



AFINIA 3D™

V1.3

H+1



H+1 User Manual

Afinia 3D

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1. Safety and Printing Environment

1.1 Safety Precautions

1. The Afinia H+1 3D printer requires the power adapter provided by the original manufacturer, otherwise the machine could be damaged or even cause fire. Keep the power adapter away from water and out of high temperature environments.
2. During printing, the temperature of the nozzle of the printer could reach 260°C and the temperature of print platform could be over 70°C. Do not touch these parts with your bare hands when the printer is in the operation mode, not even with the heat resistant gloves included in the accessories, as the temperature could damage the gloves and injure your hands.
3. During printing, the print head and other mechanical parts move at high speed. Touching these parts while they are moving could cause injuries.
4. Wear goggles when removing the supporting material from models or detaching models from the build plates.
5. When printing with plastic filaments, the process could generate light and, for some people, annoying odor. It is recommended to run the printer in a well ventilated environment. We also suggest to keep the printer in an environment with a stable temperature as unwanted cooling could cause adverse effects to the print quality.
6. When using the “Extrude” function, make sure there is enough space between the print head nozzle and the build platform. 50mm is recommended, otherwise the nozzle could be blocked.
7. Fasten moving parts. Tie back loose hair, secure loose clothing and keep all printer doors closed during operation.
8. Do not leave the printer unattended during operation. Watch to make sure the first a few layers adhere correctly.

WARNING, HOT SURFACES!

High Temperature: Do not touch!

Moving parts: Do not touch!

Flex / Perf Glass Board: Glass boards are easy to break. Handle with care!

1.2 Printing Environment

As light odor could be generated during printing, keep the printer in a well ventilated environment. The H+1's ideal working temperature is between 15°C and 30°C with a relative humidity between 20–50%. Printing at temperatures out of this range could cause adverse effects to the printing process and print quality.

1.3 One Year Warranty

Afinia 3D warrants to the original purchaser that this product is free from defects in material and workmanship. Afinia 3D will for one year, at its option, repair or replace at no charge for parts and labor from the date you purchased the product from Afinia 3D. Print heads, Nozzles and Print Boards are warranted for ninety (90) days.

- Afinia 3D reserves the right to determine the validity of all warranty claims.
- Warranty is voided if the product serial number has been altered or removed.
- Warranty is voided if the product has been misused or damaged or if evidence is present that the product was altered, modified, or serviced by unauthorized service people.

The above stated warranty is exclusive and replaces all other warranties, express or implied, including those of merchantability and fitness for a particular purpose. Afinia, a division of Microboards Technology, LLC, will not be liable for any other damages or loss, including incidental or consequential damages and loss of profits or revenues from whatever cause, including breach of warranty negligence.

For the detailed Limited Warranty statement and to register your warranty, please visit our website at <https://afinia.com/support/warranty-registration/>.

1.4 Compliance



FCC ID: 2AAHW-3DP-25A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

2. Introduction

2.1 Main Parts of H+1

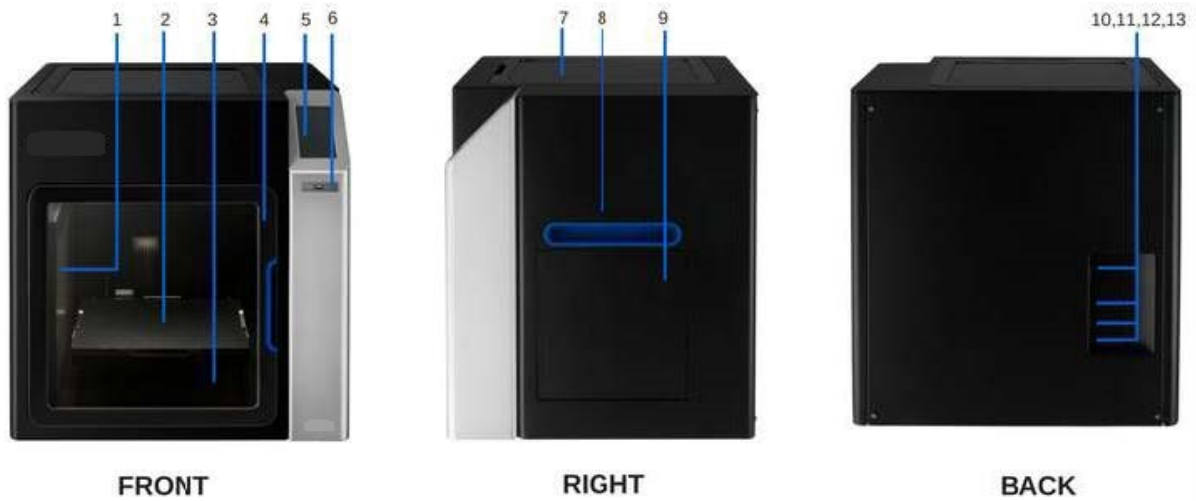


Figure 1.1 H+1 Images

1. Dual Filter
2. Build Platform
3. Waste Tray
4. Front Door
5. Touchscreen
6. Front USB Port
7. Top Lid
8. Right Side Handle
9. Filament Bay
10. Power Switch
11. Ethernet Socket
12. USB Port
13. Power Socket

2.2 Specification Table

Printer	
Printing technology	MEM (Melted Extrusion Modelling)
Extruder	Single
Nozzle Diameter	0.2mm, 0.4mm, 0.5mm, 0.6mm
Extruder Maximum Temperature	299°C
Extruder Maximum Travel Speed	200 mm/sec
XYZ Accuracy	7, 7, 1.5 micron
Connectivity	USB cable, Wi-Fi, LAN and USB Stick
Display	4.3" Full Colored LCD Touchscreen
Build Volume	205 × 255 × 225mm (8" x 10" x 8.8")(XYZ)
Printed Object Accuracy	±0.1mm/100mm
Layer Resolution	0.05/0.1/0.15/0.2/0.25/0.3/0.35/0.4mm
Calibration and Leveling	Automatic
Build Plate Maximum Temperature	100°C
Print Board	Perf Glass Board or Flex Glass Board, Heated
Enclosure	Full
Dual Filtration System	HEPA and Activated carbon filters V2
Supported Materials	Afinia ABS, ABS+, PLA , TPU and more
Filament Diameter	1.75mm
Filament Spool Compatibility	500 - 1000g
Print Queue	Yes
Pause to Change Filament Type	Yes
Out of Filament Detection	Yes
Compatible with 3 rd party Materials	Yes
Physical dimensions	
Machine Dimensions	500x523x460 mm (19.6" x 20.5" x 18.1")
Net Weight	30 kg (66 lbs)

Shipping Box Dimensions	610 x 565 x 600 mm (24" x 22.2" x 26.4")
Shipping Weight	42.5 kg (94 Lbs)
Power requirements	
Input	110-240VAC, 50-60Hz, 220W
Extra USB Input for Add-on	5V, 1A
Software	
Software	Afinia Studio V2.5 or above
Supported OS	Windows 7 SP1 or later, Mac OS X, iOS 8.x/9.x
Hardware Requirements	OpenGL 2.0, At least 4GB of RAM
Supported File Formats	up3, .ups, .tsk .stl, .obj, .3mf, .ply, .off, .3ds,
Preview Support Structures	Yes
Editable Support Structures	Yes
Cloud Print Settings	Yes
Ambient Environment	
Operating Ambient Temperatures	15 - 30°C, 20 - 70% RH non

3. Unboxing

3.1 Unboxing the H+1

1. Cut open the tape on the top of the cardboard box, and open the box from the top.
2. Take out the two boards on the top foam, and remove the top foam.
3. Remove the plastic cover and the square shaped foam wrapping around the machine.
4. With two people, lift the printer out of the cardboard box using two handles on both sides of the printer, and place it on a flat surface.
5. Open the Top Lid and remove all the tie-downs from the gantry and foams inside the printer. There are six tie-downs in the machine.
6. Open the Front Door, and take out the two foams and two extruders beneath the build platform, as shown in the figures below:

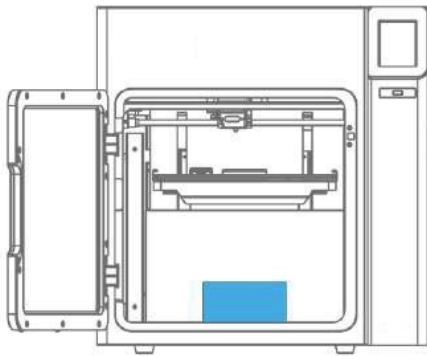


Figure 1.2 Take out the extruder.

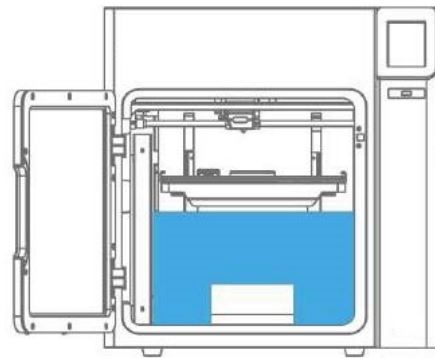


Figure 1.3
Turn the foam 90 degrees and then take it out of the machine.

7. Take out the roll of filament, the accessory box and the power cord located at the bottom of the cardboard box.
8. Put all the foams back to the box, and keep the box for the future use.

3.2 What's in the box

The ABS extruder is installed on the H+1.

The accessory box should have the following.

- **One** USB Cable
- **One** Pliers
- **One** Scarper
- **One** Nozzle Wrench: 8mm
- **One** pair of Gloves
- **One** SD Card Reader
- **One** SD Card
- **One** Calibration Card
- **Two** PTFE Tube: Shorter one for PLA Extruder; Longer one for TPU Extruder
- **Three** Allen Keys: 2mm, 2.5mm, 3mm.
- **Three** Nozzles: 0.2mm, 0.4mm, 0.6mm.

The H+1 box should have the following.

- **One** roll of 500g ABS Filament
- **One** Flex Glass Board
- **One** Perf Glass Board
- **One** Power Adapter
- **One** Power Cord
- **One** PLA Extruder with 0.4mm Nozzle
- **One** TPU Extruder with 0.5mm Nozzle

Notice: All accessories may subject to change without prior notice. If anything is missing, please contact Afinia 3D, which can be reached at support@afinia.com.

3.3 Upgrade the Touchscreen Program

We regularly update the 3D printer's touchscreen program. It is important to make sure your H+1's touchscreen system is up-to-date before the first use and pay attention to the upgrade announcement for touchscreen system in the future.

1. Download the H+1 Touchscreen Upgrade Program from <https://afinia.com/support/downloads/h1-software-downloads/>.
2. Save the file to the root directory of a USB drive, and make sure the file is named as "update_H1_x.x.x.tt" (Case sensitive), x.x.x being the version number.
3. Insert the USB drive into the USB slot just below the touchscreen display on the H+1. Turn on the power switch on the back of the printer. Wait for the prompt on the touchscreen display to select the update file and press "confirm".
4. Follow the instructions on the touchscreen display to finish the process.
5. Remove the USB drive and restart the H+1.

4. Printer Installation

4.1 Install the Print Board

There are two print boards in the H+1 package.

Perf Glass Board: The one with many small holes on one side of the board.

Flex Glass Board: The one with no holes.

1. Choose the desired type of print board for the print job.
2. Open the front door.
3. Slide the board onto the build platform and make sure to push the board all the way to the back.
4. Close the front door.

