

**THE NEXT GENERATION
OF 3D PRINTING
IS HERE**

LC HR USER MANUAL



DISPOSAL INSTRUCTIONS

Do not throw this electronic device into the waste when discarding. To minimize pollution and ensure utmost protection of the global environment, please recycle or return to Photocentric for recycling.

UK

Cambridge House, Oxney Road
Peterborough PE1 5YW UK.
info@photocentric3d.com
www.photocentric3d.com

USA

2205 West Parkside Lane, Phoenix,
85027, AZ USA
info@photocentric3d.com
www.photocentric3d.com



Liquid Crystal
HR

EU DECLARATION OF CONFORMITY



LIQUID CRYSTAL 3D-PRINTER

Model: LC HR

We hereby declare that the product above is in compliance with the essential requirements of the following:

Low Voltage (LV) Directive 2009/95/EC, 2014/35EU. Electromagnetic Compatibility Directive(EMC), 2004/108/EC,2014/30/EU.

Restriction of the use of certain hazardous substances (RoHS) Directive, 2011/65/EU Commission Regulation (EU) No. 453/2010 and IEC 60950-1 Safety of ITE

Technical Documentation is stored at the manufacturer's address above.

Date of Issue: 02. December 2016
Place of Issue: Peterborough

Paul Holt
Managing Director

Manufacturer
Photocentric Ltd
Cambridge House, Oxney Road
Peterborough, PE1 5YW, VK
Year of CE Marking: 2016



USER MANUAL

NEW PROFESSIONAL HIGH RESOLUTION 3D PRINTER

Congratulations

You have just purchased a new type of 3D printer using Daylight Polymer Printing (DPP) technology. This is a patent applied-for method of image creation that hardens liquid with the light from an LCD screen. This revolutionary system is a new way of printing that uses normal daylight as the energy providing source to initiate the free radical polymerisation necessary to change the liquid imagepac resin into your hardened object.

The principle behind your printer

There are two surprising advantages of this new DPP technology:

- i) We can use high resolution low cost LCD screens that are widely available as monitors, tablets, mobile phones and televisions providing phenomenal value for money, which we pass directly on to you. This is why our machines are a fraction of the price of machines of similar performance.
- ii) The energy used by Liquid Crystal printers is an order of magnitude lower than used in systems. This is good for your energy bills and the ecology, but there is a huge performance advantage in that there is no unnecessary energy created. All of the available photons strike photoinitiators and hand over their energy. In Digital Light Projector and laser systems there is a lot of excess energy which can lead to overcure and lead to excess attraction between the imaging source and object at the build layer.

SAFETY INFORMATION

Read the instructions carefully. Keep this document for future reference. Follow all warnings and instructions marked on the product.

Observe the following guidelines when connecting and disconnecting power to the external power supply unit:

- Install the power supply unit before connecting the power cord to the AC power outlet.
- Unplug the power cord before removing the power supply unit from the printer.
- This machine is very quiet in operation.
- Operate on a table or flat, stable surface, ensuring that the machine cannot fall and is level.
- Do not operate outdoors.
- Do not allow resin or any liquids to get inside the chassis, wipe up any liquid spills immediately.
- Store the printer in its original packaging when not in use.
- Disconnect the printer from AC before storage or when not used for a long period of time.



ELECTRICAL POWER

This 3D printer is connected to the electrical network with an INPUT of 110 or 240 V AC, 50/60 Hz, and has an operational voltage of 12 V.

- Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord.
- If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed the fuse rating.
- Do not overload a power outlet, strip or receptacle by plugging in too many devices.
- Use the product only with the supplied power supply cord set. If you need to replace the power cord set, make sure that the new power cord meets the following requirements: detachable type, UL listed/CSA certified, VDE approved or its equivalent, 4.5 meters (15 feet) maximum
- In case of malfunction disconnect the printer immediately from network.
- Do not attempt to fix this product by yourself, as opening or removing covers may expose you to dangerous voltage points or other risks. Refer all repairs to qualified service personnel. Contact the technical service please send an email to your national supplier or info@photocentric3d.com

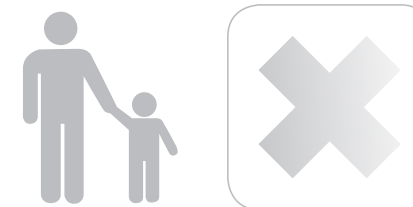
Unplug this product from the wall outlet and refer servicing to a qualified service personnel:

- The power cord or plug is damaged, cut or frayed.
- Liquid was spilled into the product.
- The product was exposed to rain or water.
- The product has been dropped or the case has been damaged.
- The product exhibits a distinct change in performance, indicating a malfunction.
- The product does not operate normally after following the operating instructions.



