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FreeShape 120
User Manual

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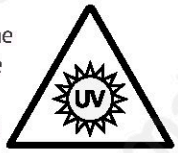
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UV Light Safety



This product uses a light engine that outputs ultraviolet light in the UV-A range, with possible trace amounts in the UV-B range. This product is compliant with the international standard ISO 3059:2012 in accordance with non-destructive penetration testing of UV irradiance. This product encloses the light engine in opaque and UV-filtered material to prevent UV light exposure. However, incidental UV light may extrude from the machine due to any of the following:

- Leaving the door open during usage
- Gaps or holes in the sides of the machine
- Transparent or translucent resins

During operation, do not stand near this product for prolonged periods of time, and do not look directly into the lighted area. Improper exposure to UV light can cause painful eye and skin injuries.

■ UV Protective Gear

Eye Protection	UV light exposure is most potentially damaging to the eyes. Wear UV-filtered glasses, goggles, or a face shield to protect your eyes from the damaging effects.
Gloves	Skin exposure is most likely on the hands, which are oftentimes closest to the product during operation. Wear thick cloth or rubber gloves to protect your hands from UV exposure.
Thick Clothing	Other areas of the skin may be exposed, especially if the product is used in cramped environments. Wear long-sleeved shirts with collars, long pants, and even cloth hats to protect your skin from incidental exposure.
Skin Protective Substances	Topical agents such as sunblock, sun cream, or similar substances can protect against the effects of UV light, but these are generally designed for outdoor use. Do not rely on such substances in lab environments, but use them as an extra layer of protection if necessary.

■ Prolonged Exposure

Eye Exposure	Direct UV-A light into the eye can lead to irritation, temporary blindness, and the forming of cataracts on the lens of the eye. UV-B light can compound the cataract-forming effect, and can also lead to photokeratitis and photoconjunctivitis.
Skin Exposure	Direct UV-A and UV-B light on the skin can cause localized tanning, burning of the skin, and can lead to skin cancer in extreme long-term situations.

Resin Safety



Resins provided by Ackuretta are non-carcinogenic acrylic-based photopolymer liquids that give off a light odor. These resins may cause skin, eyes and respiratory system irritation, and skin sensitivities or allergic reactions by skin contact. Inhalation of a high high-vapour concentration may cause headaches and nausea. Ackuretta recommends the following protective gear when handling photopolymer resins, whether from Ackuretta or from another company:

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■ Resin Protective Gear

Gloves	The hands are the most likely affected area when handling resins. Wear rubber, nitrile, polyvinyl chloride, or other chemical-resistant gloves.
Eye Protection	While using air compressors or due to usage or handling, resin may splash into the eyes. Wear protective goggles, safety glasses with side shields, or a face shield.
Face Mask or Respirator	If the room does not have sufficient ventilation, wear a respirator or medical face mask to protect against inhalation or accidental exposure to the mouth.
Thick Clothing	Prolonged exposure to resin may cause irritation or may cause allergies to develop where they previously did not seem to occur. Wear long-sleeved shirts with collars, long pants, and even cloth hats to protect your skin from incidental exposure.

■ Acute Exposure

Skin Contact	This product may cause skin irritation. Symptoms may include a slightly localized redness or rash and swelling. Repeated exposure may cause sensitization and allergic skin reaction in some individuals resulting in contact dermatitis, severe irritation, dryness and cracking.
Eye Contact	This product may cause eye irritation. Symptoms may include excessive tearing, itching, irritation, blinking and redness.
Inhalation	This product is a suspect slight respiratory tract irritation hazard, especially if used at elevated temperature or processes which may generate aerosols or mists. Symptoms of irritation may include coughing, headache and nausea, mucous production and shortness of breath.
Ingestion	This product may be harmful if swallowed. It may cause nausea, headache, vomiting, diarrhoea, and/or central nervous system effects. Keep all food in an area separate from storage and use locations. Prohibit eating, drinking and smoking in areas where there is a potential for significant exposure to this material. Thoroughly wash hands before eating.

■ Chronic Exposure

Skin Contact	Prolonged contact may cause sensitivities and allergic reactions. People with pre-existing skin conditions may incur more significant irritation. Repeated exposure may cause sensitization and allergic skin reaction in some individuals resulting in contact dermatitis, severe irritation, dryness and cracking.
Eye Contact	Prolonged contact may cause redness of eye tissue.
Inhalation	Prolonged or repeated overexposure may cause irritation, headaches, and nausea.
Ingestion	Prolonged or repeated swallowing may be a slight ingestion hazard. Chronic ingestion of high doses has shown damage to testes in studies with animals.

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■ Disposal

Resins provided by Ackuretta are not readily biodegradable. Releasing these resins into the environment may be illegal according to the regulations in the usage area.

*** Properly dispose of resins in accordance with all applicable federal, state, and local regulations.**

For more information, please refer to the Material Safety Data Sheet for your particular resin.

Cleaning Alcohol Safety

To clean prints, Ackuretta recommends using solutions of 95% ethyl alcohol or 95-99% isopropyl alcohol (IPA). Both compounds are colorless, transparent, and naturally give off strong odors. Both compounds have the following major safety concerns:

- **Highly flammable and potentially explosive.**
- Toxic and can cause adverse conditions from ingestion, inhalation, or direct contact.
- Evaporate quickly so they can become an airborne toxins.



To avoid these potential issues, do the following:

- Store in cool, dry, and well-ventilated areas.
- Label containers with instructions regarding handling and storage.
- Keep away from any sources of heat, fire, and sparks.
- Keep away from strong oxidizers, acetaldehyde, chlorine, ethylene oxide, acids and isocyanates.
- Close containers tightly with a strong seal immediately after use.
- Dispose in accordance with all applicable federal, state, and local regulations.

Adverse conditions may include:

■ Acute Exposure

Skin Contact	This product may cause skin irritation. Symptoms may include skin discoloration, dryness, and cracking.
Eye Contact	This product may cause eye irritation. Symptoms may include excessive tearing, itching, irritation, blinking and redness.
Inhalation	This product is a suspect slight respiratory tract irritation hazard. Symptoms may include nose, throat, and lung irritation, coughing, and/or shortness of breath.
Ingestion	This product may be harmful if swallowed. It may cause nausea, headache, vomiting, and/or unconsciousness. It can also affect concentration and vision.

■ Chronic Exposure

Skin Contact	Prolonged contact may cause sensitivities and allergic reactions. Repeated exposure may cause sensitization and allergic skin reaction in some individuals resulting in contact dermatitis, severe irritation, dryness and cracking. Alcohol can be absorbed through the skin and may result in symptoms similar to those listed under acute ingestion.
Eye Contact	Prolonged contact may cause redness of eye tissue.
Inhalation	Repeated high exposure may affect the liver and the nervous system.
Ingestion	Occupational exposure is unlikely to cause cancer, but direct and repeated ingestion may increase the risk of liver, esophagus, breast, prostate, and colorectal cancers. Pregnant women should not ingest alcohol, and repeated exposure may cause spontaneous abortions, birth defects, and other developmental problems. Repeated ingestion may also reduce fertility in males.

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Contents

About the FreeShape 120

01 Specifications
01 Features
02 Machine Overview
03 Package Contents
03 Machine Console Interface
04 Web Console Interface

Getting Started

05 Unboxing Your Machine
06 What You Need
08 Setup Environment
08 Calibrating Your Build Platform
11 Connecting to Your LAN or Wi-Fi Network

Printing

13 Design Your 3D Model
14 Make Your Print File
15 Attach Your Vat
16 Fill Your Vat with Resin
17 Attach Your Build Platform
17 Print Using a USB Device
20 Print Over a LAN or Wi-Fi Network
22 Print Options

Finishing Your Print

25 Remove Your Print from the Printer
25 Cleaning and Drying Your Print
26 Separate Your Print from the Build Platform
27 Cut Off Supports
27 Cure Your Print in a UV Oven

Configuring Your Printer

28 Machine Settings
31 Upgrade Settings
33 Material Settings

Maintaining Your Printer

36 Using the Clean Vat Function
37 Using Clean Vat from the Web Console
38 Replacing the LCD Panel
43 Replacing the Vat Film

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About the FreeShape 120

Resin-based 3D printing has advanced in several stages, starting from laser-based SLA machines to much faster DLP printers. Ackuretta brings its technical expertise into the next stage of printing with the FreeShape 120, a desktop LCD printer that delivers high-resolution, smooth surface prints at a price point that is ideal for the entry-level market.

Specifications

3D Printing Technology	LCD
Machine Size	25 × 21 × 38 cm
Weight	9 kg
Printing Size	120 × 68 × 140 mm
XY Resolution	38 μm
Slice Thickness	25 - 100 μm
Resin Wavelength	405 nm

Features



Complete Workflow Solutions



Open Material System



High Resolution 47 μm



Smooth Surface Printing



Advanced Software



Wi-Fi Enabled

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Machine Overview

Front Left Side



Right Side



Back Side



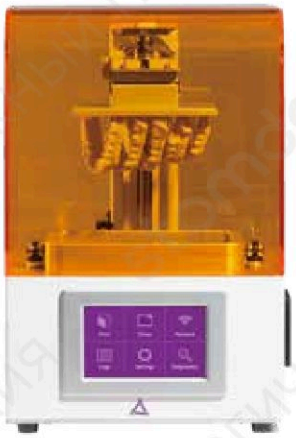


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Package Contents



FreeShape 120



Build platform



Vat



Ethernet Cable



Power Cable



Wi-Fi Dongle

Vat Film Sheets (×2)



LCD Panels (×2)



Hex Key

Machine Console Interface



When you turn on your FreeShape 120, the machine will spend a few seconds loading, and then will arrive on the home screen. The home screen has the following functions:

Settings	Set up your build platform or check that your light engine is working correctly. For instructions on how to calibrate your build platform, see **Build Platform Calibration**.
Files	Upload files to your printer and start the printing process. For more information, see **Print Using a USB Device**.
Reboot	Restart your printer. This is primarily used while setting up a Wi-Fi connection.