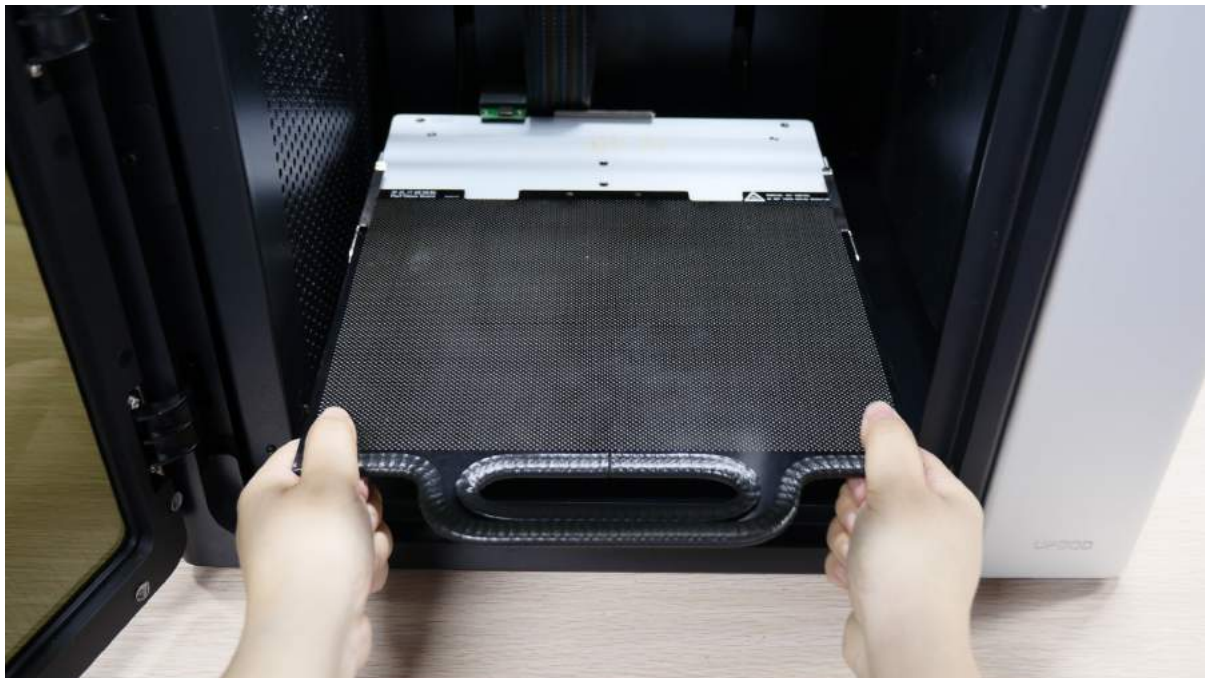


Figure 4.1 Install Print Board

4.2 Extruders

There is one ABS extruder with 0.4mm nozzle installed on the H+1. If you would like to change the extruder to different type of extruder, please refer to page 35.



Figure 4.2 Pre-installed ABS Extruder

4.3 Load Filament

The H+1 comes with no filament installed. You have to manually install the filament before printing anything. In order to get a good quality print, we recommend use Afinia's filaments.

You will find a reel of 500g ABS filament that comes inside the H+1 cardboard box.

To install the filament, please following the instruction below:

1. Find the filament reel that comes with the machine.
2. Remove the vacuum bag.
3. Find the end of the filament, and use a sniper to make a clean cut of the end.
4. Open the door of the filament Bay.
5. Hold the end of the filament straight up, and feed it into the guiding tube in the filament bay.
6. Keep feeding the filament until the end of the filament sticks out from the other end of the guiding tube (You can open the top lid, and make sure the filament sticks out).

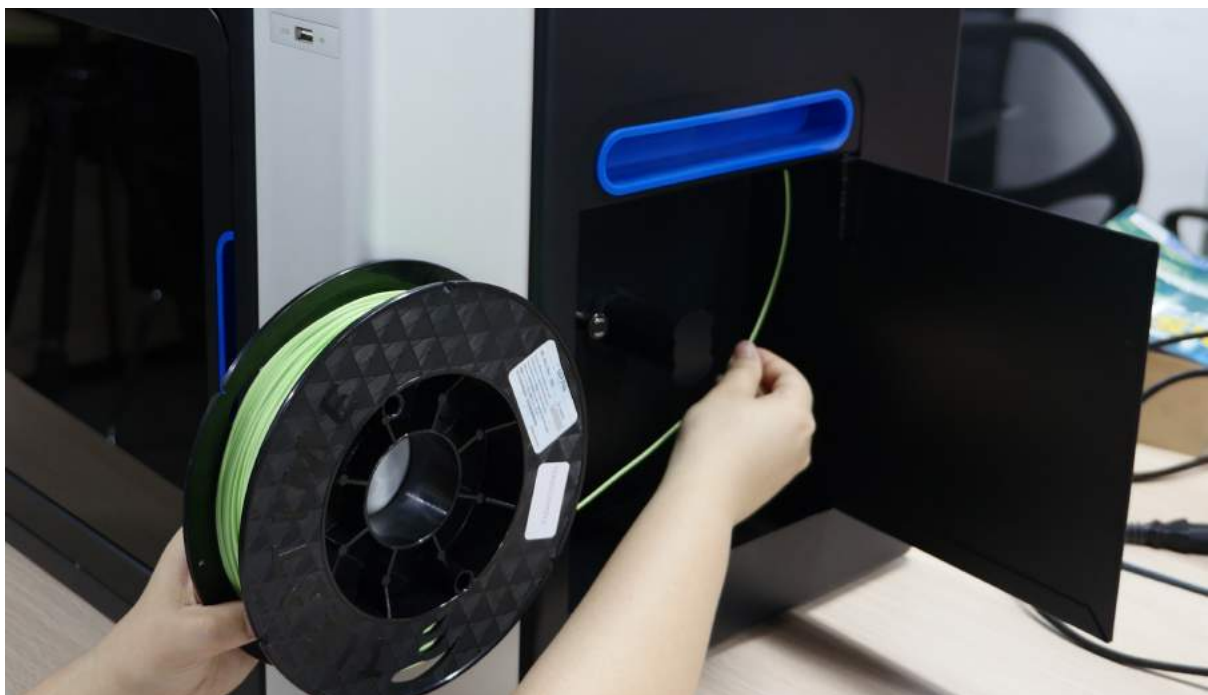


Figure 4.3 Load Filament

4.4 Connect the Power Cable

1. Plug in the power on the back of the H+1
2. Plug the other end of the cable into a wall outlet.



Figure 4.4 Connect the Power Cable

5. Touchscreen Instruction

The H+1 Touchscreen consists of two sections, the Printer Status Bar and the Main Menu.

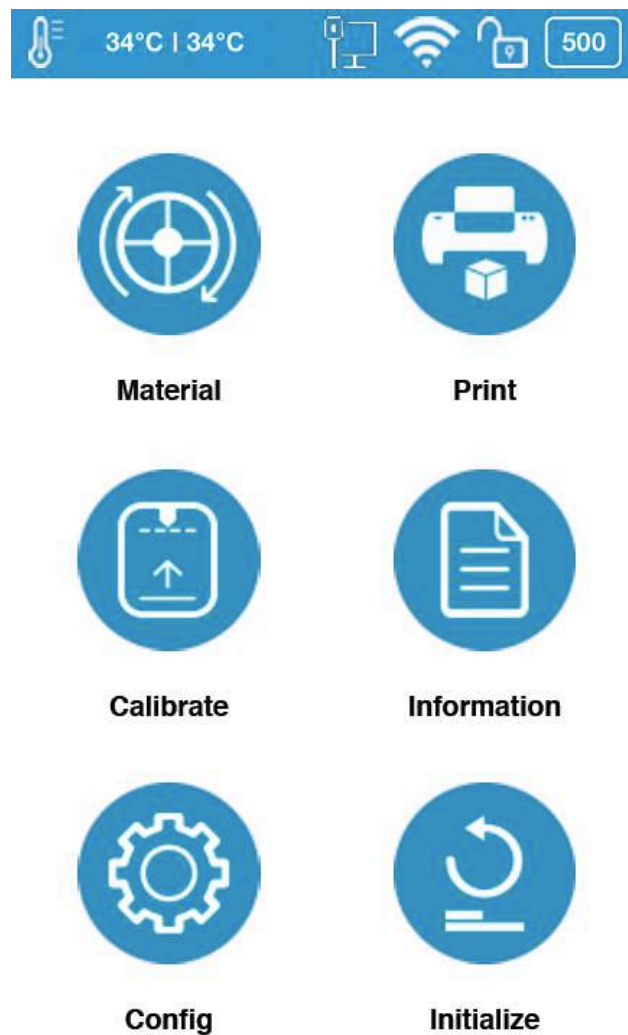


Figure 5.1 H+1 Touchscreen Display

5.1 Touchscreen Introductions

Printer Status Bar

The Printer Status Bar is at the top of the H+1 Touchscreen, which is easier for you to monitor the printer's status regularly.

There are six icons in the Printer Status Bar, each of which represents different aspects as explained in the following, starting from left to right:



Left

Figure 5.2 Printer Status Bar

Right

1. Temperature Icon: It has the thermometer icon, the nozzle temperature indicator, and the build plate temperature indicator.
2. Ethernet Status Icon: It indicates the Ethernet connection status.
3. Wi-Fi Status Icon: It shows the Wi-Fi network connection status. If there is a red exclamation mark on the top, it indicates that the Wi-Fi network has been detected but it is not connected to the printer. If there is no red exclamation mark on the top, it means that your printer has been connected to the Wi-Fi network successfully.
4. Private Status Icon: This lock icon indicates whether the printer has been set as private use to one particular user.
6. Material Information Icon: This icon represents the material's type name and the remaining weight of the current material roll. (It may appear alternatively as Name/Weight)

Main Menu

There are six buttons in the Main Menu: Material, Print, Calibrate, Information, Config, and Initialize.

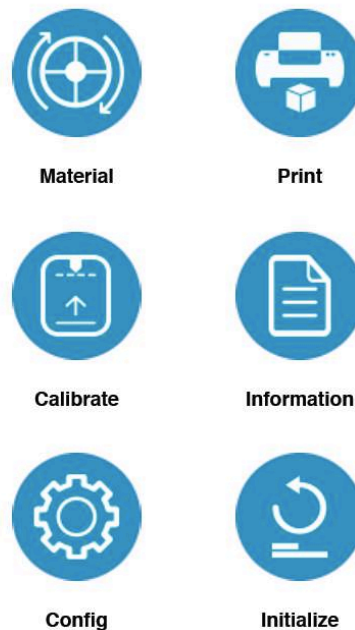


Figure 5.3 Main Menu

The following table lists all the information of icons in the Main Menu and summarizes the actions associated with each icon.

Table 5.1 Main Menu Icon Description

Name	Icon	Description
Material		<ol style="list-style-type: none">1. Change Material Type2. Withdraw Material3. Extrude Material4. Set Material Weight
Print		<ol style="list-style-type: none">1. Print Job Current List2. Print Job History List (Print Task Management)3. Print Job's Details4. Pause the ongoing print job, and change the material.
Calibrate		<ol style="list-style-type: none">1. Auto Nozzle Height Detection2. Set Nozzle Height Manually
Information		<ol style="list-style-type: none">1. Basic Printer Information: Model Name, Serial Number, Firmware Version, Screen Version, Total Print Time, Total Weight of the Material Consumed, LAN M.A.C., WLAN M.A.C..2. Reset Printer Profile.3. System Language Settings.

5.2 Material

In the material section, there are Extrude, Withdraw, Change Material Type and Set Total Weight buttons functions.

