you to send it.

Concerning Refunds:

A refund is possible only with the BIO X 3D Bioprinter itself and will not be offered for any filaments, or spare parts. If within two weeks (14 days) after receiving your BIO X 3D Bioprinter you are not completely satisfied, we offer you a refund option.

You ship it back at your own expense and after we receive it, we will deduct a 10% restocking fee from the total refund of the price of the BIO X 3D Bioprinter (excluding the tax and other fees). There will also be a thorough inspection of the bioprinter, and upon finding any damages deemed on the part of the buyer, other deductions from the refund would be made accordingly.

Deductions will be made for any wear perceived to the bioprinter, including scratches. The 14 day period after receiving the bioprinter will be concretely determined in calculation with the FedEx tracking information.

Limitations:

This guarantee and limited warranty are sole and final as they stand in reference to BIO X, CELLINK and its products where permitted by law. Any implied warranty or fitness is limited to this 3 months (90 day) warranty starting from the date of purchase. CELLINK waives all liability for any incidental, exemplary, punitive, collateral, indirect, consequential, or special damages. CELLINK will determine on sole discretion whether an issue is covered under the warranty or not.

Concerning any problems or enquiries, please contact us at: info@cellink.com

Returned parts/products can be sent to:

CELLINK AB,

Arvid Wallgrens Backe 20,

Gothenburg SE-413 46,

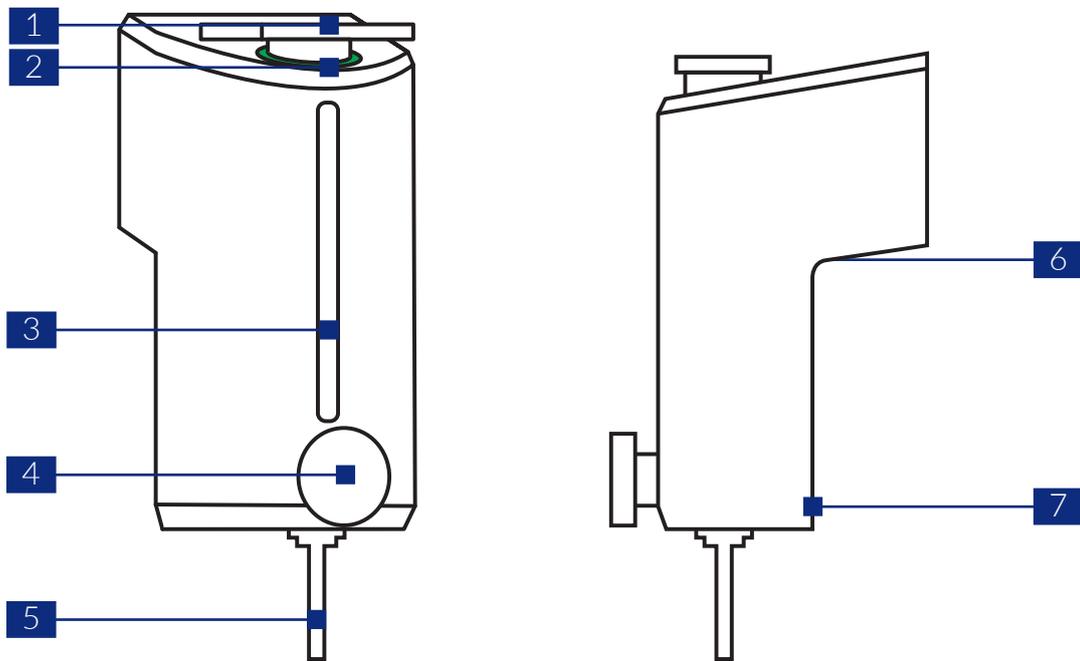
Sweden.

7. Printhead manuals

7.1 CELLINK pneumatic-based printhead

7.1.1 Printhead overview

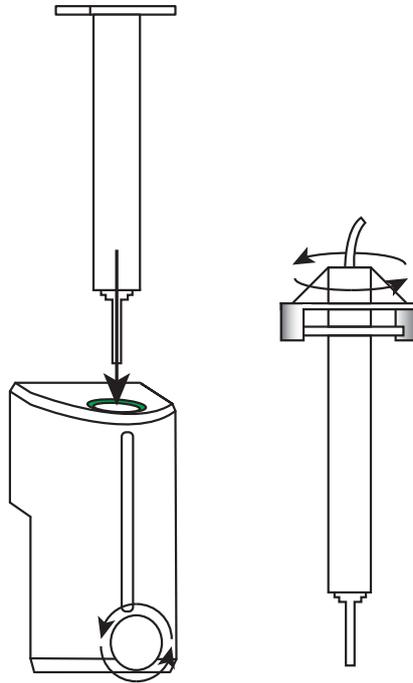
The CELLINK pneumatic-based printhead is an extrusion-based printhead. It is equipped with heating up to 60 degrees Celsius. It can connect with an external air supply to bioprint most bioinks.



1. Cartridge.
2. Heat indicator – The LED changes color depending on the printhead temperature. Red is hot, yellow is normal and blue is cool.
3. Opening for cartridge overview – View the volume of bioink left in the cartridge.
4. Cartridge fastening screw – Securely fastens the cartridge to the printhead.
5. Nozzle or needle.
6. Printhead contact – The connector between BIO X and the intelligent printhead.
7. Magnet – The magnet securely fastens the printhead on the printhead holder.

7.1.1 Mounting of a cartridge in the printhead

Follow these steps to mount a cartridge in the CELLINK pneumatic-based printhead.



1. Twist the pressure connector to attach the pressure hose to the cartridge.
2. Insert the cartridge in the printhead. Push it down until the cartridge wings touch the top of the printhead.
3. Turn the cartridge-fastening screw to secure the cartridge in the printhead.

The CELLINK pneumatic-based printhead needs to be connected to an air supply to function. When inserting the printhead, remember to connect the pressure hose to the pressure connector on the printhead holder.

Imagination is the beginning
of creation.

You imagine what you desire,
you will what you imagine,
and at last, you create what
you will.

-George Bernard Shaw

Happy printing!

CELLink®