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Web Console Interface



Access the web console by connecting your FreeShape 120 to a network, either using an Ethernet cable or over Wi-Fi. The web console has the following functions:

Print	The Print screen is the home screen for the web console. You upload print files from your computer to the Printer Memory and start prints from there. Additionally, you can download or restart previous prints from the Print History, or from a USB device connected to the machine from Printer USB. For more information, see **Print from the Web Console**.
Clean	If your print fails, use the Clean function to remove pieces of prints that did not stick to the build platform during printing. The Clean function cures one layer of resin at the bottom of the vat, and then you can easily remove that cured layer and throw away any lingering debris with it. For more information, see **Using the Clean Vat Function**.
Network	Connect to a Wi-Fi network or a static IP address. For instructions on how to set up a network connection, go to **Connecting to Your Network**.
Log History	View the FreeShape 120 print, system, and error logs.
Settings	Configure your FreeShape 120 system settings, or update your printer firmware. For more information, see **Configuring Your Printer**.
Diagnostics	If your printer encounters a problem, use the Diagnostics functions to determine the source of the issue. For more information about FreeShape 120 diagnostics, send a request email with your FreeShape 120 serial number to **support@ackuretta.com**.

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Getting Started

After you receive your FreeShape 120 printer, you will need to do a little bit of work to get your printer up-and-running. This section describes all of the setup you need to do for your machine, so you can go from package to printing as soon as possible.

The topics covered in this section are as follows:

1. Unboxing Your Machine
2. What You Need
3. Setup Environment
4. Calibrating Your Build Platform
5. Connecting to Your LAN or Wi-Fi Network

1. Unboxing Your Machine

A. Open the printer box.

The FreeShape 120 is visible with attached handles, and 4 smaller boxes are to the side of it.



B. Lift the printer out of the box by the handles.

Place the printer on a sturdy table to make it easier to remove the other parts of the packaging.



C. Remove the additional accessory boxes from the main box.



D. Lift the hood off of the printer and place it to the side.



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E. Remove the machine from the rest of the packaging.

When moving the machine, hold the bottom and the build platform guideway. Be careful not to put your fingers on the vat while moving. Keep the machine vertical, without tilting it backward, so as to not bend or displace critical components.



F. The vat film package is taped to the front of the hood. Remove that package from the hood, and store it in a safe place.

Do not bend vat film or touch the film directly with your hands while moving it.



G. Put the hood back on the printer. You may remove the plastic wrap or leave it on.



H. Remove and store the contents of the 4 accessory boxes.



CABLE: 1 Ethernet cable and 1 power cable

TOOLS: 1 Hex key

PANEL: 2 LCD panels, packaged in bubble wrap

One box is unmarked, and is usually empty.

2. What you need

Beyond the printer, you need several other items in order to make a complete print and use your printer effectively. This section outlines the items that you need to acquire in addition to the items shipped with the printer.

A. Computer

In order to run the Alpha 3D or Omega 3D print software, you will need a computer that meets the following minimum requirements.

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	Minimum	Recommended
CPU	Intel i3 2.0 GHz dual-core AMD Athalon 2.0 GHz dual-core	Intel i7 2.6 GHz quad-core AMD Phenom II X4/ X6 at 2.6 GHz quad-core
GPU	Dedicated GPU with 1 GB RAM	NVidia GeForce 830 AMD Radeon R7 M340
Memory (RAM)	4 GB	8 GB
Disk Space	1 GB	2 GB
Operating system	Windows 7 SP1, 8.1, or 10	Windows 7 SP1, 8.1, or 10
Display	1600 × 900	1920 × 1080

B. Safety equipment – gloves, UV-protective glasses, and a respirator or face mask

C. Cleaning alcohol – isopropyl alcohol (99% solution) or ethyl alcohol (95% solution)

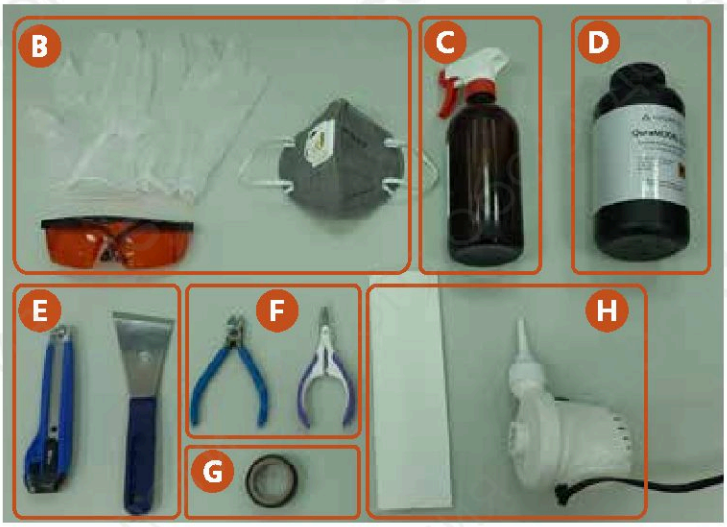
D. Resin – the FreeShape 120 is tested with all Ackuretta Qura- resins, but you may use any 405 nm resin

E. Knife or scraper – to remove prints from the build platform

F. Wire cutters or scissors – to remove supports from your prints

G. Electrical tape – to hold the LCD panel in place after replacement

H. Drying tools – air compressor is preferred, but you can also use a handheld blower or tissues for most prints



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3. Setup Environment

Consider the following when choosing where to set up your FreeShape 120 and your printing work space.

A. Temperature: 18° - 25° C

Keep your printer and your resins in a dry, temperature-controlled room around 22° C (72° F).



Resins become more viscous when they are too cold. If the environment is around 15° C (59° F), Ackuretta recommends increasing all curing times by 15%. Even colder temperatures may require increasing curing times further or may cause print failures.



Similarly, resins may become very thin in hot temperatures. If the environment is hotter than 35° C (95° F), resins may overcure or may melt during the print process.

B. UV-Filtered Lighting

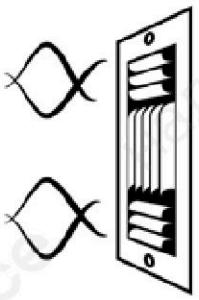
The UV-protected hood of the FreeShape 120 protects the resin from outside lighting while the hood is on the printer. As you use the printer, the door will be opened many times, and the resin will be exposed to outside light.



To protect the resin, set up the printer in a place where the lighting is controllable or covered by a UV filter. Similarly, use the same UV filtering in your finishing space and your resin storage location.

C. Ventilation

Resins and cleaning alcohol evaporate over time like all liquids. These substances can be corrosive to other equipment and may be harmful if inhaled over a long time.



Keep your printer, resins, and your cleaning work space well ventilated at all times. Avoid lingering in the same room with uncovered resins for a long period of time.

4. Calibrating Your Build Platform

Adjust the fit of your FreeShape 120 build platform when you first open your machine. If you do not calibrate your build platform, your prints may be uneven, or you may encounter print failures. After calibrating once for the machine, you do not need to calibrate your build platform again, unless you use it on a different FreeShape 120, or unless you purchase a new build platform.

Start your build platform calibration with a dry, clean vat and build platform.

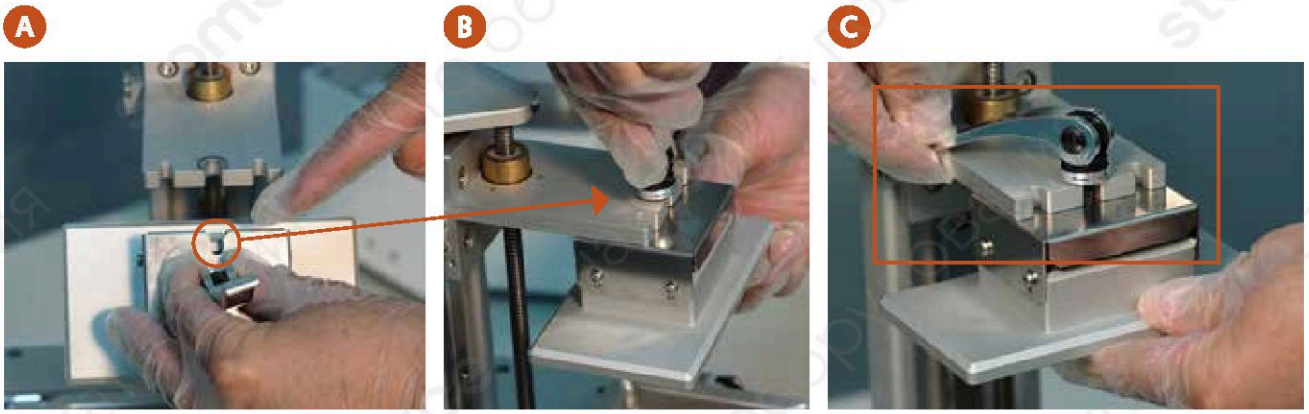
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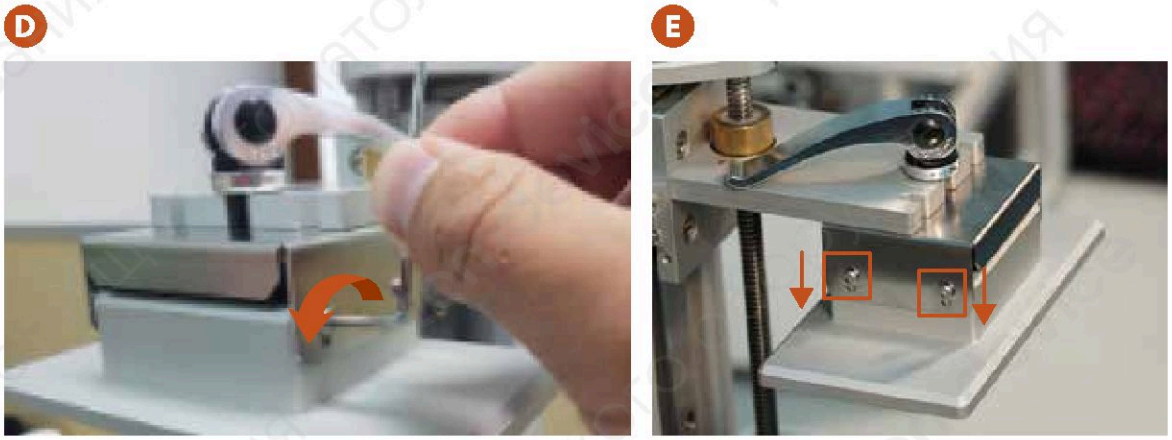
Your FreeShape 120 comes with a build platform attached. If you remove your build platform, attach your build platform securely before calibrating.