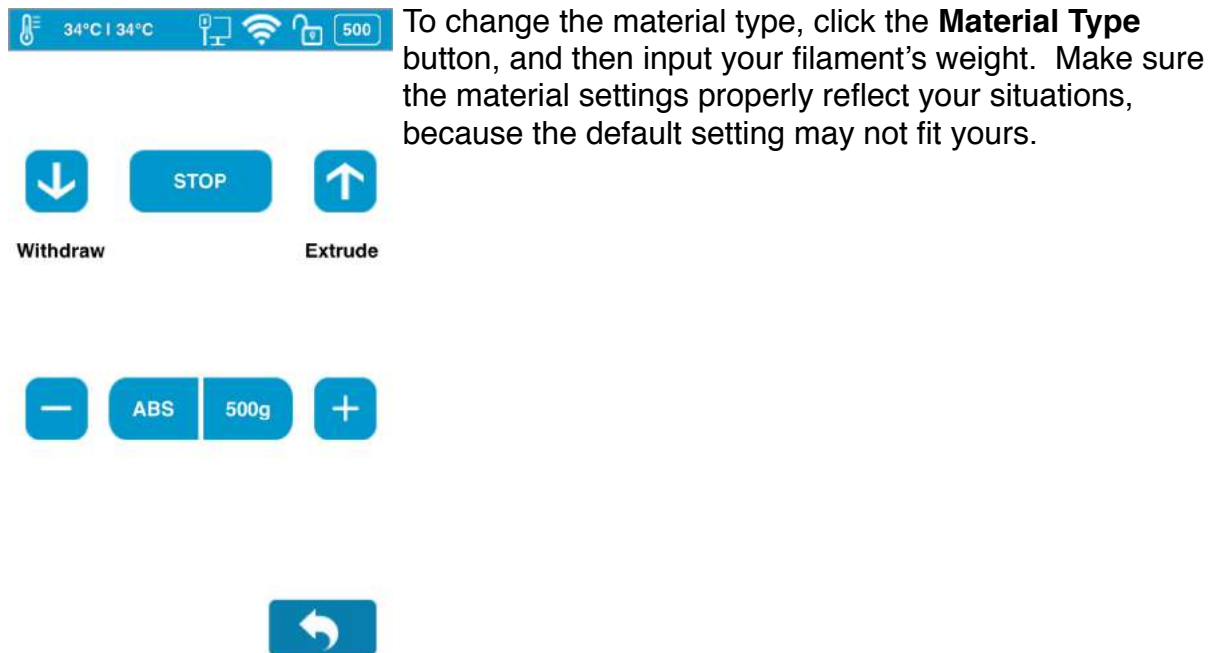










Figure 5.4 Material

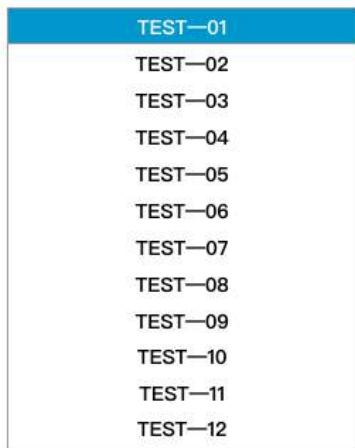
Table 5.2 Material Icon Description

Name	Icon	Description
Withdraw		<p>To take out the filament inserted in the extruder unit with the preset temperature.</p> <p>Click the Withdraw icon. The up arrow on the button will start moving upwards, indicating the extruder is heating up. The extruder will start pushing the filament out once the temperature reaches the melting temperature with a beep.</p> <p>You now can remove the filament from the tip of the extruder.</p>
Extrude		<p>To load the filament into the extruder unit with the preset temperature.</p> <p>Click the Extrude icon. The down arrow on the button will start moving downwards, indicating the extruder is heating up. Once the extruder temperature reaches the filament's melting point, the machine will give off a beep, and you can push the filament into the extruder and the extruder will heat up the filament, and extrude through the nozzle.</p> <p>If the machine works properly, you will find an evenly extruded string of filament coming out of the nozzle, without bubbles or tangling as the extrusion proceeds.</p>
Stop		<p>To stop the printer in the middle of an extruding or withdrawing process.</p> <p>Click the STOP icon, the up/down arrow on the buttons will stop moving. The printer should stop fully from extruding or withdrawing the filament.</p>

Name	Icon	Description
Withdraw		<p>To take out the filament inserted in the extruder unit with the preset temperature.</p> <p>Click the Withdraw icon. The up arrow on the button will start moving upwards, indicating the extruder is heating up. The extruder will start pushing the filament out once the temperature reaches the melting temperature with a beep.</p> <p>You now can remove the filament from the tip of the extruder.</p>
Material Type		<p>To change the material type.</p> <p>Click the Material Type icon button to change the material type.</p> <p>Also, you can add customized types of material under Maintenance in the software first, and then the new type will be available on the touchscreen for you to select.</p> <p>Default Settings: The default material type is ABS. The default material selection includes ABS, ABS+, PLA, and TPU. The button will show the current selected material type.</p>
Material Weight		<p>To change the total weight the material remaining manually.</p>
		<p>Click Plus icon to increase the value or Subtract icon to decrease the value. The value ranges from 0g- 9999g.</p> <p>The material weight will be adjusted automatically based on how much the material is consumed by print jobs</p> <p>Default Setting: The default value of material weight is 500g.</p>
Exit		<p>Exit the Material section and back back to the main menu.</p>

5.3 Print

In the Print section, you can start a print job or manage the print jobs that currently in the print queue or have finished.



There are two sections:

The Print Job Current List lists the print jobs that have been assigned to the printer.

The Print Job History List contains all the print jobs that have finished.

It is the same content that shows in the software Wait Assignment Section.



Figure 5.5 Print

Table 5.3 Print Description











Name	Icon	Description
Current Print Job List		The print job list contains the print jobs that are assigned to the printer. The highlighted row is the current print job. Click the Print Job Name to view more settings and detail information for the print job. You can start the printing process by clicking Print, or delete the print job by clicking Delete.
History		Entering the history list of the print jobs which has previously been printed on the printer, or ended with errors.
Page		Click to go to the next page.
Exit		Exit and go back to the main menu.

Print Job History List

The Print Job History List contains all the print jobs that have finished.

Tap the **Print Job Name** in the list to view the detail print settings. You can add the print job back to the Current Print Job List. The **Clear** button will erase the entire history print list.

Table 5.4 Print Job History List

Print Job History List	Print Job Information
<div data-bbox="312 568 699 611">   </div> <ul data-bbox="328 629 683 1066" style="list-style-type: none">TEST-01TEST-02TEST-03TEST-04TEST-05TEST-06TEST-07TEST-08TEST-09TEST-10TEST-11TEST-12 <div data-bbox="328 1155 683 1216">Clear 2/99 </div>	<div data-bbox="890 568 1276 611">   </div> <p data-bbox="906 629 1228 656">Infill:  Material: ABS</p> <p data-bbox="906 692 1257 719">Layer Tnk.: 0.2 Quality: Normal</p> <p data-bbox="906 754 1220 781">Time/ Weight : 1h10m20s/ 135g</p> <p data-bbox="906 817 1193 844">File Name : TEST-01</p> <hr data-bbox="890 875 1276 880"/> <p data-bbox="906 911 1161 938">Creator: Administrator</p> <p data-bbox="906 974 1134 1001">Date: 04-18 12:11:46</p> <p data-bbox="906 1037 1267 1064">Total Time/ Weight: 1h10m20s/ 135g</p> <div data-bbox="1031 1133 1139 1193">Add</div>

Start a Print

Table 5.5 Printing Process

Print Job Information	Printing	Paused Printing
<p> 34°C 34°C 500 </p> <p> Infill: Material: ABS Layer Tnk.: 0.2 Quality: Normal Time/ Weight : 1h10m20s/ 135g File Name : TEST-01 </p> <hr/> <p> Creator: Administrator Date: 04-18 12:11:46 Total Time/ Weight: 1h10m20s/ 135g </p> <p> <input type="button" value="Delete"/> <input type="button" value="Print"/> </p>	<p> 34°C 34°C 500 </p> <p> Time Remaining : 1h34m53s Material Type/ Weight: ABS/ 30g File Name : TEST-01 </p> <p> <input type="text" value="0%"/> </p> <p> </p>	<p> 34°C 34°C 500 </p> <p> Time Remaining : 34m53s Material Type/ Weight: ABS/ 30g File Name : TEST-01 </p> <p> <input type="text" value="35%"/> </p> <p> <input type="button" value="Play"/> <input type="button" value="Stop"/> </p> <p> <input type="button" value="Down Arrow"/> <input type="button" value="Up Arrow"/> </p>

Table 5.6 Print Description

Name	Icon	Description
Pause		Pause the on-going print job.
Resume		Resume the paused print job.
Stop		The printer will stop the print job completely.
Extrude		To extrude the inserted filament.
Withdraw		To withdraw the inserted filament.

5.4 Calibrate

The nozzle height of a printer is a key parameter that needs properly set before any print jobs. It can be calibrated manually or set automatically.



Click **Auto** on the touchscreen, the printer will go through a mechanical process to detect the nozzle height. The final nozzle height will appear on the screen after the whole process finishes:



Click **Edit** on the touchscreen, and enter the suitable value for your printer.

You can also use either +/- button to adjust the value in the Value Box, and then tap the Value Box to move the nozzle to the value height you set in the Value Box.

Nozzle Height: is the current printer's nozzle height.

The default value for the nozzle height for each Afinia printer has been set as 0mm before leaving factory floor for safety reasons. Therefore, calibration is the mandatory step prior to your first print.

Figure 5.6 Calibrate

Table 5.7 Calibration Icon Description

Name	Icon	Description
Nozzle Height	Nozzle Height : 125.4mm	The actual nozzle height.
Live Nozzle Height	20.0 mm	Indicating the present nozzle height.
	+ -	Using +/- to adjust the nozzle height manually.
Auto	AUTO	The printer will start detecting the nozzle height automatically. Same as Nozzle Detection in software.
Edit	Edit	To edit the nozzle height by inputing numbers manually.
Exit	↩	Exit Calibration section and back to main menu.

5.5 Information

Within this section, it displays all the information of your printer, which is not editable.

Field	Value
Model:	H+1
S.N.:	252212
Firmware Ver.:	353
Screen Ver.:	1. 1.20
Total Time:	0.1h
Total Weight:	0.1kg
Lan MAC:	ABCDEF GHIJKL
WLAN MAC:	ABCDEF GHIJKL

- **Model:** The Model Name of your printer's model.
- **S.N.:** Your printer's ID, which will be required if you looking for customer service.
- **Firmware Ver.:** Stands for firmware version of your printer.
- **Screen Vers.:** Stands for the touchscreen version. You can check whether your touchscreen is operating using the latest touchscreen system.
- **Total Time:** This represents the total printing time of your printer from the beginning.
- **Total Weight:** This indicates the total material weight which accumulated from the first print.
- **LAN M.A.C:** The unique LAN M.A.C address of your printer in Ethernet .
- **WLAN M.A.C:** It's the unique printer's M.A.C address in your Wi-Fi network.

Reset Language

Exit

Figure 5.7 Information

Table 5.8 Information Icon Description

Name	Icon	Description
Reset		This reset button will erase the following three sets of values which has been stored in your printer. Nozzle height: 0mm. Material type set to ABS, and total weight set to 500g. Name to its defaulted S.N number.
Language		There are two types of languages available for you to choose from, Simplified Chinese and English.
Exit		Exit Information section and get back to the main menu.

5.7 Config

Config section contains five parameters, and the Network Settings .



Name	252212
Sound	<input type="checkbox"/> OFF
Preheat	<input type="checkbox"/> OFF
Private	<input checked="" type="checkbox"/> ON
Password	<input type="text"/>



Name: it's the printer's name, you can change it on the Afinia Studio software.

The default name is the printer's S.N number.

Sound: Toggle the click sound while using touchscreen.

Preheat: Toggle the build plate preheating option. If it is on, the machine will start pre-heating 15 minutes ahead of the start of the print job.

You can read the introduction of Preheating in Maintenance -> Preheat in the Software User Manual.

Private: Toggle the printer to set a password for private use. Once this option is on, you can set a password for your printer and your printer will not be accessible by other users on the same network without obtaining the password.

Figure 5.8 Config

Password: The password for the printer to protect your printer from other people's access. Click the text field to enter your password.

Network Connection

This section includes Ethernet Network Settings and Wi-Fi Network Settings.

Ethernet Network Settings:

1. Plug an Ethernet cable to the LAN socket at the back of the H+1.
2. The Ethernet connection Status icon should be appear in the **Printer Status Bar**.
3. You now can go to **Config** to enter Network Settings section.
4. Click Information button to edit the printer's Ethernet Network Settings.