DISPOSAL INSTRUCTIONS

Do not throw this electronic device into the waste when discarding. To minimize pollution and ensure utmost protection of the global environment, please recycle or return to Photocentric for recycling.



USEFUL ADVICE

Please ensure any minors are supervised at all times.

Use in a well-ventilated room.

Keep the printer out of the reach of small children.

The resin is an irritant to skin and eyes. Always wear gloves when coming into contact with the liquid resin. We have developed and used the resins extensively for many years and have a lot of experience with them. Resins meet health and safety requirements but in exceptional circumstances people can be sensitive to the resin and develop a skin irritation or rash. Avoid this possibility by always wearing gloves.

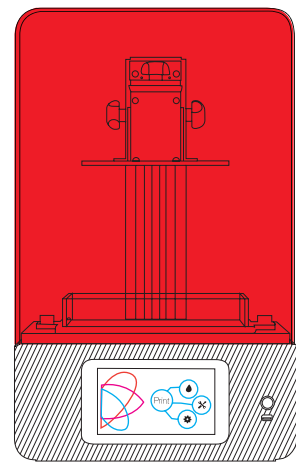
The printer should be operated on a stable and level surface, preferably away from direct ambient light and with sufficient space to be able to open doors.

Please note that the latest instructions will always be available from:

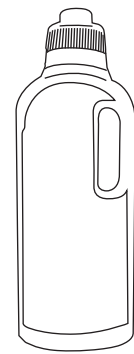
www.photocentric3d.com/support

CONTENT

The box contains



Liquid Crystal High Res 3D Printer with red hood and platform



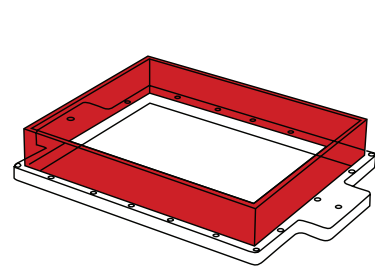
250g of Hard Red resin



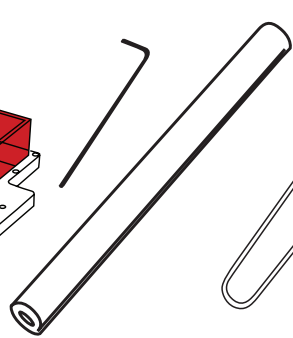
Power supply for the printer



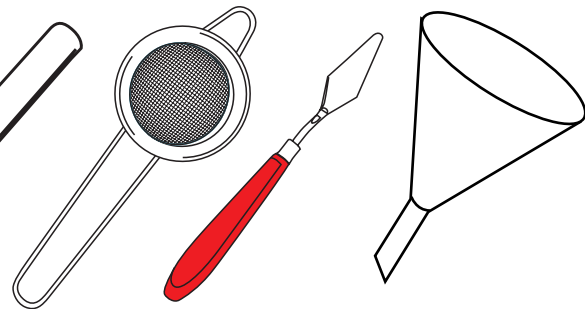
USB wifi



Vat ready to use



Vat film - 2 sheets



Strainer, small spatula, funnel, allen key, gloves

MINIMUM COMPUTER REQUIREMENTS

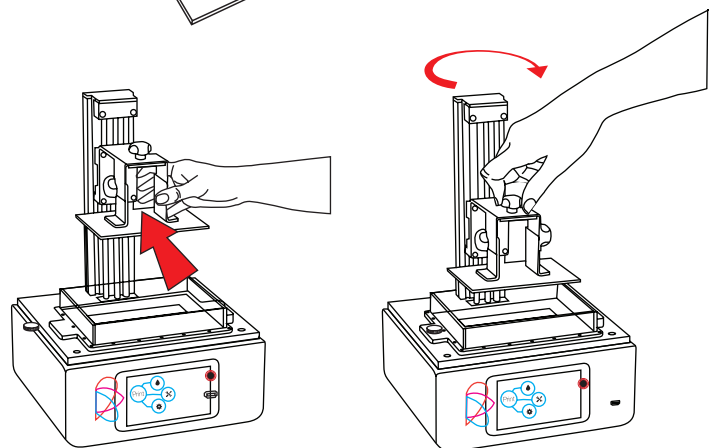
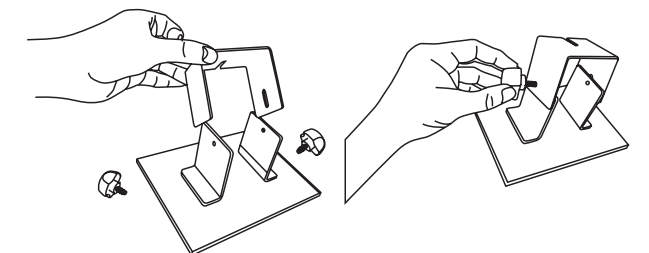
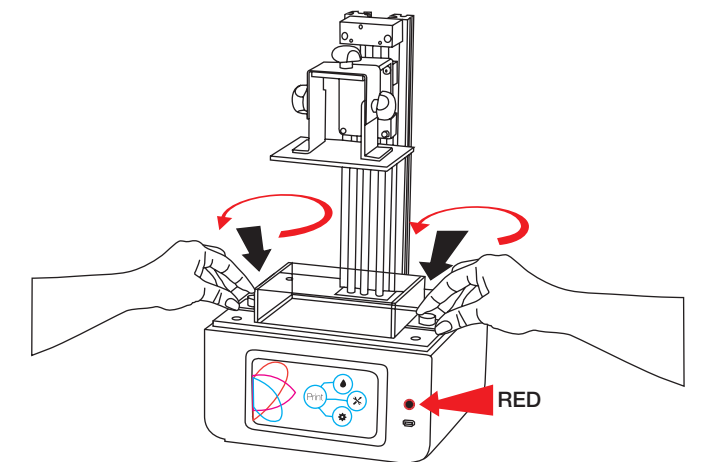
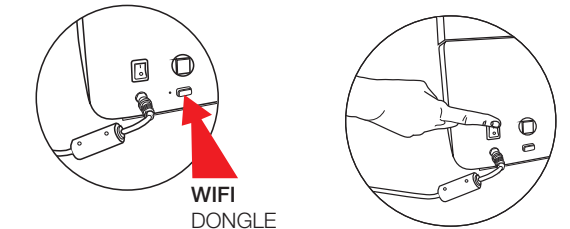
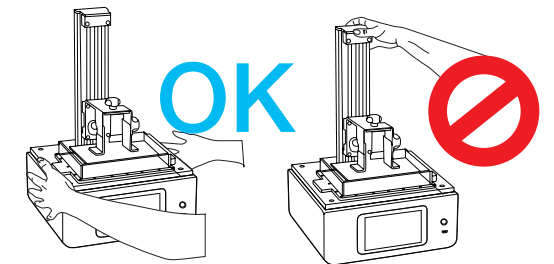
- 1.2 GHz processor or above.
- Windows, Linux OS or Mac
- 2 GB RAM memory or above.

RECOMMENDED ITEMS

- Extra gloves.
- Paper towels.
- Access to a sink with hot water to clean the object.
- Soap for cleaning the object easier.
- Soft brush or sponge to clean the object.
- Plastic container to post expose the object.