A. Turn your build platform so the hole in the top of the platform is facing toward the printer.
B. Pull the rubber stopper up as you slide the build platform into the guideway on the printer.
C. Push the handle backwards and down so the handle touches the platform.



Note:
Turn the handle backwards, not forward or to the side. If the handle is turned the wrong way, or is pushed down too far, the build platform will become unstable, which can affect print performance.

D. Use the hex key to loosen the 4 hex screws on the build platform.
E. The build platform hangs loosely.

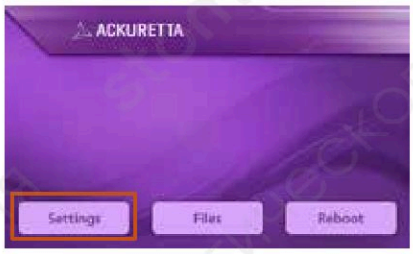


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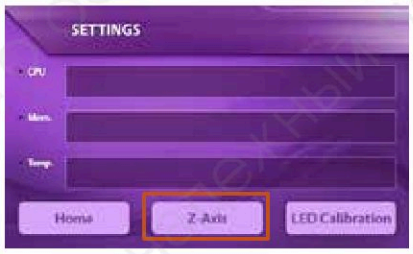
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F. Turn on your printer and then go to **Settings**.
G. Press **Z-Axis** to go to the Z-Axis Adjustment screen.
H. Under **Auto** press **Adjust**.
I. Press **Next**.
J. The build platform starts to move down.

F



G



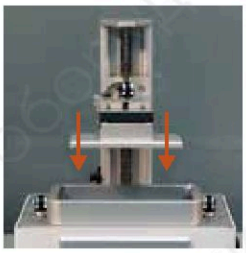
H



I



J



K. When the build platform stops on the vat, press down on the build platform, so it rests flat on the vat surface.
L. While holding the platform down, tighten the 4 hex screws. Interchange tightening the left side and right side of the platform to ensure that the platform stays flat during the tightening.

K



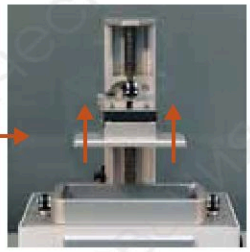
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M. Press **OK**. The build platform moves back up.

M

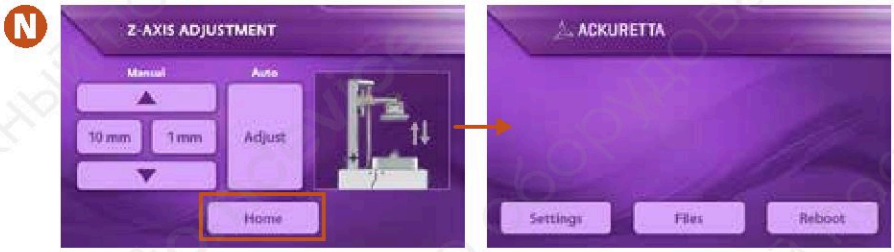




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N. When the build platform moves to the top, press **Home**.



5. Connecting to Your LAN or Wi-Fi Network

Connect to a Wi-Fi network or LAN so that you can access the printer and start up prints from your internet browser.

The FreeShape 120 arrives with a Wi-Fi dongle attached to one of the USB ports. If you want to connect to your Wi-Fi network, ensure that your dongle is connected before starting this process.

A. Connect your FreeShape 120 to either your router or directly to your computer using the Ethernet (LAN) cable.



B. The FreeShape 120 automatically generates an IP address. The IP address appears on the machine console.

C. Open an internet browser while on the same network as the FreeShape 120 and type the IP address shown into the address bar. The FreeShape 120 web console opens.



Note:
If you only wanted to establish a LAN connection, your task is complete. If you want to set up a Wi-Fi connection, continue to the next steps.

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D. Click the **Network** tab in the toolbar on the left side of the browser.

E. Turn **ON** the setting next to **Connect printer to Wi-Fi network**.



F. Select a network and press **Connect**.

G. If the network has a lock symbol (🔒), you will be prompted to input a network password. Enter the Password and click OK. If the connection is successful, the network will display "Connected" next to its network name.



H. Once connected, the machine console will display 2 different IP addresses:

Top IP address: Wi-Fi connection

Bottom IP address: LAN connection



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I. You may now disconnect the Ethernet cable. Your FreeShape 120 will remember your Wi-Fi network. Only the Wi-Fi IP address will remain on the FreeShape 120 console.



FreeShape 120

Printing

After you set up your FreeShape 120, the next step is to get your first print up and running. This section describes the basic process for getting your printer ready and starting up a print.

The topics covered in this section are as follows:

1. Design Your 3D Model
2. Make Your Print File
3. Attach Your Vat
4. Fill Your Vat with Resin
5. Attach Your Build Platform
6. Print Using a USB Device
7. Print Over a LAN or Wi-Fi Network
8. Print Options

1. Design Your 3D Model

The most important part of using a 3D printer is having the 3D model to print from. Ackuretta printers and software work best using 3D models saved in STL format.

The following are some examples of software you can use to make your 3D model from:

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Dental

- ExoCAD DentalCAD
- 3Shape Dental System



3shape

Jewelry

- Gemvision RhinoGold
- 3Design Software Solution

RG RhinoGold®

3DESIGN SOFTWARE SOLUTION

Engineering

- Dassault Systèmes SolidWorks
- Autodesk Inventor

SOLIDWORKS

AUTODESK.

2. Make Your Print File

Ackuretta provides a variety of different software solutions to match your industry or application. Import your STL or other design file into your Ackuretta software, support your print, and use the built-in slicer to make your print file.

The FreeShape 120 supports the following Ackuretta software:

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Alpha 3D

Alpha 3D offers ease-of-use for quick and simple print placement and processing. With automatic mesh repair, automatic supports, and automatic nesting, you can load your prints into your machine in minutes.



- **Print file type: .ibf**
- Project file type: .i3dp
- Supported input file types: .stl, .tri

Omega 3D

Omega 3D uses the most flexible supporting system available for 3D printers. Make every part of your supports exactly as strong as you want, or use the fast and accurate automatic supports to give you a head start.



- **Print file type: .sbf**
- Project file type: .pyr
- Supported input file types: .stl, .fbx, .blend, .obj, .dfx

3. Attach Your Vat

Your FreeShape 120 comes with a vat or resin tank attached. If you remove your vat and need to reattach it, do the following:

A. Place the empty vat on the LCD panel, so the metal grooves on the sides line up with the handle holes.



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B. Hold the rubber stoppers of the handles and slide them inward toward the vat.

B 

C. Turn the handles backwards and down so the handles touch the metal base.

- If you turn the handles toward the front or to the sides, the handles may interfere with the door.

C 

Warning:
Do not touch the vat film and do not place the vat directly on tables with the film side down. If the vat is empty, place the vat upside-down on tables. If the vat has resin, place 2-3 tissues under the vat to protect the vat film from scratching or other damage. For more information, see **Vat Storage**.

4. Fill Your Vat with Resin

If any resin is in the vat, stir the resin with a rubber spatula. Then shake your resin bottle for at least 2 minutes so that the resin is thoroughly mixed.

A. After shaking, slowly pour resin into the vat.

A 

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B. The minimum level of resin should be at least 2 mm of resin over the whole vat surface. The maximum amount of resin should be no higher than the resin level in the vat.

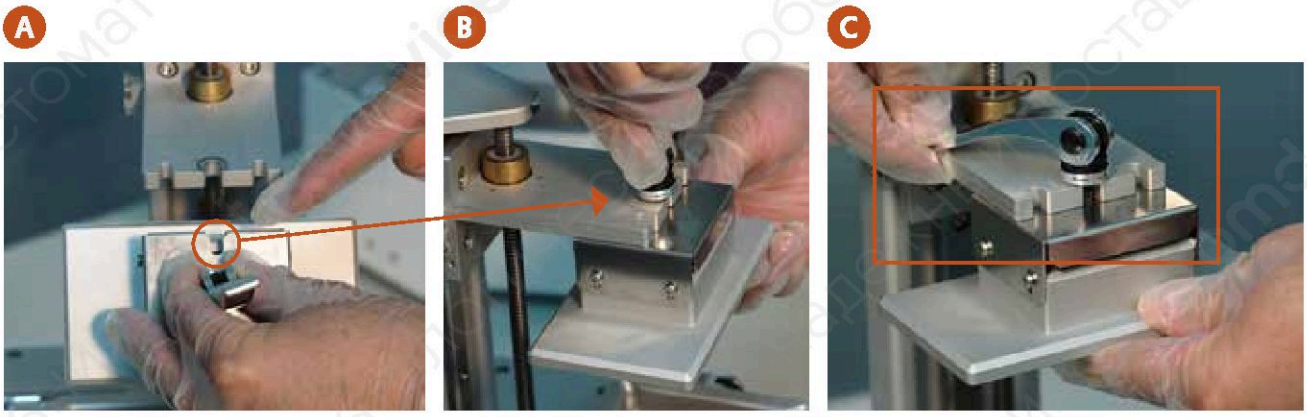


5. Attach Your Build Platform

A. Turn your build platform so the hole in the top of the platform is facing toward the printer.

B. Pull the rubber stopper up as you slide the build platform into the guideway on the printer.

C. Push the handle backwards and down so the handle touches the platform.



Note:
Turn the handle backwards, not forward or to the side. If the handle is turned the wrong way, or is pushed down too far, the build platform will become unstable, which can affect print performance.