Figure 5.9
Printer Status Bar

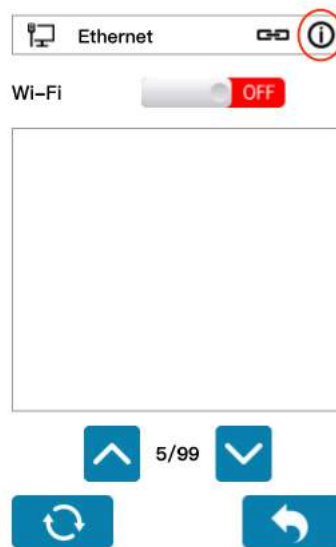


Figure 5.10
Network Settings

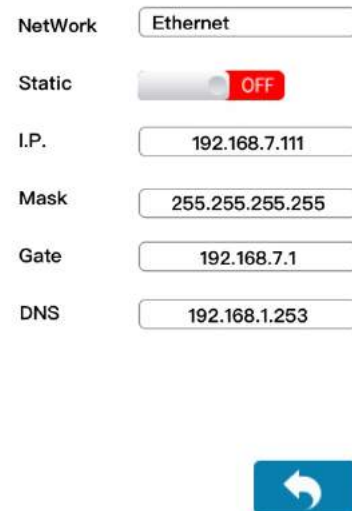



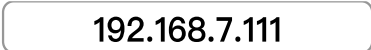







Figure 5.11
Information

Table 5.9 Network Settings Icon Description

Name	Icon		Description
Network Type/ Name	Network		The printer is connect with Ethernet.
	Network		The name of connected Wi-Fi network.
Static			Toggle the static IP option to edit following settings for static IP.
IP	IP		This is printer's IP address in the network. Click the text field to edit, click Return to save and exit editing.
Mask	Mask		This is printer's mask in the network. Click the text field to edit, click Return to save and exit editing.
Gateway	Gate		This is where you define the printer's gateway. Click the text field to edit, click Return to save and exit editing.
DNS	DNS		This is where you define the printer's domain name system. Click the text field to edit, click Return to save and exit editing.
Page			Go to the next page.
Exit			Exit and get back to the Network Section.

The following descriptions also applies for Wi-Fi network settings.

Wi-Fi Network Connection and Settings:

1. Go to **Config**, enter **Network Settings** section.
2. Toggle on **Wi-Fi Network Connection**.
3. Find the desired Wi-Fi Network's name in the list below.
4. Tap the name to connect the Wi-Fi Network.
5. The H+1 is connect to the Wi-Fi Network successfully, when the red exclamation mark disappeared, a interlock and Information icon appears.
6. Tap the **Information** icon to edit the printer's Wi-Fi Network Settings.



Figure 5.12 Wi-Fi Network Connection

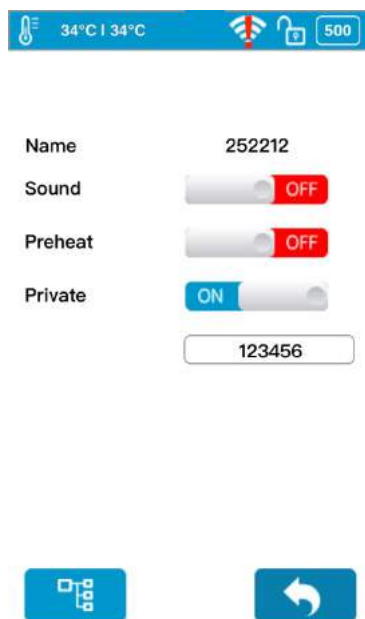


Figure 5.13
Configure Section











Figure 5.14
Network Settings



Figure 5.15
Wi-Fi Network Information

Table 5.10 Wi-Fi Network Settings Description

Name	Icon	Description
Wi-Fi Networks		Toggle the option to allow the printer connect to Wi-Fi networks.
Wi-Fi Name		Choose the name of the network to connect to
Connection Status		Once this icon appears next to the Wi-Fi network name, it indicates the printer has been connected to this Wi-Fi network.
Network Information		Click the Network Information icon to enter network information editing page.
Password Required		The network requires the password to connect.
Refresh		Refresh the Wi-Fi network list.
Page		Click to enter the next page.
Exit		Exit and go back to the main menu.

5.8 Initialize

The printer requires initialization before printing.

The Material, Calibration and Print buttons on the Main menu of the touchscreen will be greyed out before the printer is properly initialized.



Click **Initialize** and confirm the printer will start initializing by clicking “√”. After the printer is initialized, you can start sending print jobs to the printer.

Printer Initialize



Figure 5.16 Initialize

6. First print

6.1 Touchscreen Upgrade

Once the H+1 has been unboxed and connected to the network, it will detect whether its touchscreen system needs an upgrade. If it needs upgrade, follow the instruction to finish the upgrade process.

To choose the language in the touchscreen, go to **Information**, choose **Language**. Right now, we only support English and Chinese languages and we will support more languages in new upgrades in the future.



Figure 6.1 Config



Figure 6.2 Language

6.2 Install Software Afinia Studio

To operate the H+1 for 3d printing, you need to install the Afinia Studio software version 2.5 or above on your computer.

You can download the installation files of UP Studio software from <https://afinia.com/support/downloads> or search Afinia Studio in the App Store.

System Requirements:

Support Operating Systems:

Windows 7 (SP1) or higher
(32 bit and 64 bit)

Mac OS 10.10 or higher

Hardware requirements:

Open GL 2.0

At least 4GB of RAM

Installation

Make sure you download correct version of software based on your computer's configuration.

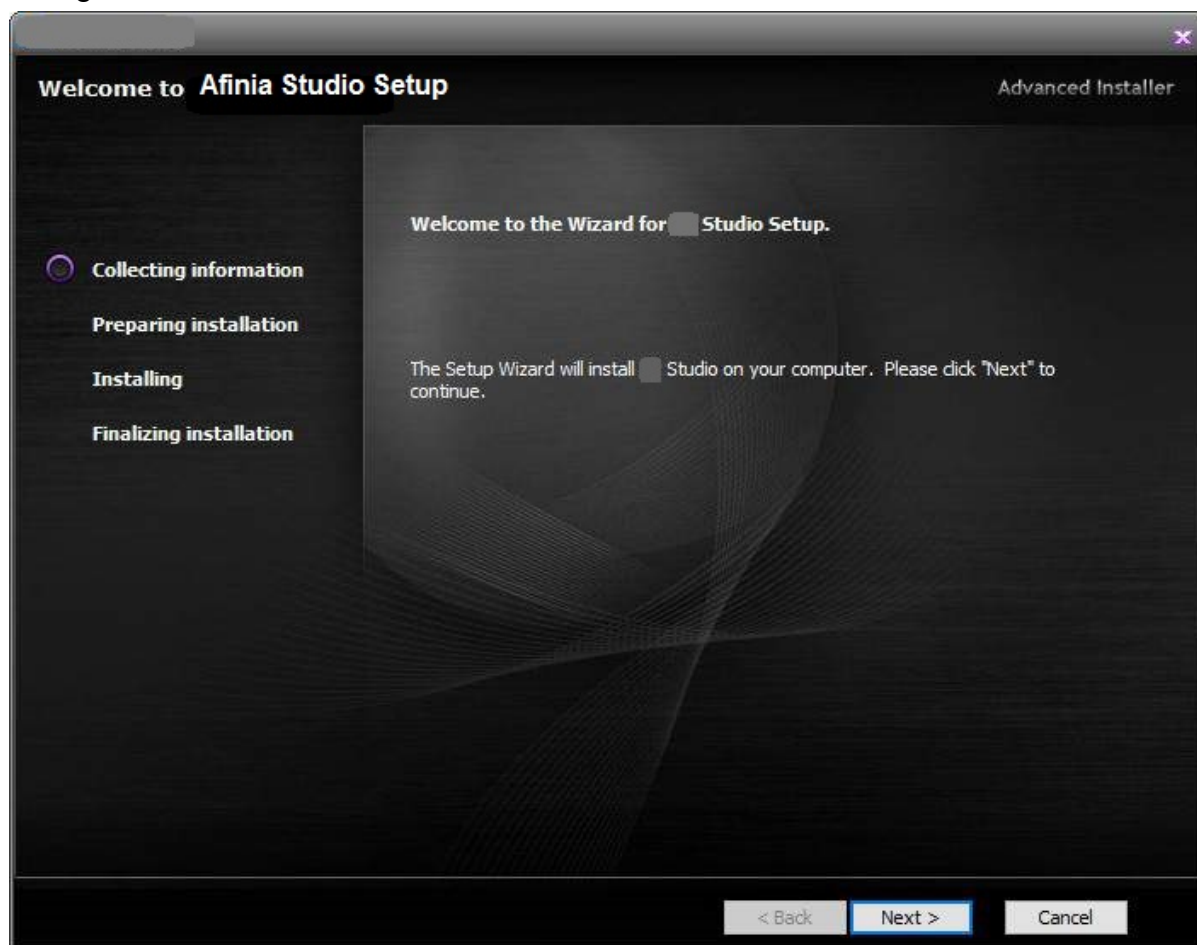


Figure 6.3 Install Afinia Studio

6.3 Connect the H+1

The H+1 supports USB and network connections.

For network connections, you can connect the H+1 via Wi-Fi or Ethernet connection. You can choose the right connection based on your needs.

1. USB Connection

Find a USB cable, connect one end to the computer and the other end to the H+1. Open Afinia Studio on the computer, you will find the connected H+1 listed in the Printer section.

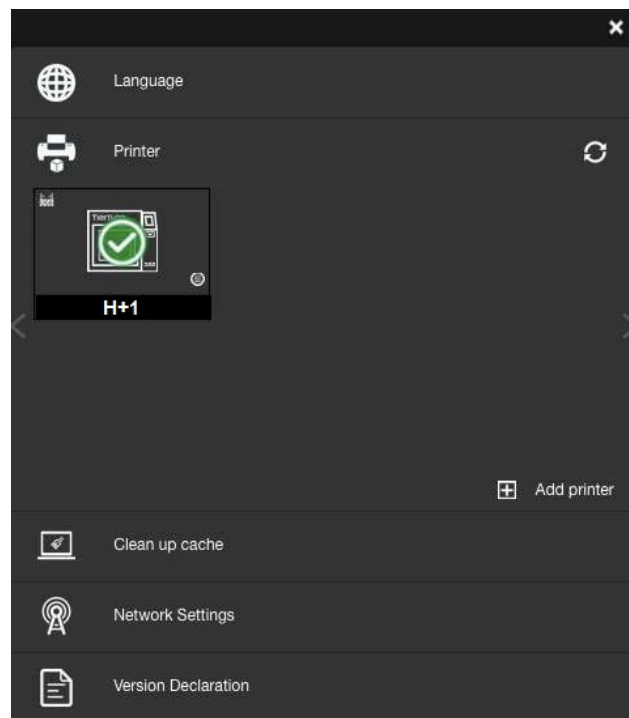


Figure 6.4 USB Connection

2. Network Connection

Ethernet Connection

Find a Ethernet cable, insert the connector into the LAN socket on the back of your H+1, and a LAN icon will appear on the touchscreen.



Figure 6.5 Ethernet Connection Icon in Printer Status Bar

To edit the Ethernet Network Settings in Afinia Studio: Open Afinia Studio in your computer, and go to **Settings**, find the printer under the **Printer** section, click **More** (circled in the red in Figure 6.6) and then click the **Information** button to make further changes.