1. INSTALLATION & ASSEMBLY INSTRUCTIONS

1. Open the box and carefully remove the printer. Do not pull the printer out by the linear drive/z-axis.
2. Place the printer in the work area and attach the 4 feet supplied in the ancillary box.
3. Connect the usb wifi dongle supplied to the back of the printer.
4. Connect the B end of the power supply cable to the power supply and insert into the back of the printer. Turn the printer on using the rocker switch located at the back of the printer. The touchscreen at the front will turn on. The screen will start making a system check and the welcome screen will appear a few seconds later. Then the system will search automatically for wireless connections before it comes out the main screen. Do not disconnect while this process is taking place, it may take up to 5min the first time.
5. Remove the vat from the printer by removing the thumbscrews. Check the film for any imperfections or holes; any problem with the film may cause a leak and potentially ruin your print and/or printer. To change film, see end of this document. Once inspected, install back the vat. Tighten the two vat retaining bolts. Before each print, wearing gloves, sweep the film completely down onto the screen to ensure that there are no objects stuck there.
6. Assemble the platform from the ancillary box by placing the black U bracket on the outside of the L bracket. Once complete, slide onto the printer arm and tighten the top knob only. Side knobs must be loose.
7. If you are experiencing difficulties to start or connect your printer, go to our website: www.photocentric3d.com/support.



2. SETTING UP A NETWORK CONNECTIONS

The LCHR supports two different types of network connection: Ethernet and WiFi. To set up ethernet, simply plug the ethernet cable into the back of the printer and a router.

Steps to set-up Wifi:

1. Power on the printer with the rocker switch at the back of the printer.
2. Click “Settings” on the touchscreen on the front of the printer.
3. Click “Wifi Settings”.
4. Wait until your desired Wifi network shows.