Your build platform must be calibrated before printing. For more information, see **Calibrating Your Build Platform.**

6. Print Using a USB Device

There are two ways of starting a print on the FreeShape 120:

- Attach a USB device with the print file to the printer, and then use the printer console to start the print
- Connect the printer to a LAN or Wi-Fi connection and use the web console to print.

This section describes the former of those two options. To print over a network connection, skip ahead to **Print Over a Wi-Fi or LAN Network**.

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A. Copy your IBF or SBF file to your USB device. Connect your USB device to any of the USB ports on the back side of the FreeShape 120.

For more information about making a print file, see **Make Your Print File**.

A



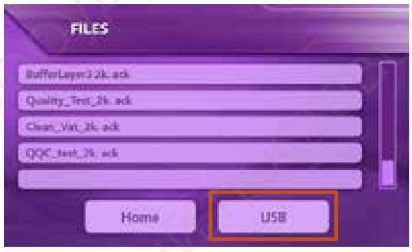
B. On the FreeShape 120 console, go to **Files**.

B



C. On the FILES screen, press **USB**.

C

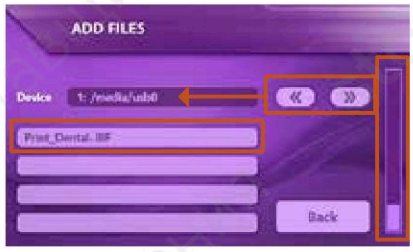


Note:
On the **Files** screen, all previous prints you have uploaded to the FreeShape 120 are available, as well as a few default print files from Ackuretta.

D. Find and press the file that you wish to print.

- Press the << or >> buttons to choose your USB device if you attached more than one USB device.
- Slide the scroll bar on the right side to find your print file.
- Press the print file that you want to print.

D

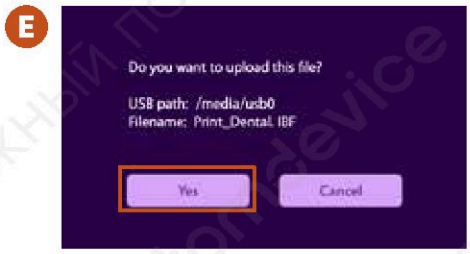


Note:
The FreeShape 120 only supports files in IBF or SBF format. For more information about software and file types, see **Make Your Print File**.

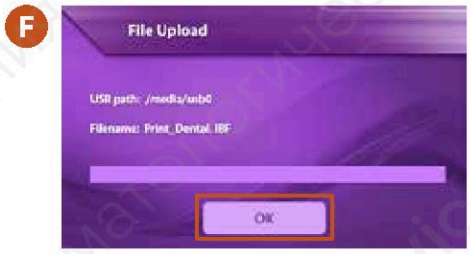
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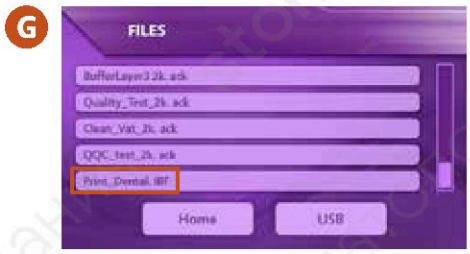
E. Confirm that you want to upload the print file by pressing **Yes**.



F. After the file is uploaded, confirm again by pressing **OK**. You will return to the home screen.

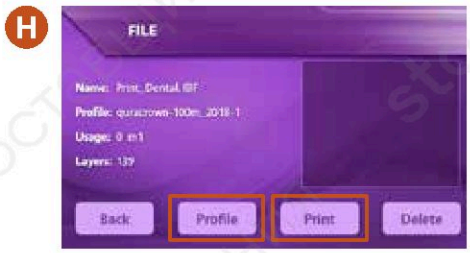


G. On the Home screen, press **Files** again. On the FILES screen, your print file now appears. Press your new file.



H. A screen appears to show the details of your print file.

Press **Print** to begin your print.



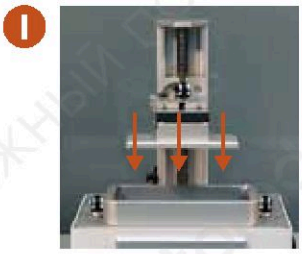
Note:
If your resin profile is incorrect, press **Profile** to change your resin settings. If you are using an Ackuretta resin profile from Alpha 3D or Omega 3D, your resin profile will be automatically set from the software.

If you are using a third-party resin, you may need to adjust your resin settings. Ackuretta recommends setting your resin profiles from a LAN or Wi-Fi connection using the web console. See **Material Settings** for more information.

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I. The build platform moves down, and your print begins.



7. Print Over a LAN or Wi-Fi Network

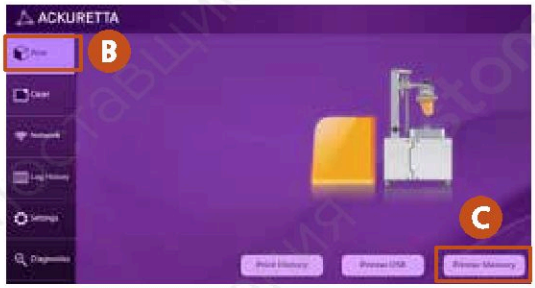
If you have connected your printer to a LAN or Wi-Fi network, instead of printing by USB, you can print from an internet browser on your PC or your mobile device. For instructions on how to set up your FreeShape 120 for browser use, see **Connecting to Your LAN or Wi-Fi Network**.

A. Type the IP address on your FreeShape 120 into an internet browser using a computer or mobile device on the same network. The FreeShape 120 web console opens.



B. Go to the **Print** screen.

C. To upload a new print from your computer, click **Printer Memory**.



Note:
Alternatively, the web console can access and print from USB devices connected to the FreeShape 120 through **Printer USB**. Your most recent prints are stored in the **Print History**, which you can use to reprint items, or download them back to your computer.

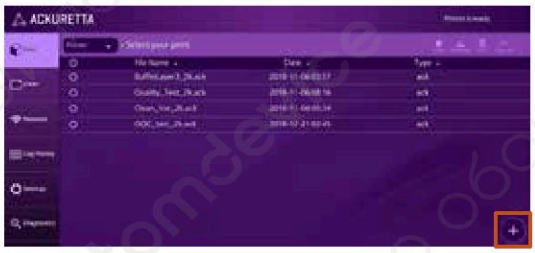
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D. Click + icon to browse your system for print files.

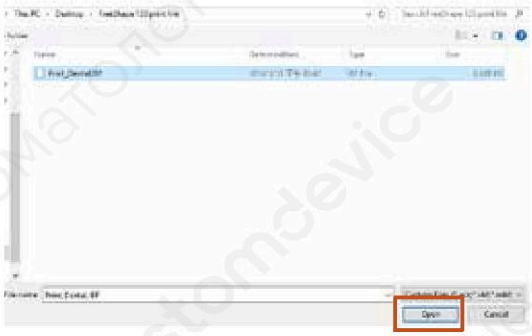
D



E. Browse for your print file and click **Open**.

The FreeShape 120 only supports files in IBF or SBF format. For more information about software and file types, see **Make Your Print File**.

E



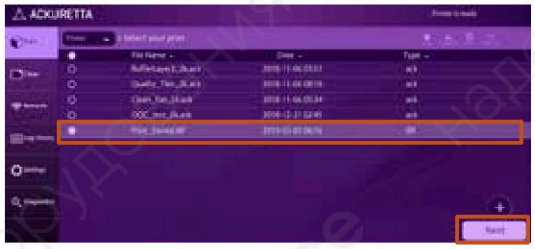
F. The FreeShape 120 uploads the file to the printer.

F



G. Select the print file you uploaded, and then click **Next**.

G



H. If your print file uses an Ackuretta material, your resin is automatically chosen.

You can adjust material settings at this time, or you can select a resin from the **Material list** .

For more information about configuring your own resin parameters, see **Material Settings**.

H



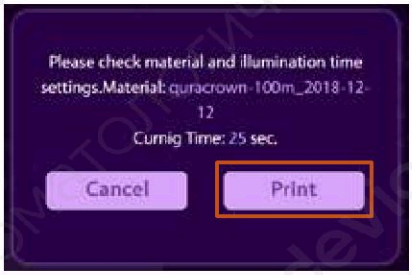
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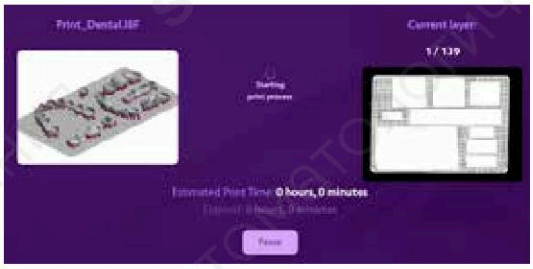
I. After you have chosen your resin parameters, click **Print**.



J. A dialog box appears. Confirm your settings and click **Print**.



K. Your print begins.



8. Print Options

While the machine is printing, you can pause or stop the print at any time from the printer console or the web console.