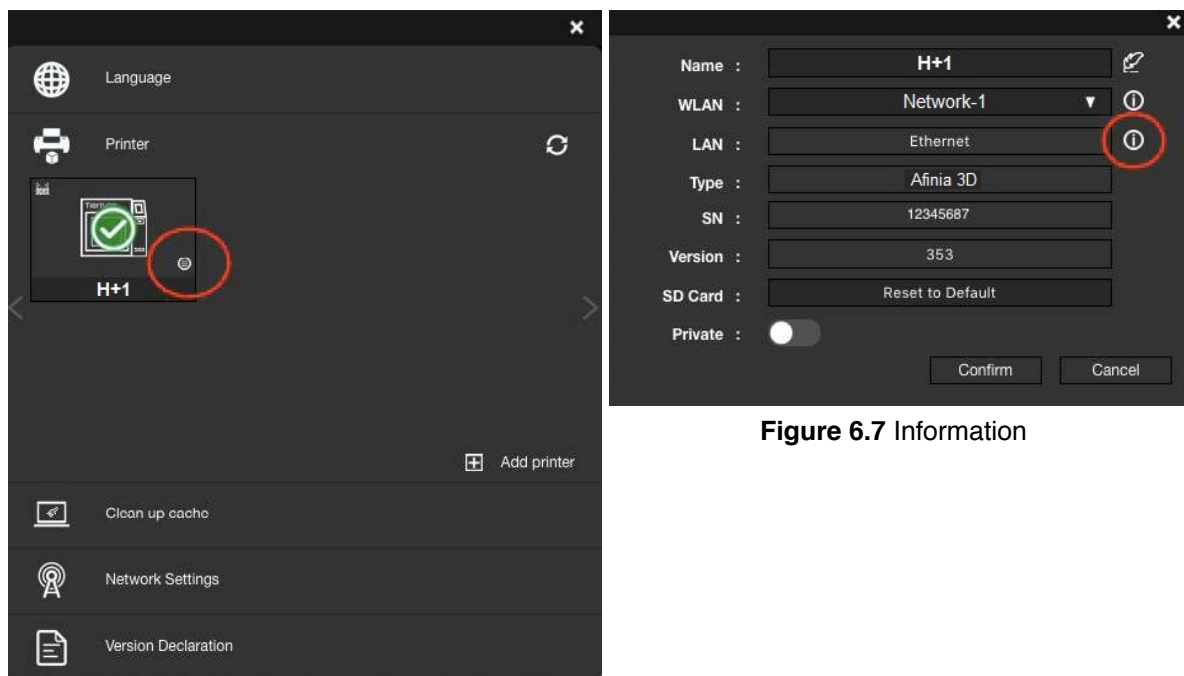


Figure 6.7 Information

Figure 6.6 Ethernet Connection

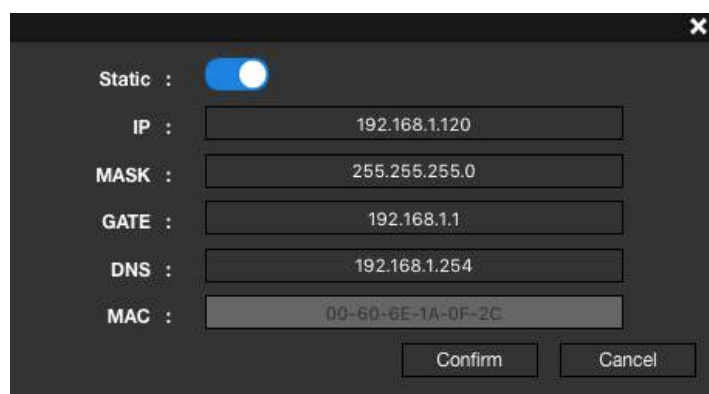


Figure 6.8 Ethernet Network Settings

Wi-Fi Connection

To connect your H+1 via Wi-Fi, you can set it up through Afinia Studio on your computer or use the touchscreen on the H+1.

Using Afinia Studio on the computer:

1. Connect your H+1 with a USB cable to your computer,
2. Open Afinia Studio on your computer, go to **Settings**, choose **Printer**.
3. The connected H+1 will appear with a green tick on top, click **More (circled in the red)**.
4. Click the down drop down menu, and then select the desired Wi-Fi network to connect. You may be asked to enter the password of the Wi-Fi network.

You can make further changes for the Wi-Fi network by clicking Information icon.

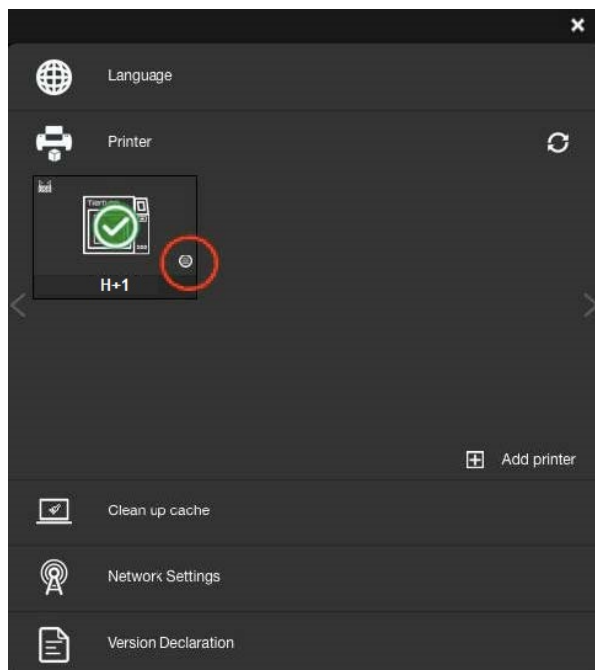


Figure 6.9 Wi-Fi Connection Settings

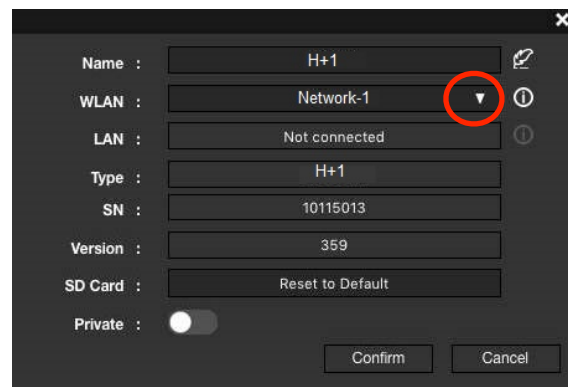


Figure 6.10 Wi-Fi Drop-down Menu

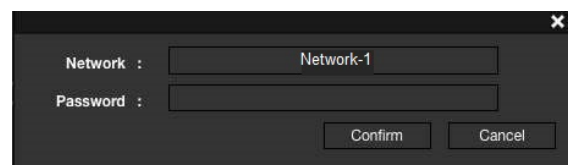


Figure 6.11 Wi-Fi Network

5. You can now unplug the USB cable, and connect your computer to the Wi-Fi network that you set for the H+1.

6. Open Afinia Studio, go to **Settings**, click **Printer**, click **Add Printer**, find your H+1 on the All Printer list, and click + to add your H+1.

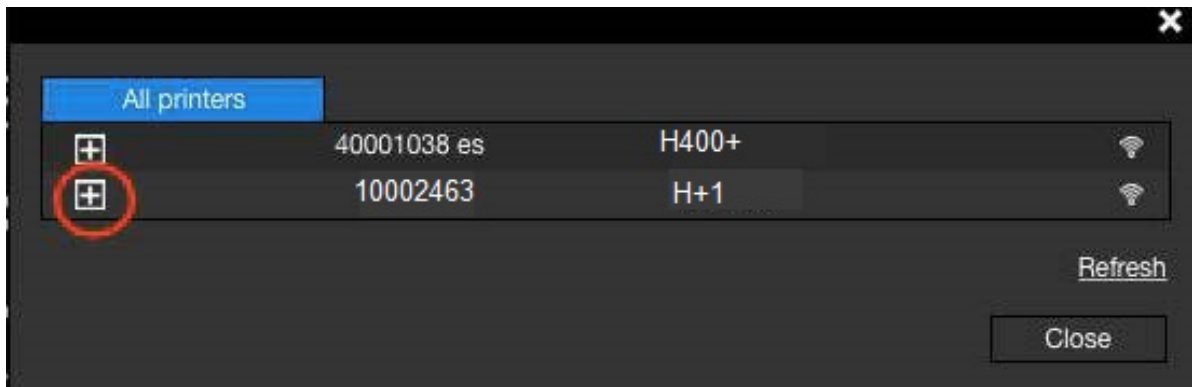


Figure 6.12 All printers

If you cannot find your H+1 in the printer list, click **Refresh**.

7. An icon of your H+1 will appear in the **Printer** section, Click the icon a green check mark representing your H+1 is connected via Wi-Fi successfully will appear on top of the H+1 icon.

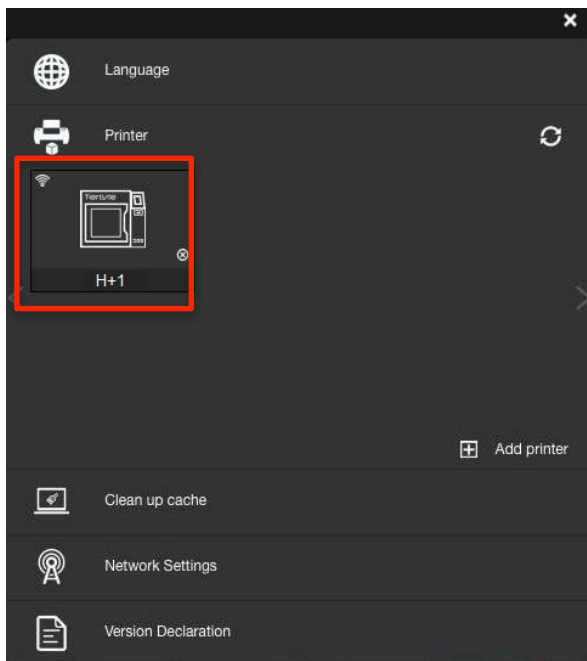


Figure 6.13 H+1 Icon

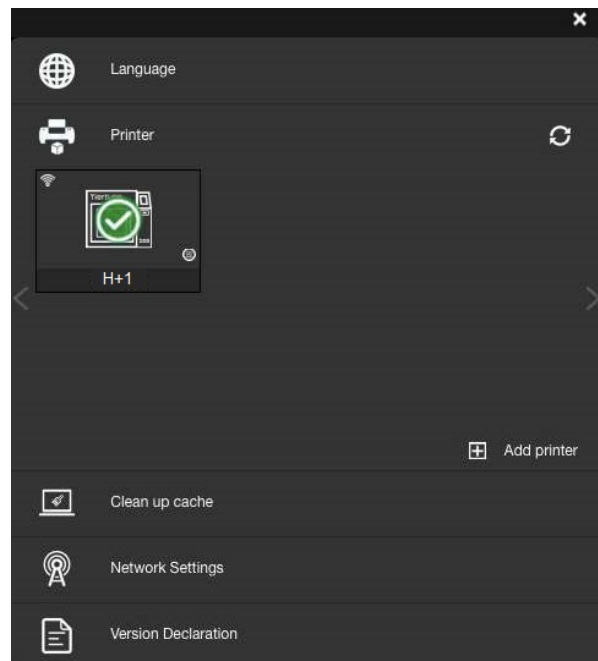


Figure 6.14 Added H+1 Icon

Using the touchscreen on the H+1 to setup the Wi-Fi connection:

Go to **Config**, click **Network Settings**. Select network name on the list, type in password if required, and press return. A lock icon appears which means your H+1 is connected to the desired Wi-Fi network.

You can make further change in the configurations of the Wi-Fi network by clicking the Information icon. Please refer to page 26.

6.4 Choose Extruders

There are three types of extruders, ABS extruders, PLA extruders, and TPU extruders, and four sizes of nozzles, 0.2mm, 0.4mm, 0.5mm, and 0.6mm diameter nozzles, supported by the H+1.

The H+1 has one ABS Extruder pre-installed on the machine with 0.4mm nozzle.

1. Three Type Extruders:

- **The ABS Extruder with 0.4mm nozzle:** For ABS filaments or alike high temperature thermal-plastic materials, which requires the extruder unit heat up at high temperature to melt the filament, and cool down effectively at the nozzle for proper extrusion.
- **The PLA Extruder with 0.4mm nozzle:** For PLA filaments or alike low temperature thermal-plastic materials, which requires the extruder unit heat up at relatively low temperature to melt the filament, and cool down effectively at the nozzle for proper extrusion.
- **The TPU Extruder with 0.5mm nozzle:** For flexible or soft filaments, which requires the filament pass through the gears and feed into the nozzle for proper extrusion.

Note: TPU filament is recommended to pair with 0.5mm nozzle for proper printing.

2. Four Nozzles with different sizes:

- **0.2mm:** For printing models that require complicated structures, and more details and with time.
- **0.4mm:** For general printing jobs.
- **0.6mm:** For printing models that require less details, with less time and for the materials that are easy to clog the nozzles.

3. Change the extruder:

Tools: An Allen Key and the Extruder you would like to install.

Preparation: Withdraw the filament, switch off the printer, unplug the extruder cable, and wait, until the extruder cools down before taking any further actions.

4. Replace the extruder:

Use the Allen key to unscrew the screw on the left side of the extruder, remove the extruder, and then position the replacement extruder in the right place, tighten the screw, and plug in the extruder cable.

5. Update the software:

Open Afinia Studio on your computer, click **Build** on the left menu, click **Maintenance**, find **Material Type**, and click the drop down menu to choose among the available options.