5. Select the desired network and press the button “Setup Network”.

6. Enter your Wifi Password and press “Accept”.
7. Finish by pressing “Save”.
8. Press “Home” to get back to the main screen.



3. PREPARE LIQUID CRYSTAL FOR PRINTING

Now you have your printer installed and configured.

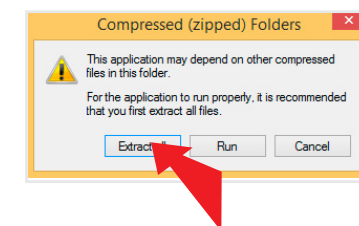
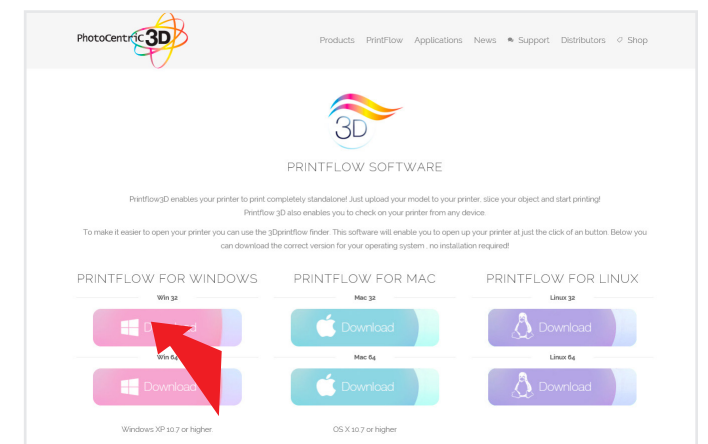
There are 3 ways to start a print:

- A. Start a print from a browser (computer, tablet, phone) using Printflow 3D.
- B. Start a pre-sliced and uploaded print from the LCHR touchscreen.
- C. Start a print after uploading a file from a USB stick.

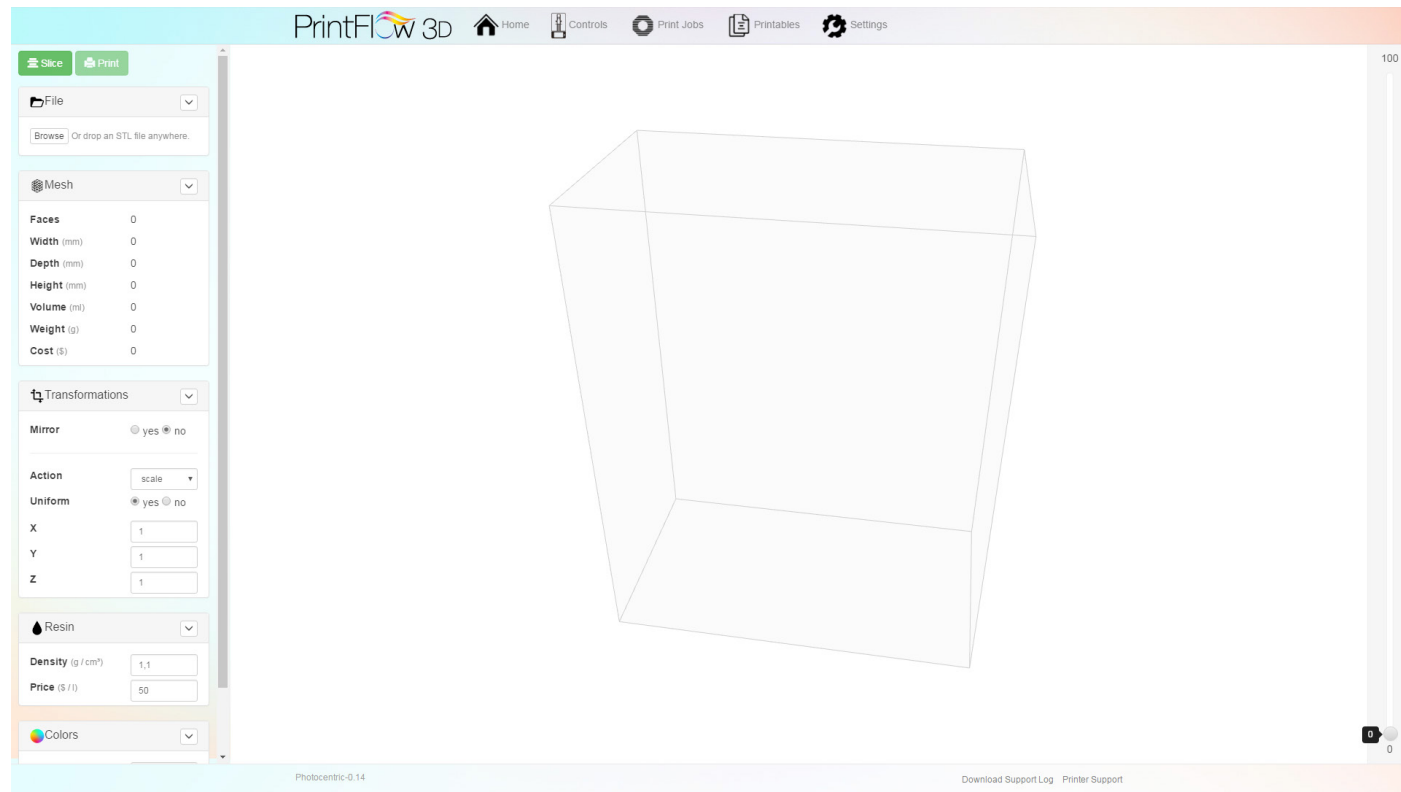
Please read these software instructions to help you start printing.