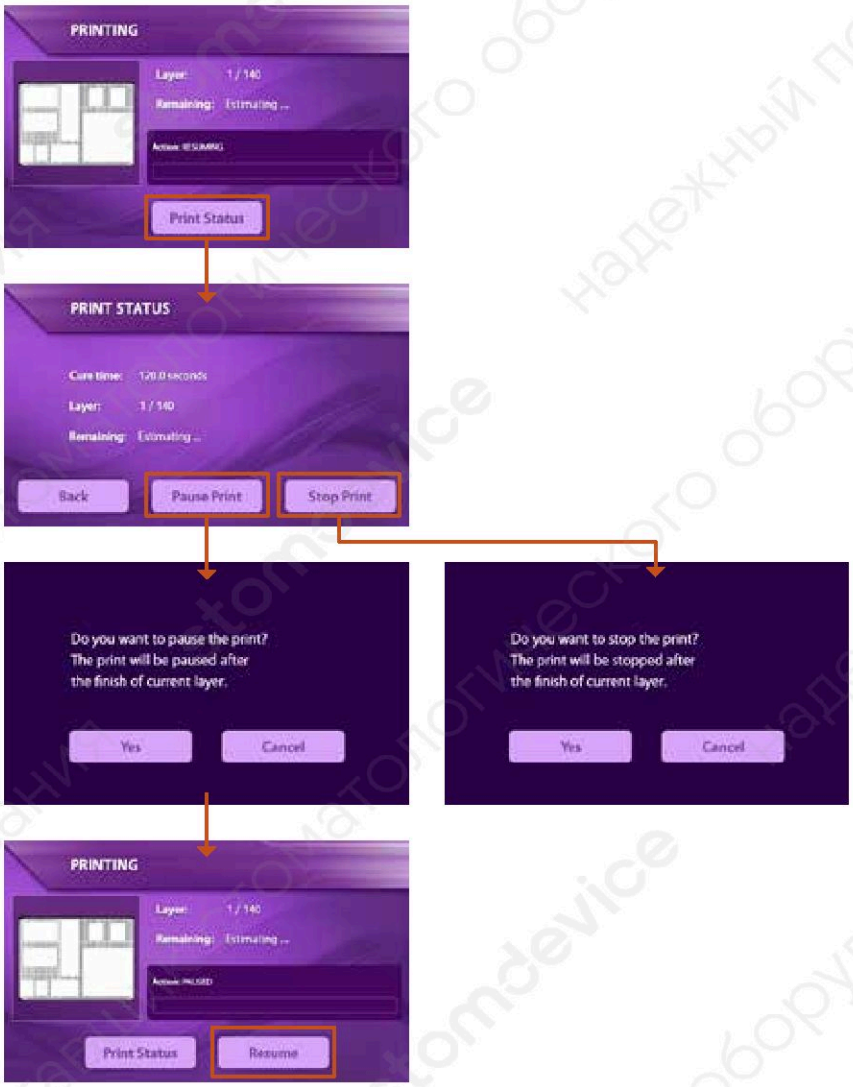
- **FreeShape 120 Console Options**
  - **Print Status**
    View the print information, and access the other print options from the Print Status screen.
  - **Pause Print**
    Temporarily pause the printer. This may be useful to check whether a print has failed, or to add resin. When you pause, the printer finishes printing its current layer before other options are available.
  - **Resume**
    If the print is paused, you may continue printing.

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- **Stop Print**
  The printer will completely stop its print so you can clean the platform and begin printing a new print. **You cannot undo this action.**

  When you stop, the printer finishes printing its current layer before returning to the home screen. When the layer is finished, the build platform will move back to the top position.



Web Console Options

- **Pause**
  Temporarily pause the printer. This may be useful to check whether a print has failed, or to add resin.

  When you pause, the printer finishes printing its current layer before other options are available.

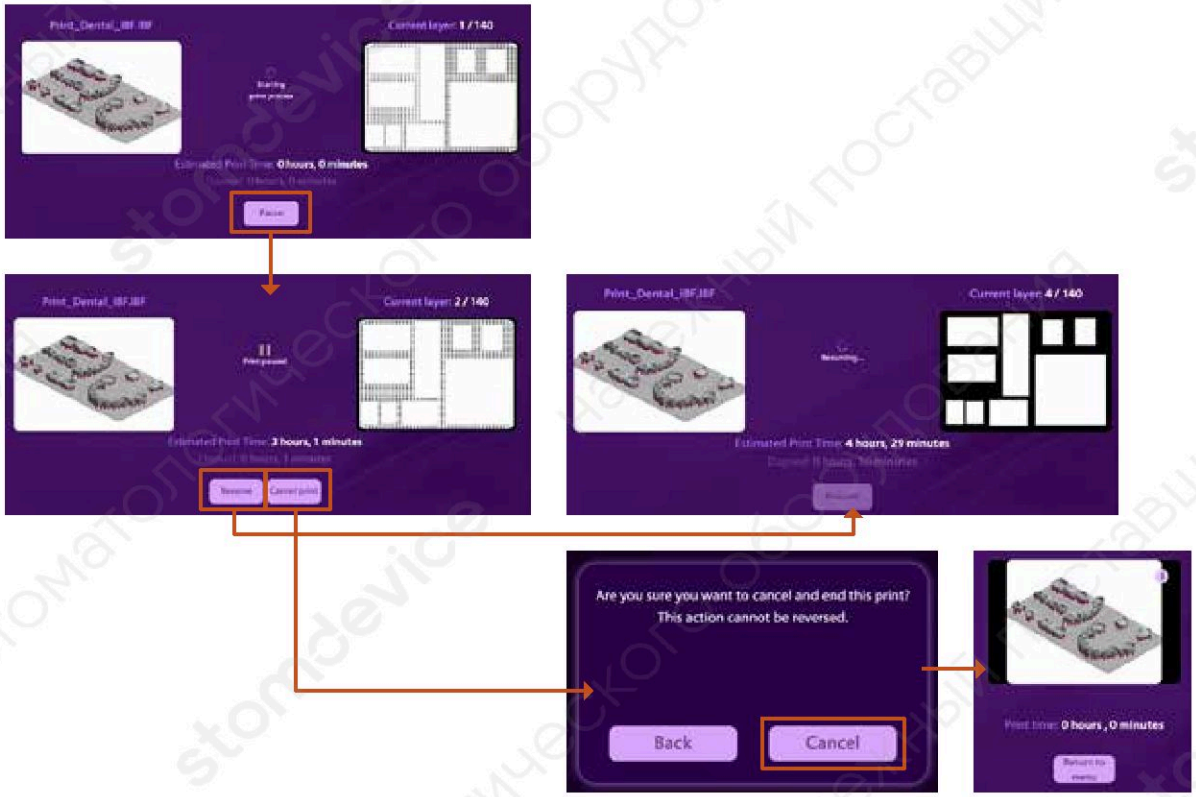
- **Cancel Print**
  The printer will completely stop its print so you can clean the platform and begin printing a new print. **You cannot undo this action.**

  After you press **Cancel Print**, the printer will finish printing its current layer. When the printer has completely stopped, the build platform will move back to the top.

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- **Resume**
  If the print is paused, you may continue printing.



FreeShape 120

Finishing Your Print

After the FreeShape 120 finishes your print, the print still requires some preparation before it is ready for polishing, casting, or applying to a machine or a patient.

The order of the process is variable, as most steps can be done before or in between others. Generally, the process is as follows:

1. **Remove Your Print from the Printer**
2. **Cleaning and Drying Your Print**
3. **Separate Your Print from the Build Platform**
4. **Cut Off Supports**
5. **Cure Your Print in a UV Oven**

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1. Remove Your Print from the Printer

A. The build platform returns to the top when your print is finished.

B. Turn the build platform handle upward. The platform hangs loosely off the guideway.

C. Pull the build platform outward to remove it from the printer.

D. The print has residual liquid on it from the vat. Turn the platform over quickly to keep your environment clean.



Tip:
You can use a rubber spatula or air blower to push resin off of the build platform back into the vat to save resin.

2. Cleaning and Drying Your Print

Most resins are somewhat shiny when they are uncured, and turn to a matte appearance when they are properly cured and dried. The goal when cleaning the print is to remove all uncured resin from the print so that the entire print has no remaining wetness or glossiness.

Typically, you will need to do the following steps multiple times:

A. Spray your print liberally with cleaning alcohol to rinse off residual material. Ackuretta recommends using ethyl alcohol (95% solution) or isopropyl alcohol (99% solution).

B. Use a blower or air compressor to dry your print, pushing away the resin and dirty alcohol. Turn the print as necessary while blowing, and make sure you focus on small holes and places where liquid can get trapped.



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If you have an ultrasonic cleaner or cleaning bath available, you may soak the print to make cleaning easier. Usually you should do this after separating the print from the build platform.

C. Submerge the print into a bath of cleaning alcohol or an ultrasonic cleaner. For most prints, Ackuretta recommends soaking for about 2 minutes.

After soaking the print, dry the print with your air blower or compressor, and then perform additional fine cleaning if necessary.

C 

3. Separate Your Print from the Build Platform

A. Hold the print at an angle.

A 

Tip:
Place tissues or a soft cardboard box below the print to catch the print and excess resin. Wear tough, cut-resistant gloves to prevent injury if your print is too firmly attached to the platform.

B. Slide a utility knife or scraper under one corner of the print. Pull the knife under the print to separate one side from the build platform.

B 

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C. Continue sliding the knife through to the other side of the print.



D. Your print detaches from the build platform. Hold your print securely toward the end of the separation, or allow the print to fall into a soft, safe surface.



4. Cut Off Supports

Cut off large supports with scissors, wire cutters, or an ultrasonic cutter.

With tiny supports, cut the support at the base first, and then do a second cut near the print.





5. Curing Your Print in a UV Oven

The 3D printer cures the resin to a certain level, but the print usually cannot be fully cured by the printer alone. After printing, cleaning, and drying, place your print in a UV oven for final curing.