6. Change the nozzle:

Tools: A Nozzle Wrench

Preparation: Withdraw the filament, and wait, until the extruder cools to 200°C before taking any further actions.

7. Replacing the nozzle:

Make sure the nozzle is around 200°C, then use the nozzle wrench to unscrew the nozzle, then screw the replacement nozzle back to the extruder.

8. Update the software:

Connect your printer to the computer, open Afinia Studio on your computer, click **Build** on the left menu, click **Maintenance**, find **Nozzle Diameter**, click the dropdown menu to set the matching size.

Notice: After you change the nozzle or material in the extruder, it is necessary for you to do the following steps to update the settings on the software.

a. Connect the computer to your printer, and open UP Studio software.

b. Click **UP** on the left side menu, go to **Maintenance**.

c. Choose the **Material Type**, and then select the available **Nozzle Diameter**.

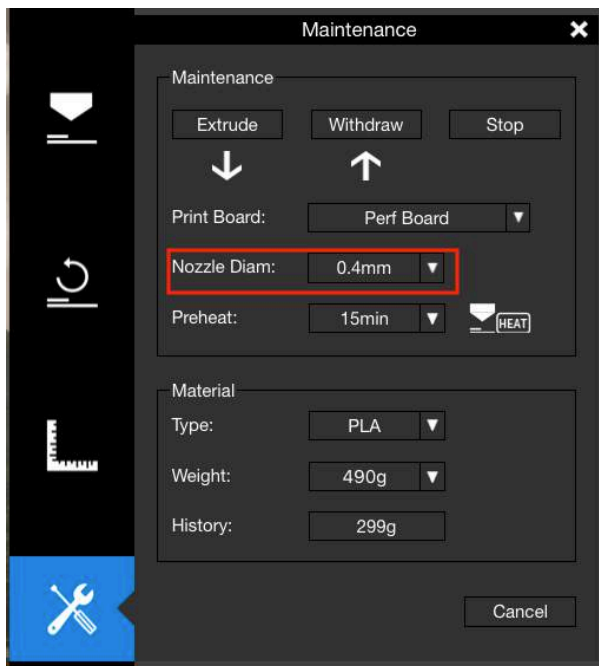


Figure 6.14 Nozzle Diam

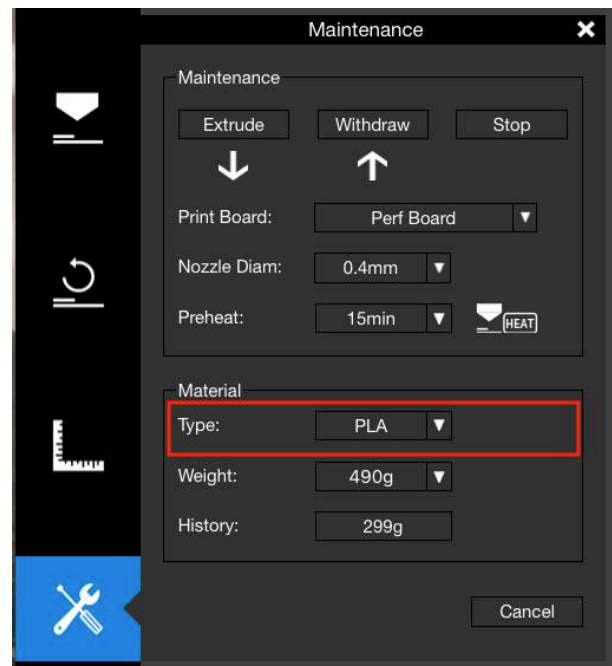


Figure 6.15 Material Type

Notice: After changing the nozzle or extruder head, please run the Nozzle Height Detection routine as the nozzle height may have changed.

Custom Filament Profile

To achieve better printing quality, you can create and edit the custom material profiles in the latest UP Studio software.

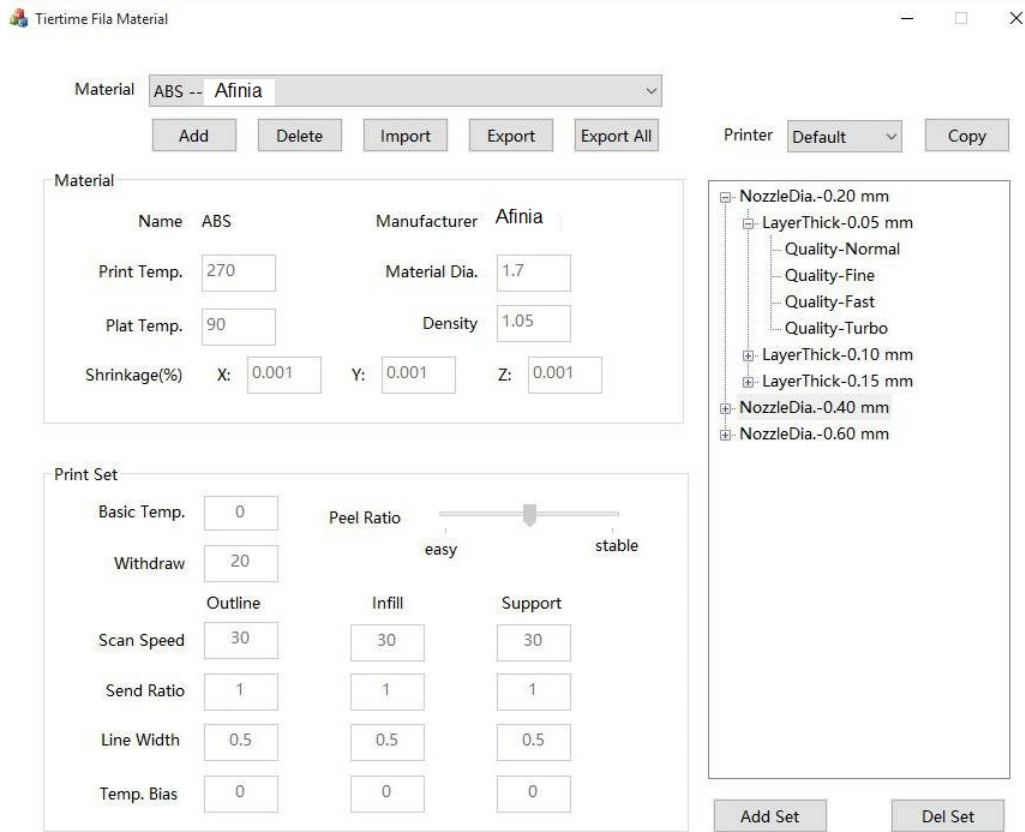


Figure 6.16 Custom filament profile

6.5 Print Board Selection

There are two types of print boards coming with the H+1, the Flex Glass Board, with the smooth surface, and the Perf Glass Board, with the perforated surface, both of which have glass board on the other side. You can always choose the glass as the print surface, which makes the third print surface supported by the H+1.

Each of the print surface is made to serve for different printing purposes and provide distinguishable finishing of the bottom layer of each printed model.

1. Flex Glass Board:

- Stiff, with the smooth surface on one side and glass surface on the other.
- Medium first layer adhesion. Easy to remove raft.
- For printing models with not raft or no support settings, provide glossy and flat finish for the bottom layer.

2. Perf Glass Board:

- Stiff, with the perforated surface on one side and glass surface on the other.
- Maximum first layer adhesion. More difficult to remove raft.
- For printing models with larger base size.

3. The glass surface of the Perf and Flex Board:

- The glass surface on the both print board.
- Minimum first layer adhesion;
- Stiff, with smooth surface. May require anti-slippage measures such as a glue stick.

Notice: Flex/ Perf Glass Board: Glass boards are easy to break. Please handle with care.

6.6 Calibration

Calibration for H+1 is an important step to make sure the printer is functioning well and is able to generate good quality prints.

Calibration includes two steps: platform leveling adjustment, and nozzle height detection,

Platform Leveling Adjustment is the process of making sure the build platform is leveled, so that every layer printed is leveled, which is essential to guarantee good quality prints.

Nozzle height refers to the perpendicular distance between the tip of the nozzle and the build platform. This value will be used to control the print head's movement, and the accuracy of this value is greatly affecting the print quality and success rate of a print job.

Before the machine was shipped out from the factory, the nozzle height was set to 0. therefore, it is mandatory to calibrate the machine to get the correct nozzle height before the first print.

It is not necessary to do the calibration every time before each print. If you see issues like warping, support being hard to remove or model not sticking to the build plate, it is very possible that the calibration is needed.

6.6.1.Auto Calibration

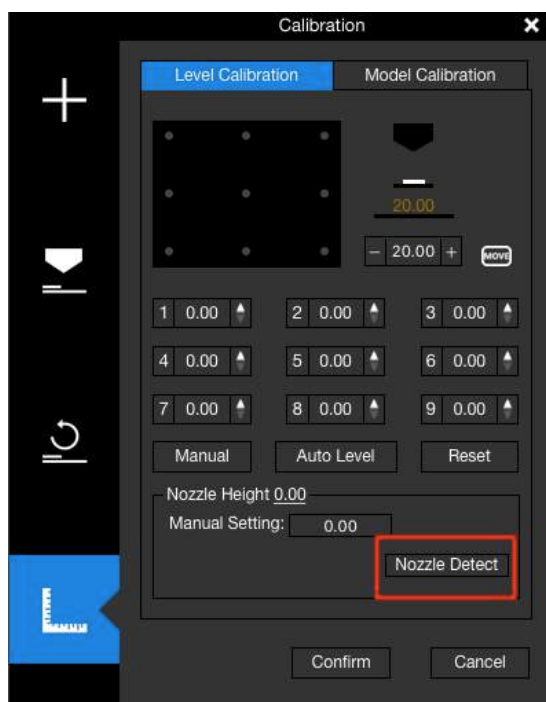


Figure 6.17 Nozzle Detect

Auto Calibration is an automatic process that, once triggered, will automatically adjust the leveling of the build platform, and detect the nozzle height without any human involvement. You can start the process either from the touchscreen, or from the UP Studio software.

Auto Calibration from Touchscreen

Go to the touchscreen on the H+1, click **Calibration**, and press **AUTO**. The printer will start the process of calibration. Follow the instructions on the display and wait until the process finishes.

Auto Calibration from Afina Studio Software

1. Open Afina Studio on your computer,
2. Click **Build** from the menu on the left,
3. Click **Initialize**, and wait for the initialization process finishes
4. Click **Calibration**, and **Auto Leveling**. Follow the instructions on the screen, then wait for the calibrating process to finish.

Auto Leveling

In the Calibration section, click **Auto Level** to initiate auto leveling process. The leveling probe will be lowered and start to probe nine positions on the platform. After probing the platform, the leveling data will be updated and stored in the machine. The leveling probe retracts automatically.

Nozzle height detection will be started automatically after auto leveling process. The print head will move toward the nozzle height detector. Eventually, the nozzle will touch and press the thin metal sheet on the device to make the measurement. Follow the instructions on the screen to complete the process.

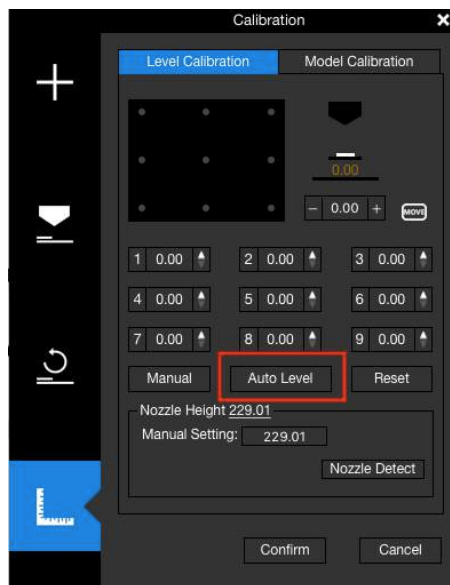


Figure 6.18 Auto Level

2. Manual calibration

Although the Auto Calibration is always the easiest way to calibrate the H+1, some experts in 3D printing always prefer manual calibration over automatic to have full control of the whole process. Afinia Studio provides the manual calibration process in the software.

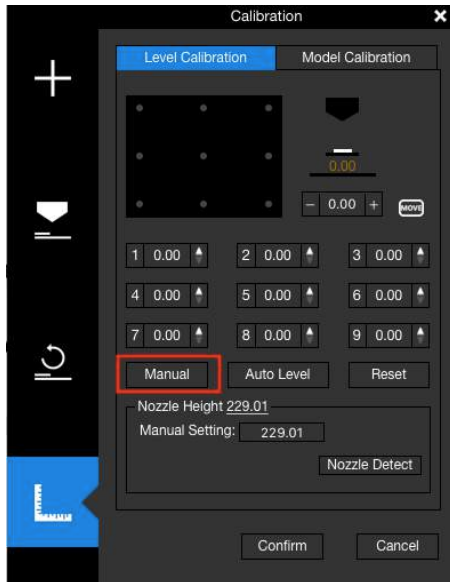


Figure 6.19 Manual

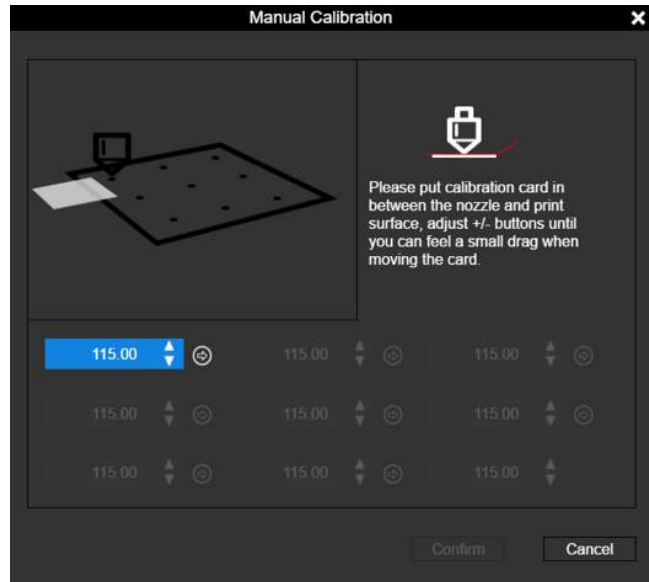
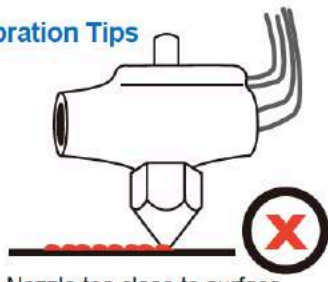


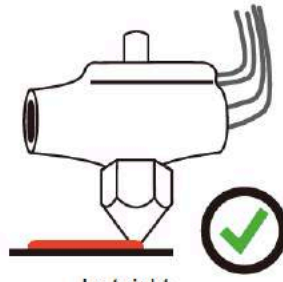
Figure 6.20 Manual Calibration

- a. Open Afinia Studio on your computer,
- b. Click **Build**, click **Maintenance**, and then click **Manual**.
- c. Place the Calibration Card (Find the card in the accessories that comes with the machine) between the nozzle and the print surface, follow the instruction in the software to finish the manual calibration process.
- d. The software will guide you go through 9-point calibration process, and measure the offset of each point.
- e. Adjust the nozzle height using the up/down button at each point, and use the calibration card as the medium between the nozzle and the surface. The ideal distance between the nozzle and the surface is between 0.1-0.2mm, and you will feel a small drag when moving the calibration card if the distance is right. When the height is right for the point, click the arrow on the right of the up/down button, the software will save the offset for the point, and move the print head to the next point.
- f. Make sure all 9 points will have the same degree of drag, so that all 9 points will have the same distance to the surface.
- g. Once the 9-point measurement is finished, click the **Confirm** button to finish the whole process.

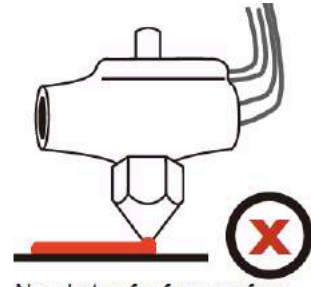
Calibration Tips



Nozzle too close to surface.
Model removal will be difficult.



Just right.



Nozzle too far from surface.
Increased risk of warping.

Figure 6.21 Calibration Tips

3. Model Calibration

Model Calibration – Vertical Calibration

Vertical Calibration. The main purpose of Vertical Calibration is to ensure all three axes are perpendicular to each other in order to guarantee consistent, high-quality prints.

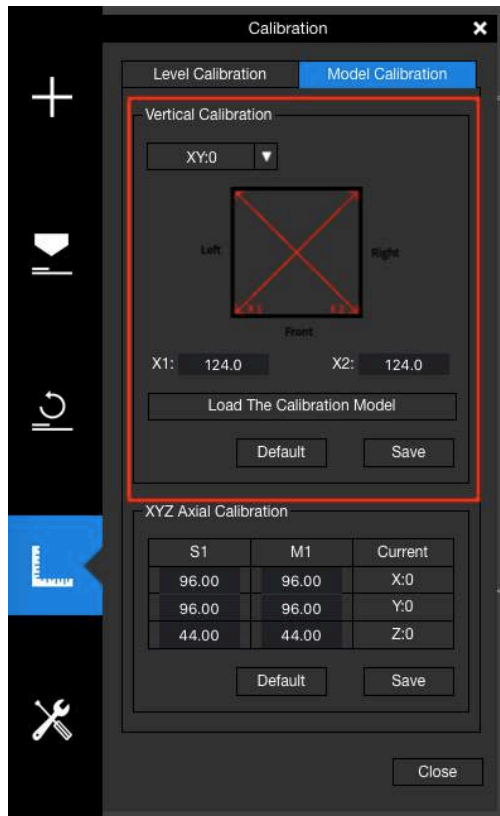


Figure 6.22 Vertical Calibration

a. Find the **VC.stl** in the installation directory of Afinia Studio. Load it in the Afinia Studio software, and follow the normal process to print it.

b. After the model printing is done, take out the build surface with the printed model on it. Don't remove the object from the surface. The printed model includes 4 corners, and 4 L-shapes.

c. In the Afinia Studio Software, find **Model Calibration**. Click **Default** before entering any new values into the edit fields.

d. Perform X/Y measurements. Use a thin ruler or a Vernier scale to measure the diagonal length of the printed model from one corner to the opposite corner, as shown in the figure below for X1. Then, do the same for X2. Enter the values for X1 and X2 into the software.

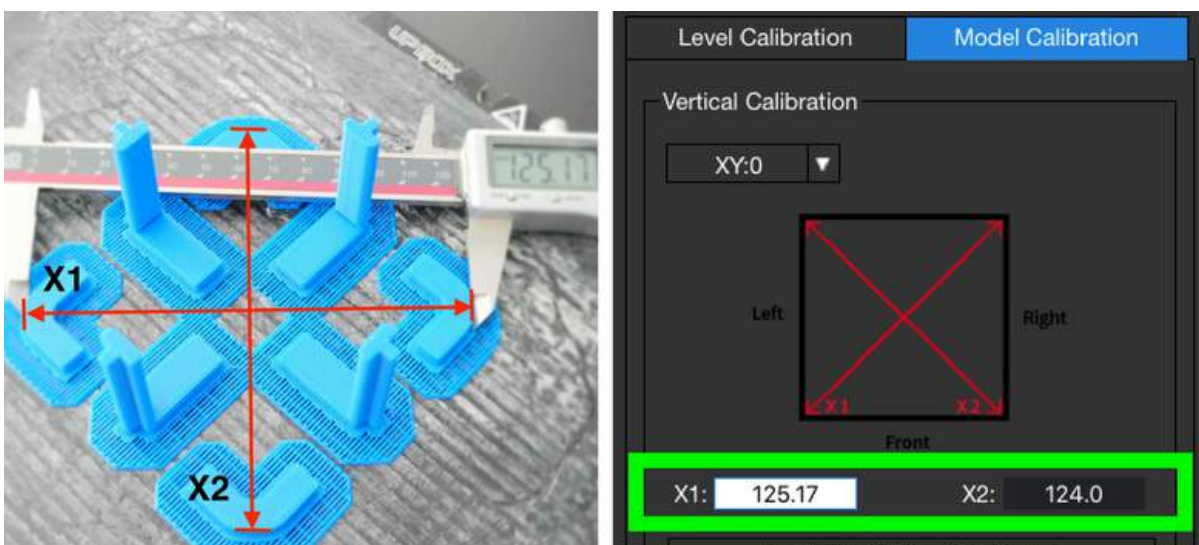


Figure 6.23 X/Y Axis Calibration

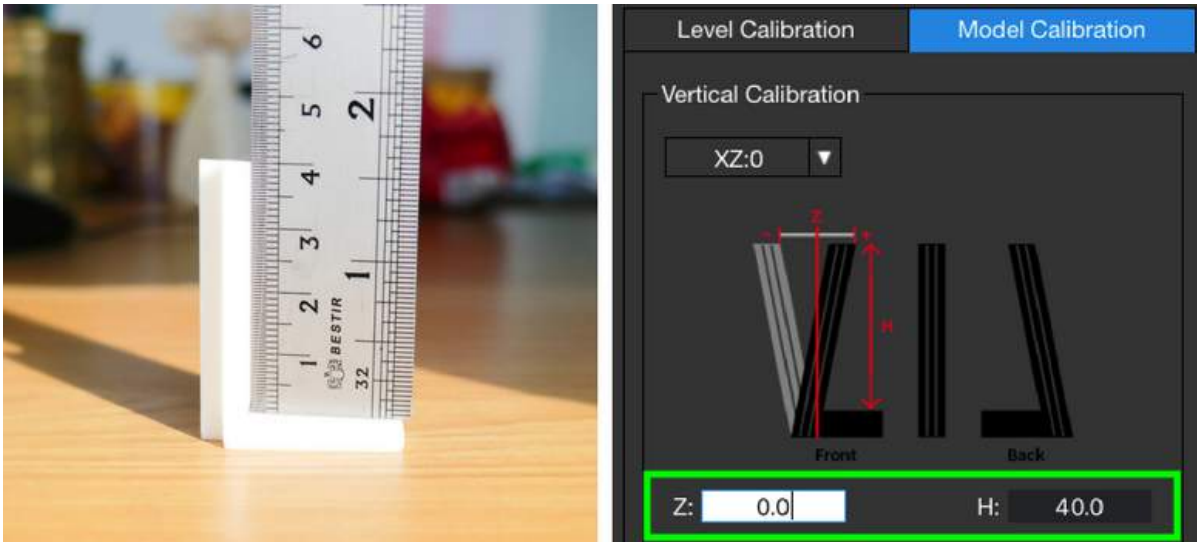


Figure 6.24 X/Y Axis Calibration

e. Click the Confirm button to complete the X/Y axis calibration. The software will round those values to the nearest tenth.

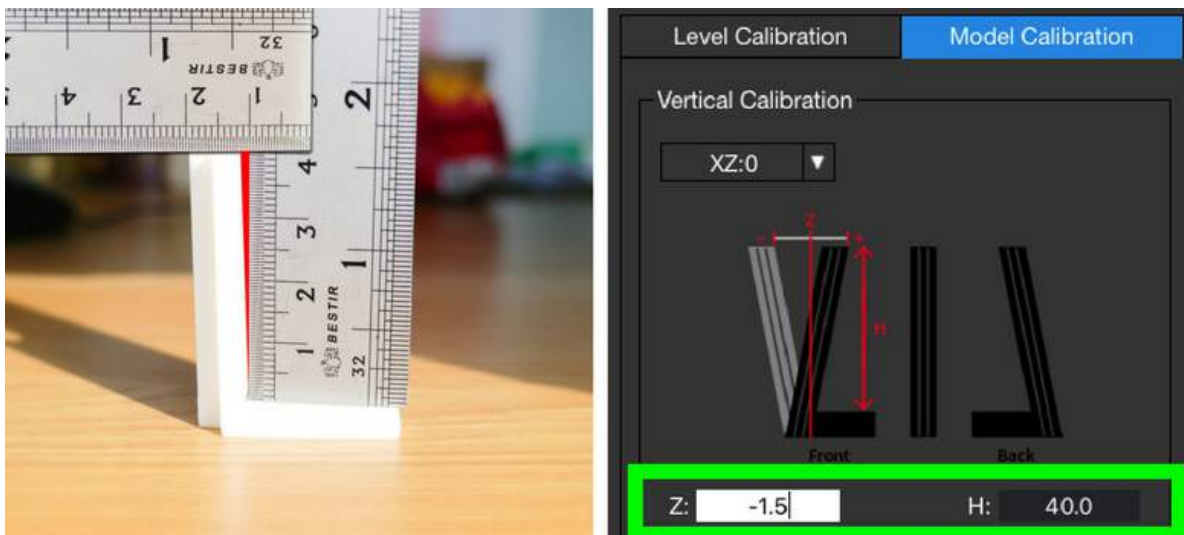


Figure 6.25 Obtuse Angle, Z value will be negative.

f. Click the dropdown menu in the upper left to shift to X/Z mode. X/Z calibration requires measurement of the L-shapes.