The Ackuretta UV oven is tested and certified for all Qura- resins. Dreve, Keystone, and other resin suppliers may have preferred UV ovens to use with their materials. See your resin supplier for details about which UV ovens they recommend that you use.





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FreeShape 120

Configuring Your Printer

Confiture your printer from the Settings tab. Whenever you modify a setting in this tab, the printer applies the setting immediately, so be careful with which settings you adjust, and record the previous settings before modifying.



Machine Settings

This screen shows the system wide settings and information.



- **Save log to USB device**

  If you encounter a problem with your printer and contact Ackuretta Support, Ackuretta may request your log file in order to perform important system or print diagnostics.

  To obtain your log file:

  1. Attach your USB device to a USB port on the rear side of the FreeShape 120.

  2. Go to FreeShape 120 web console, and click **Save log to USB device**.



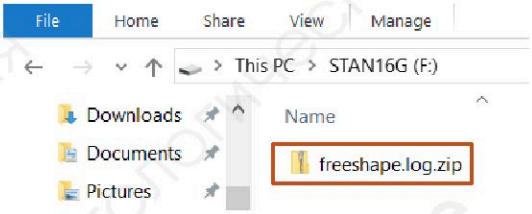
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3. Confirm your selection by clicking **Download**, and when the download completes, click **OK**.



4. The log file will be named **freeshape.log.zip**. Email the complete ZIP file to **support@ackuretta.com** .



- **Set Timezone Offset**

Set your time zone in order to show the actual time of your system in log files. The Timezone function will not affect print performance or any other function of your printer.

1. Go to FreeShape 120 web page, and click **Set Timezone Offset**.



- Toggle either + or - to set if your time zone is before or after UTC 0:00.
- Set the amount of hours offset in the space before the colon (:).
- If your time zone has a minute offset, set that offset in the space after the colon (:)

2. After your setting is complete, click the **Set Timezone Offset button**.



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- **Ignore Fan Error**

  If any of the fans in your Freeshape 120 is not working, the machine can automatically stop printing. This can prevent heating problems which can damage internal components.

  By default, this setting is turned **ON**, which means the printer will not stop printing even if there is a fan problem.



- **Firmware version**

  The currently installed version of the FreeShape 120 firmware.

  For information about how to update the FreeShape 120 firmware, see **Update Settings**.



- **Machine ID**

  The unique ID for this FreeShape 120. This is not the same as the serial number, which is affixed to the back side of the printer.



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- **Storage Used**

The Diplo has 16 GB of on-board storage. About 2 GB of that storage is dedicated to the FreeShape 120 firmware and is inaccessible.

If your storage is nearly full, go to **Print > Printer Memory** to remove some print files.



Upgrade Settings

Check your FreeShape 120 firmware version and update your firmware from this screen.



- **Firmware version**

The currently installed version of the FreeShape 120 firmware.



- **Upgrade firmware from USB device**

Click this button to check your USB for a new firmware version and begin installation. Use this method of firmware installation only if your FreeShape 120 is not connected to an internet-enabled connection.

1. Move the firmware package to your USB device. Save it in the root folder of the USB device, not in any subfolders.

2. Attach your USB device to a USB port on the rear side of the FreeShape 120.

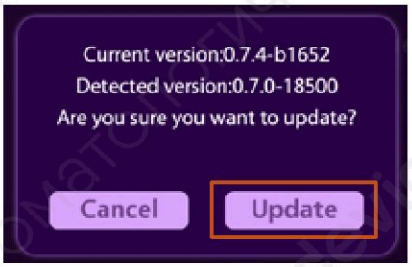
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3. Click **Upgrade firmware from USB device**.



4. The machine will check your USB device for an update, and if one is found, an update screen will appear.
5. Confirm by clicking **Update**.



6. The FreeShape 120 will automatically reboot after the update is complete.



- **Upgrade firmware online**

The FreeShape 120 will automatically search the latest firmware from the Ackuretta web server.

1. Ensure that you are connected to an internet-enabled network. Turn off firewalls and antivirus if necessary.
2. Click **Upgrade firmware online**.



3. The machine will check for an update from the Ackuretta server, and if one is found, an update screen will appear.



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4. Confirm by clicking **Update**.



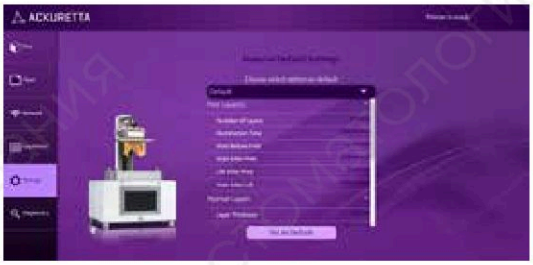
5. The FreeShape 120 will automatically reboot after the update is complete.



Material Settings

The FreeShape 120 printer stores settings for all Ackuretta materials. You can modify or add materials from here.

If you upload a print file using an Ackuretta resin in Alpha 3D or Omega 3D, the FreeShape 120 automatically detects the resin profile and prints using the settings stored in the printer. If you use the "Resin Test" profile in Alpha 3D, or any non-Ackuretta resin in Omega 3D, you will additionally need to set a material setting on the FreeShape 120.

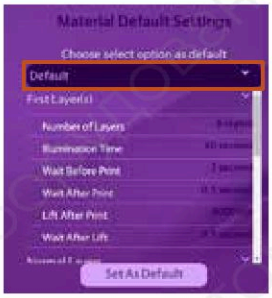


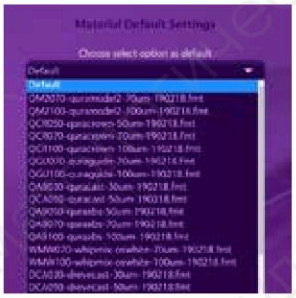
Choosing Your Setting

Click the dropdown to expand the Material List. Choose any material to see the settings.

One option is called "Default". If you choose a material and click **Set As Default**, the default material will be overwritten with the settings of that resin.

After you have chosen a setting, adjust the fields as described below. Your settings will be changed after every modification.





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- **First Layer(s)**

  The printer will add additional curing to the first layers of the print. This ensures that the print does not fall from the build platform.

  - **Number of Layers**
    The number of layers that will be cured additionally. Ackuretta recommends using a value between 4 and 12.
  - **Illumination Time**
    The amount of time these layers will be cured. Ackuretta recommends using a value about 3 times that of the Normal Layers Illumination time.
  - **Wait Before Print ***
    The printer will pause before curing each layer for this amount of time.
  - **Wait After Print ***
    The printer will pause after curing each layer for this amount of time.
  - **Lift After Print ***
    The printer will lift this high off of the vat after each layer.
  - **Wait After Lift ***
    The printer will suspend the print above the vat for this long after each layer.



* Ackuretta recommends leaving these settings at their default values.

- **Normal Layers**

  After the first several layers, the printer will use the following parameters for all remaining layers.

  - **Layer Thickness**
    The Z-resolution of the print. This value should be the same as the value chosen in Alpha 3D or Omega 3D.

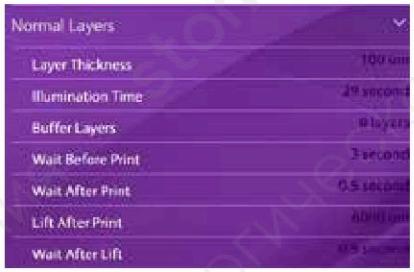
    The minimum Z-resolution for the FreeShape 120 is 10 µm, and the guideway may only move in multiples of 10 µm.

    Typical values include: 200 µm, 100 µm, 70 µm, 50 µm, and 30 µm.
  - **Illumination Time**
    The amount of time each layer will be cured. This is the most important parameter for a material.
  - **Buffer Layers ***
    Instead of curing all First Layers at the same rate, if you add any Buffer Layers, the FreeShape 120 will gradually reduce curing between the first layers until reaching the normal layers.
  - **Wait Before Print ***
    The printer will pause before curing each layer for this amount of time.

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- **Wait After Print ***
  The printer will pause after curing each layer for this amount of time.
- **Lift After Print ***
  The printer will lift this high off of the vat after each layer.
- **Wait After Lift ***
  The printer will suspend the print above the vat for this long after each layer.

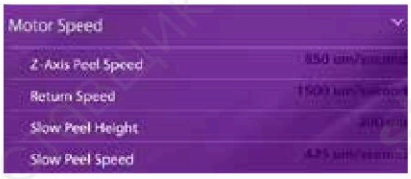


* Ackuretta recommends leaving these settings at their default values.

Motor Speed

Some prints may fall because they either get stuck to the platform or because there is not enough time for the resin to fill into the vat after the build platform moves up. Control the motor speed to prevent these issues.

- **Z-Axis Peel Speed**
  After printing a layer, the guideway will move at a maximum of this speed.
- **Return Speed ***
  When the print is complete, the guideway will move up at this speed.
- **Slow Peel Height ***
  After printing a layer, the guideway will move up slowly for this amount of distance. Then it will move the remaining distance shown in the Lift After Print setting at an increased rate.
- **Slow Peel Speed**
  Immediately after printing a layer, the guideway will move at this speed for a distance equal to the Slow Peel Height. After that, it will increase based on the Z-Axis Peel Speed. Ackuretta recommends using a value of half of the Z-Axis Peel Speed.



* Ackuretta recommends leaving these settings at their default values.

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FreeShape 120

Maintaining Your Printer

■ Using the Clean Vat Function

Whenever your print fails, use the Clean function to remove pieces of prints that did not stick to the build platform during printing. The Clean function cures one layer of resin at the bottom of the vat, and then you can easily remove that cured layer and throw away any lingering debris with it.

★ What You Need

- Small pieces of paper - note cards, sticky notes, or business cards work well
- At least 0.5 mm of resin across the vat
- Tissues

Warning:
Do not use any metal tools in the vat because metal tools may damage the vat surface. This includes knives, scrapers and tweezers.