Only one L-shape is needed to do the measurement, but all the L-shapes are needed to check in order to find the right one.

First, remove all the L-shapes from the build plate and peel them off the raft. Remember the position of each L-shape on the build plate when peel them off the build plate.

Place them in a position on a table that matches their original position on the print surface – right for right, front for front, etc.

Use a right angle ruler as shown in the following Figure and push the ruler against the corner of each one of the L-shapes. If the angle of the corner of the L-shape is 90 degrees, move to the next L-shape. Continue this process with each L-Shape.

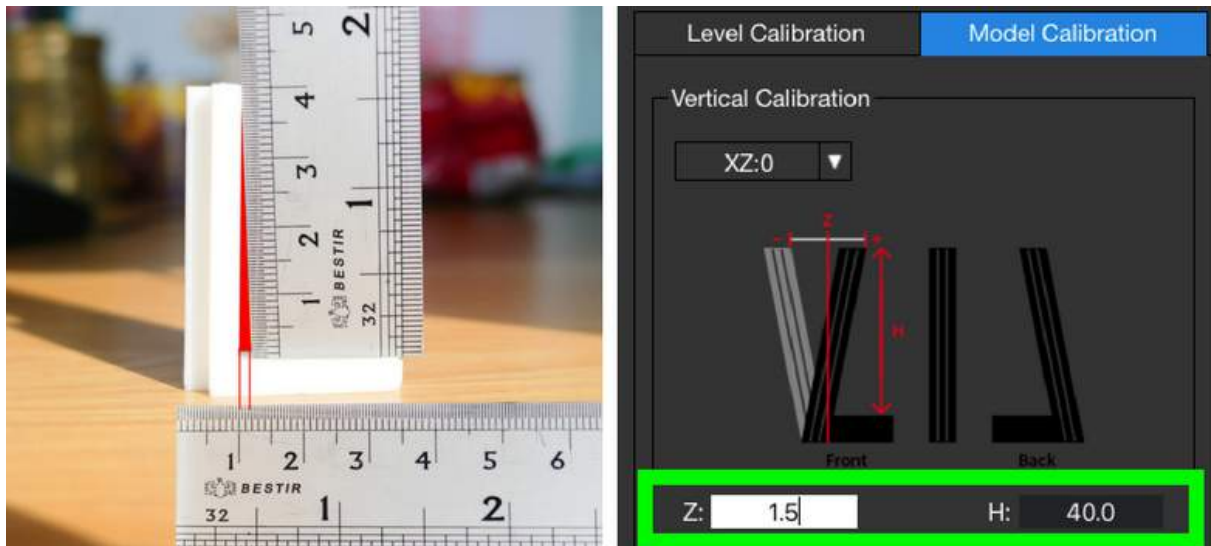


Figure 6.25 Acute Angle, Z value will be positive.

If all the L-shapes are 90 degrees as shown in figure 6.23, enter '0.0' for the Z value and X/Z calibration is done.

If you find one L-shape that is not 90 degrees, it means the X and Z axis are not perpendicular, and it needs to be adjusted. To clarify, you need to look for a gap between the ruler and the L-shaped object. If you find a gap, you have found the L-shape that will provide your Z value and so you need to measure the gap.

The gap will either be at the top of the L-Shape (an obtuse angle) or at the bottom corner (an acute angle), between the ruler and L-Shape. Use another ruler to measure the gap, as shown below. Enter the Z value as a negative number if the angle is obtuse. Enter the Z value as a positive number if the angle is acute.

In our case, for figure 6.24, the value of Z entered is -1.5 mm. For figure 6.25, it is 1.5 mm.

The H value is the measurement of the L-shape's height between the bottom of the ruler sitting on the L-shape's base and top of the L-shape. Theoretically, it is 40.0 mm, and the deviation on the height makes the value otherwise. Enter the height measurement into the H value field.

In the end, do not forget to click the Confirm button to finish the process.

Model Calibration – XYZ Axial

XYZ Axial Calibration is used to improve dimensional accuracy for a specific model. When a printed object is found to be deviating from its theoretical dimensions, we can use this method to correct it and achieve better precision.

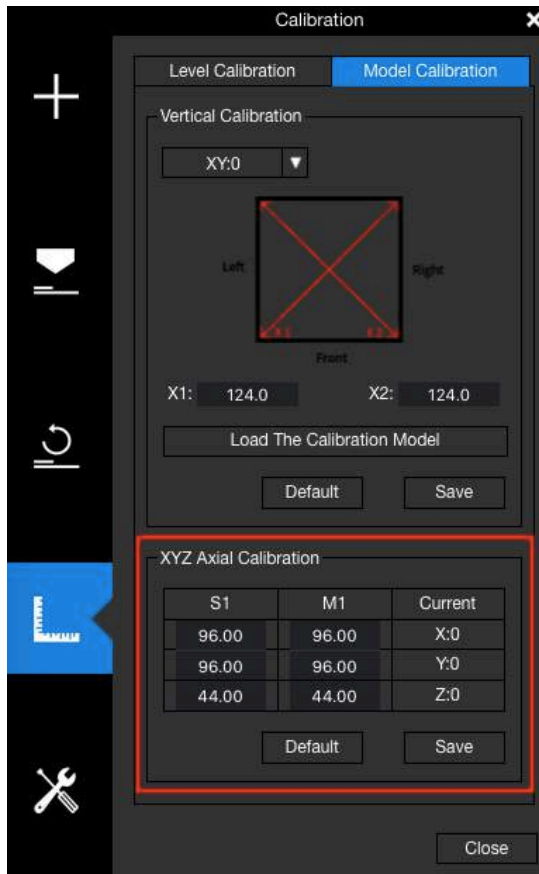


Figure 6.26 XYZ Axial Calibration

To correct the dimensional error, go to **Calibrate**, find **Model Calibration**. Fill in the M1 column with the printed object's actual values and enter the model's correct values into the S1 column.

Click Confirm. The software will save the values and adjust printing parameters to correct for deviation.

Keep in mind, a calibration is only valid for the model used during the calibration process. You may need to redo XYZ axial calibration for a different model in order to achieve maximum dimensional accuracy.

7. Start Printing

7.1 Afinia Studio Interface

Connect your H+1 to the computer, open **Afinia Studio**, click **Build**, and then choose to add a 3D model.

You can use the wheel menu to adjust the model's profile, use Print Settings to define the parameters that are used to process the print job.

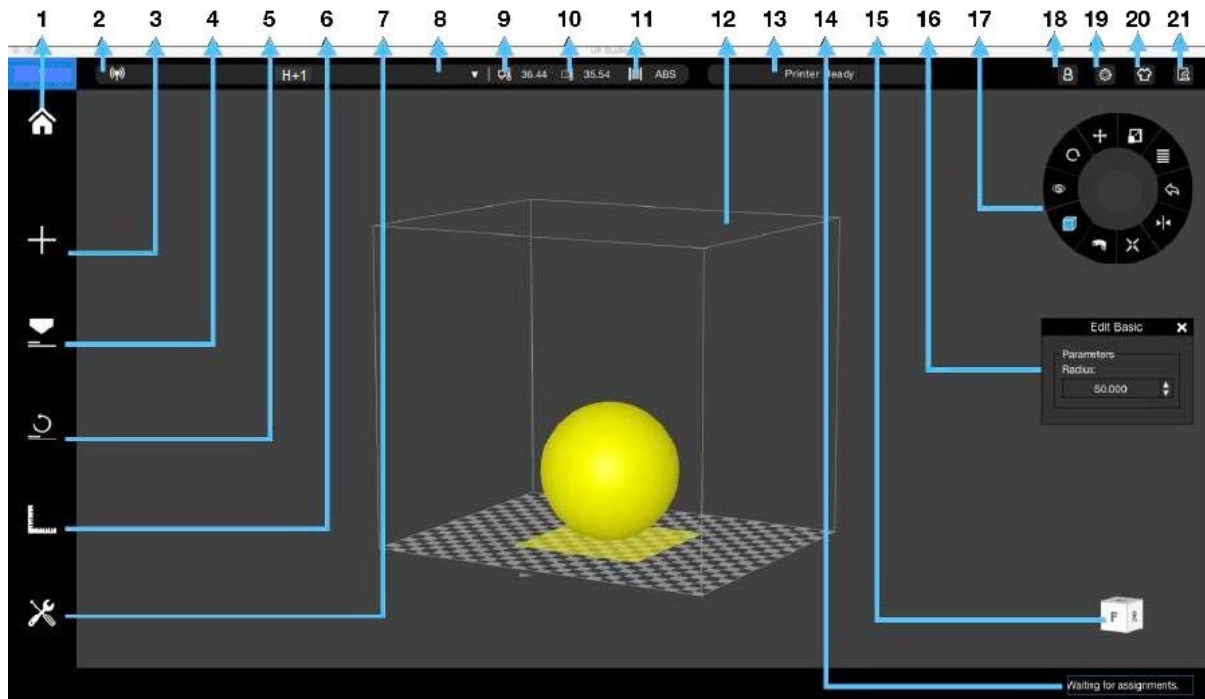


Figure 7.1 Afinia Studio Interface

- | | | |
|------------------------------|-----------------------------|-----------------|
| 1. Home | 8. Connected Printer Name | 14. Settings |
| 2. Add a Model | 9. Nozzle Temperature | 15. Skin |
| 3. Print Settings | 10. Build Plate Temperature | 16. Feedback |
| 4. Initialize | 11. Material Type | 17. Wheel Menu |
| 5. Calibration | 12. Printer Status | 18. My Account |
| 6. Maintenance | 13. My Account | 19. View Cube |
| 7. Printer Connection Method | | 20. Print Queue |

After you finish setting up the printing parameters, click **Print**, the model file will be processed, and sent to the printer for printing.

7.2 Remove the Printed model

To remove the printed model from the print board of the H+1, it is recommended to wear gloves for protection, Take out the print board with its front handle, place the print board on a flat surface perpendicularly, and start scarping the model off the print board from one corner of the model using the scraper that comes with the machine.

Once getting the model off the print board, use the scraper to remove any plastic remains on the print board until there is nothing left on the surface. Place the print board back into the build chamber, and be ready for the next print.

If you begin seeing issues with rafts not adhering well to the print surface, try wiping down the surface with isopropyl alcohol and allowing it to dry. This will remove any oils or debris that may have been transferred to the surface over time.

8. Maintenance

8.1 Clean the Waste Tray

Located at the bottom of build chamber, a waste tray is introduced in H+1. 3D printing with plastic extrusion technology is a messy business. Normally lots of unwanted plastic scraps are generated here and there during printing and the post processing stage. It is a nightmare to clean it up especially for the machine with full enclosure.

The waste tray makes the cleaning work fast and easy. You can take the whole tray out and dump the scraps inside the tray to a dumpster, and put it back to the bottom of the machine.

8.2 Dual Filtration System

The H+1 has an upgraded air filtration system inherited from H800+ with a larger and more effective Dual Filtration System - the HEPA Filter and Activated Carbon Filter. Both of the filters are located inside the build chamber, circulating the air internally to reduce the toxic particles generated during the 3D printing process.

We suggest you change the filter every 3 months, or every 300 hours active printing time.

To change the Filters

The filter system is located at the left side of the build chamber.

1. Use a screwdriver to unscrew the two screws in the front, remove the cover, and take out the two used filters separately.
2. Take two new filters, place them into the slot, and push the slot back to the end.
3. Tighten the screws using screwdriver.



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