A. Remove the build platform from the FreeShape 120.

B. On the Home screen press **Files**.

C. Select the file: **Clean_Vat_2k.ack**

D. Press **Print**.

E. The build platform will go down and will begin to print one layer of resin. Because the build platform is not connected, the layer will stay on the bottom of the vat.



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F. After the guideway returns to the top, obtain a small piece of paper. Push resin away from one side to the other so that a corner of the layer at the bottom is exposed.

F 

Tip:
You may remove the vat from the machine at this time to make this task easier. When your paper is saturated with resin, dispose of your paper and obtain a new piece.

G. Slide your paper underneath a corner of the cured layer, and then peel the layer off of the vat. Dispose of the resin layer by your normal resin disposal method.

G 

H. After removing the layer, your printer is ready for your next print.

H 

Using Clean Vat from the Web Console

Alternatively, you may start the clean vat process through your web browser.

A. Connect to the web console by inputting the FreeShape 120 IP address. For more information, **Connecting to Your LAN or Wi-Fi Network.**

B. Click the **Clean** tab.

C. Click on the white box next to "seconds" to adjust the length of the Clean Vat curing time.

Note:
Ackuretta recommends three times the curing time of the resin being used.

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D. Click on **Clean** after entering your preferred amount of time.



The build platform will move down as shown in **Using the Clean Vat Function**. Continue by removing the cured layer from the vat.

Replacing the LCD Panel

The FreeShape 120 LCD panel encounters some wear over time. Eventually, pixels on the LCD panel will go dark, and some areas of the panel will not cure as thoroughly as other areas.

Ackuretta provides 2 free LCD panels with the FreeShape 120 that can be used for replacement purposes.

Prepare these tools before you start to replace the LCD Panel of FreeShape 120:

1. Hex key
2. LCD panel (new)
3. Electrical tape
4. Utility knife



A. Turn off the power and unplug the power cable from the FreeShape 120.

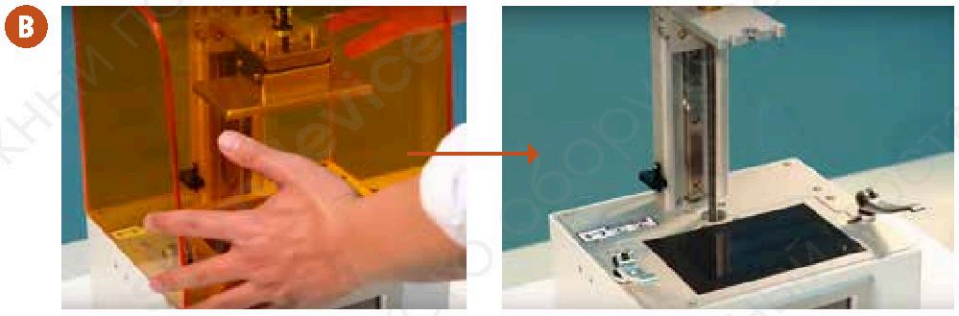


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B. Remove the hood, build platform, and vat.



C. Use the hex key to remove the 4 screws from both sides of the front casing.

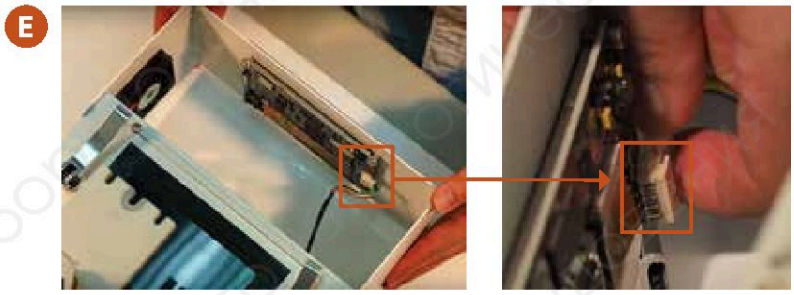


Note:
Do not remove the screws holding the back panel. It is not necessary for this operation.

D. Pull the front casing outward from the machine.



E. Before completely removing the front casing, unplug the UI console cable by moving the connector from side to side.

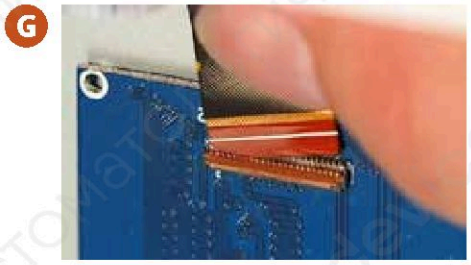


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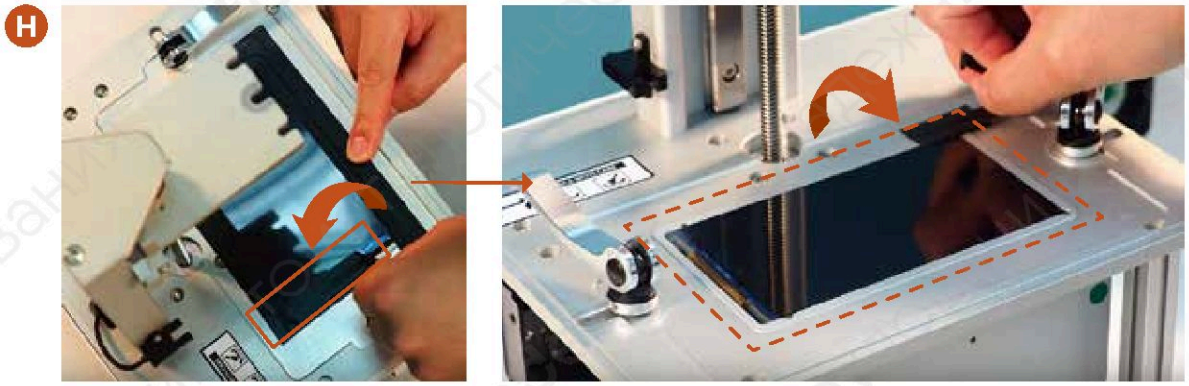
F. Use your fingernail or a business card to pull down the LCD connector.



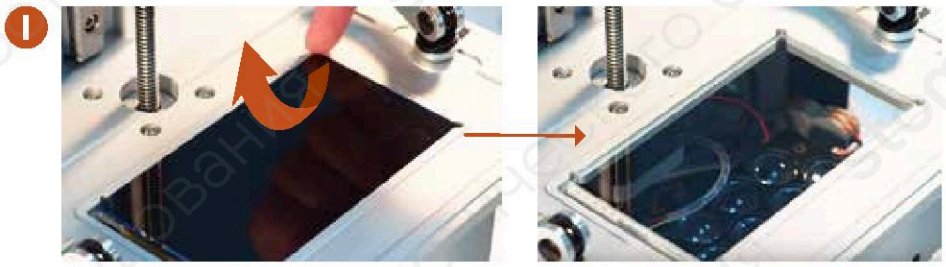
G. Pull the LCD wiring off of the circuit board.



H. Remove the electrical tape from around the LCD screen.

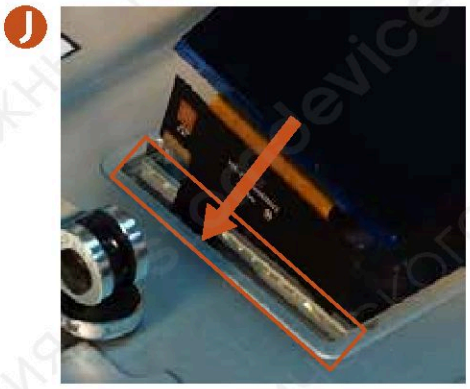


I. Use your fingernail or the head of a screwdriver to lift the corner of the LCD panel, and lift the panel out of the machine.

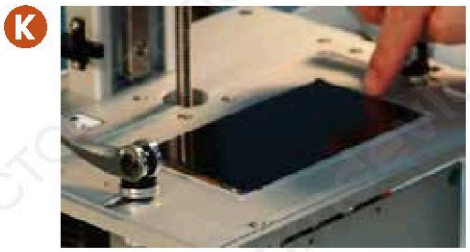


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J. Retrieve your new LCD panel. Slide its circuit cable through the gap in the side between the panel and the connector.



K. Gently lay down the LCD panel into position.



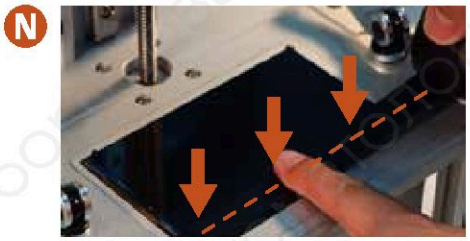
L. Push the LCD wiring into the connector.

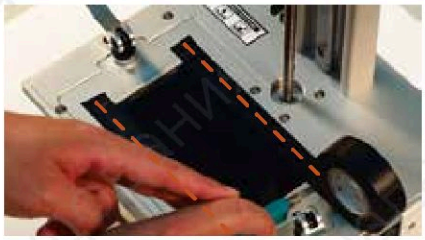


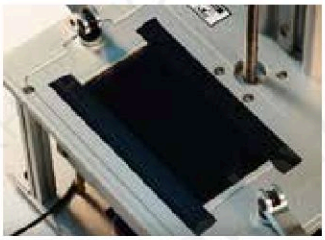
M. Flip the connector back upward to hold the wiring.



N. Attach strips of electric tape over the sides of the LCD panel. Press down on the electrical tape to remove any air pockets.







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Note:
Only cover about 1 mm of the panel with the tape. If you cover any more, you may cover printing space, which may affect your printing performance.

O. Cut and remove any excess tape with a utility knife.



Tip:
Clean off any dust or debris with an air blower and microfiber tissues.

P. Reattach the cable to the UI board before connecting the front casing to the FreeShape 120.



Q. Attach and tighten the front casing screws



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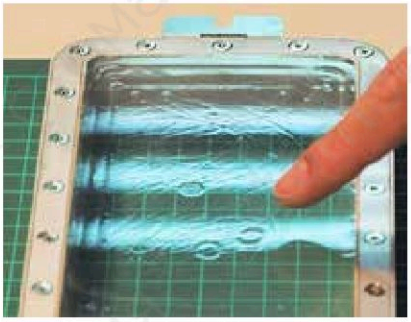
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R. Reattach the vat, build platform, hood, and power cable.



Replacing the Vat Film

If the film on your vat becomes damaged, then you may need to replace it. Cloudiness or tears on the vat surface require replacement, but small bumps do not.



Prepare these tools before you start to replace the FreeShape 120 vat film:

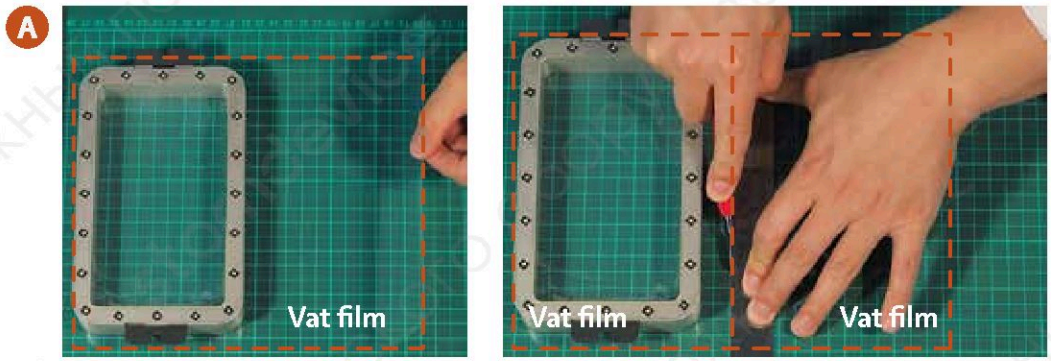
1. Vat to replace film on
2. Vat film (new)
3. Hex key
4. Screwdriver (flat head, small) - Optional
5. Utility knife
6. Microfiber tissues



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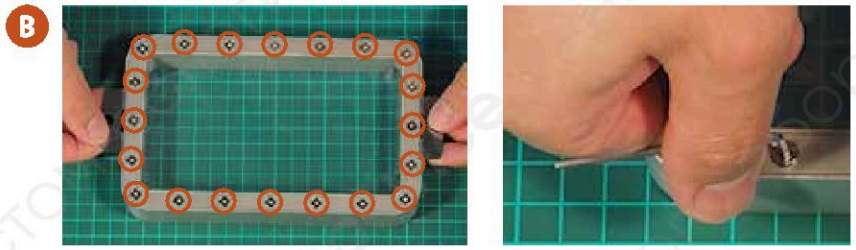
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A. Cut a new vat film sheet in half so that it is about 2-4 cm larger than the vat frame on all sides.

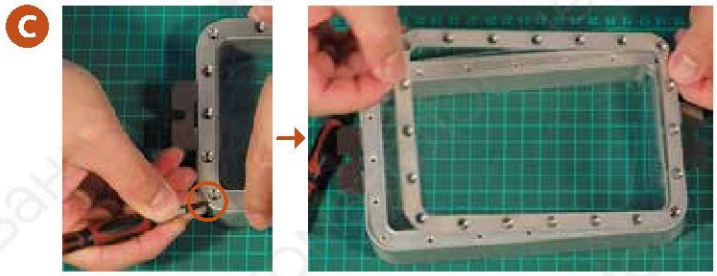


Tip:
Store the other half in a dry, safe space to use in the future.

B. Place the vat on a table upside-down. Remove all screws from the underside of the vat.

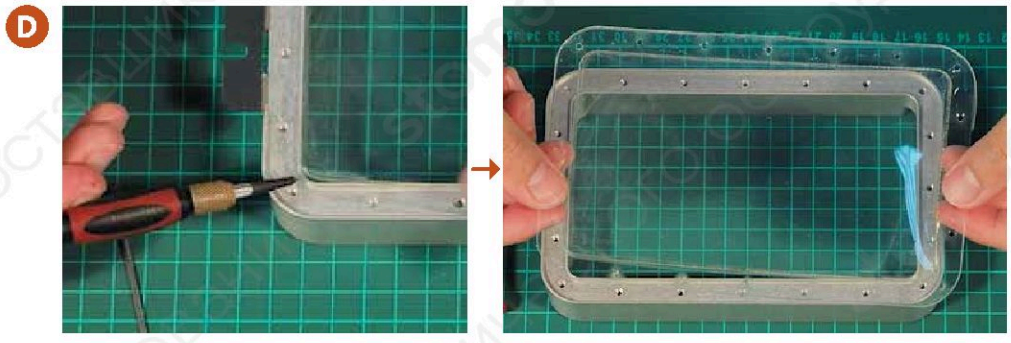


C. Pull the bottom plate off of the bottom of the vat.



Tip:
Use the screwdriver to assist in removing the plate.

D. Remove the old vat film. The screwdriver may also be useful here.

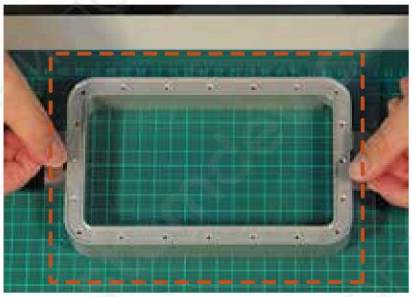


Note:
Clean any resin that may have remained between the vat film and the frame.

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E. Place the vat film piece over the vat frame.

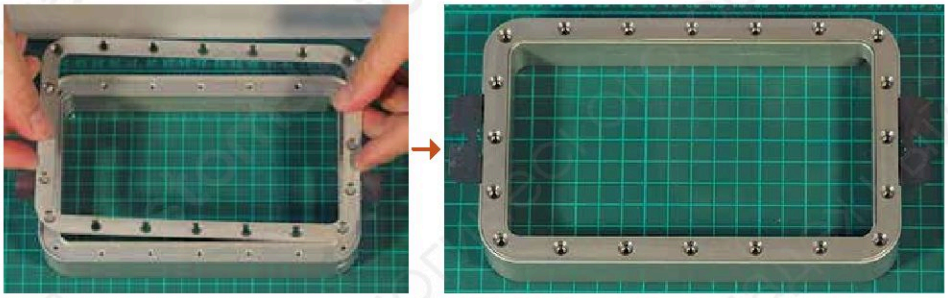
E



F. Place the bottom plate over the vat film. Press it as far down as possible.

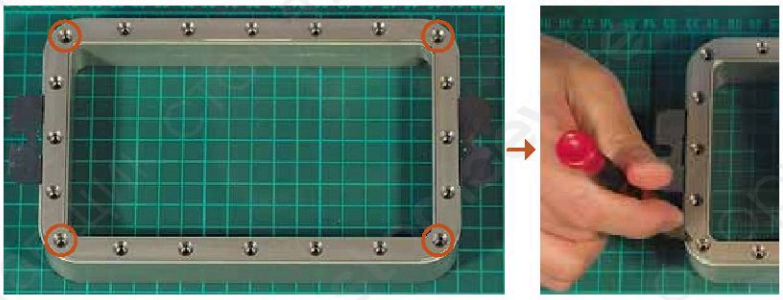
- Cover the bottom of the vat frame with the new vat.
- Put the bottom plate over the film.
- Poke 4 holes in the film through the screw holes in the corners of the frame.
- Attach screws through those 4 holdes to tighten the film to the frame.

F



G. Poke holes in the vat film at the screw holes on the 4 corners of the frame.

G



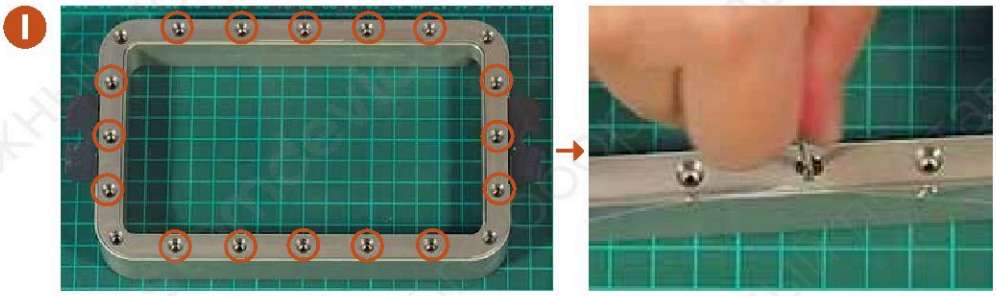
H. Attach screws through those 4 holes.

H

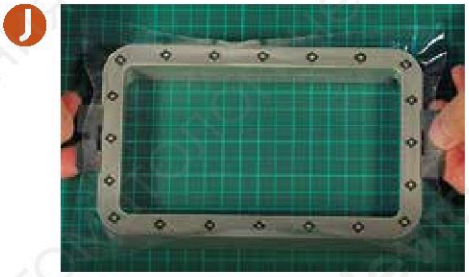


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I. Poke holes and attach screws in the remaining holes.



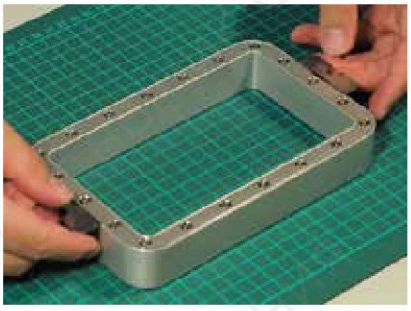
J. Tighten all screws so that the vat film is very tight.



K. Cut off the excess film with a utility knife.



Your vat is now ready for printing.



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