A. STARTING A PRINTER FROM A BROWSER.

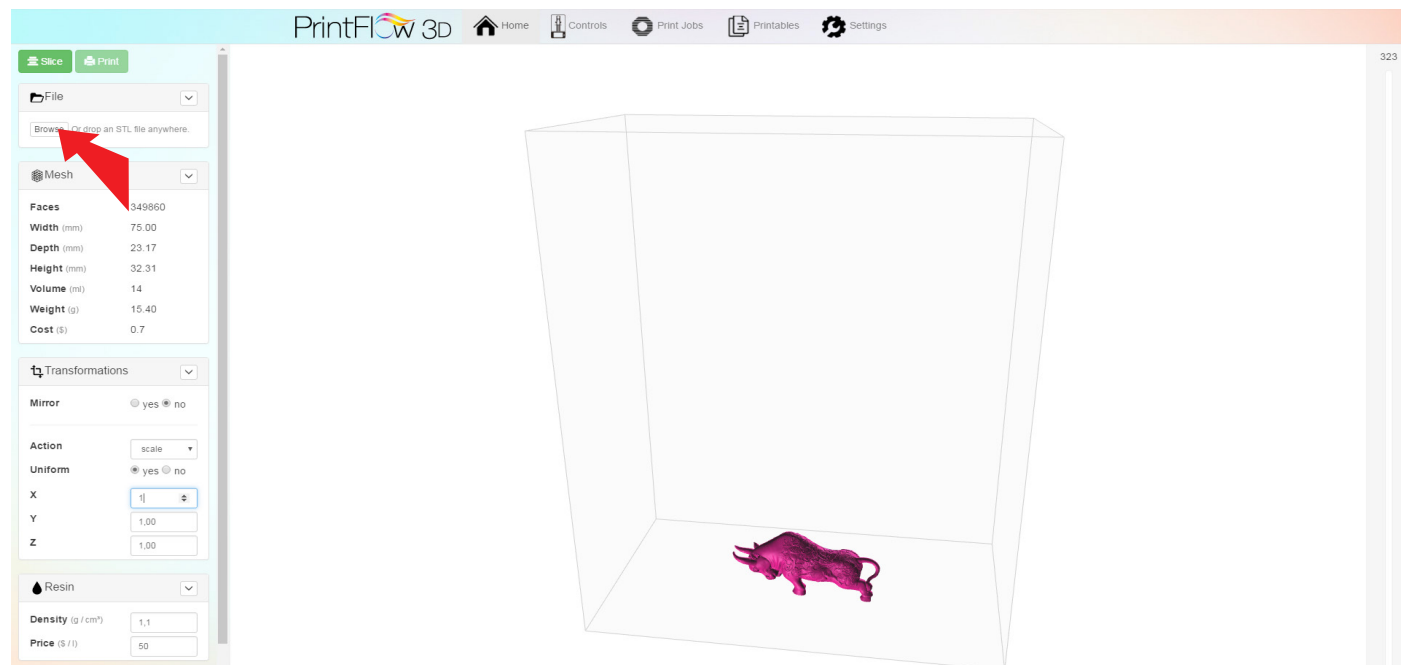
1. Make sure your printer is turned on and connected to a network. If the LED at the front button is illuminated then the printing screen is turned on.
2. Download the desktop software called “Printflow3D_opener” for your operating system from www.photocentric3d.com/printflow.
3. Move the Printflow3D_opener.exe onto your desktop, double click and start the software.



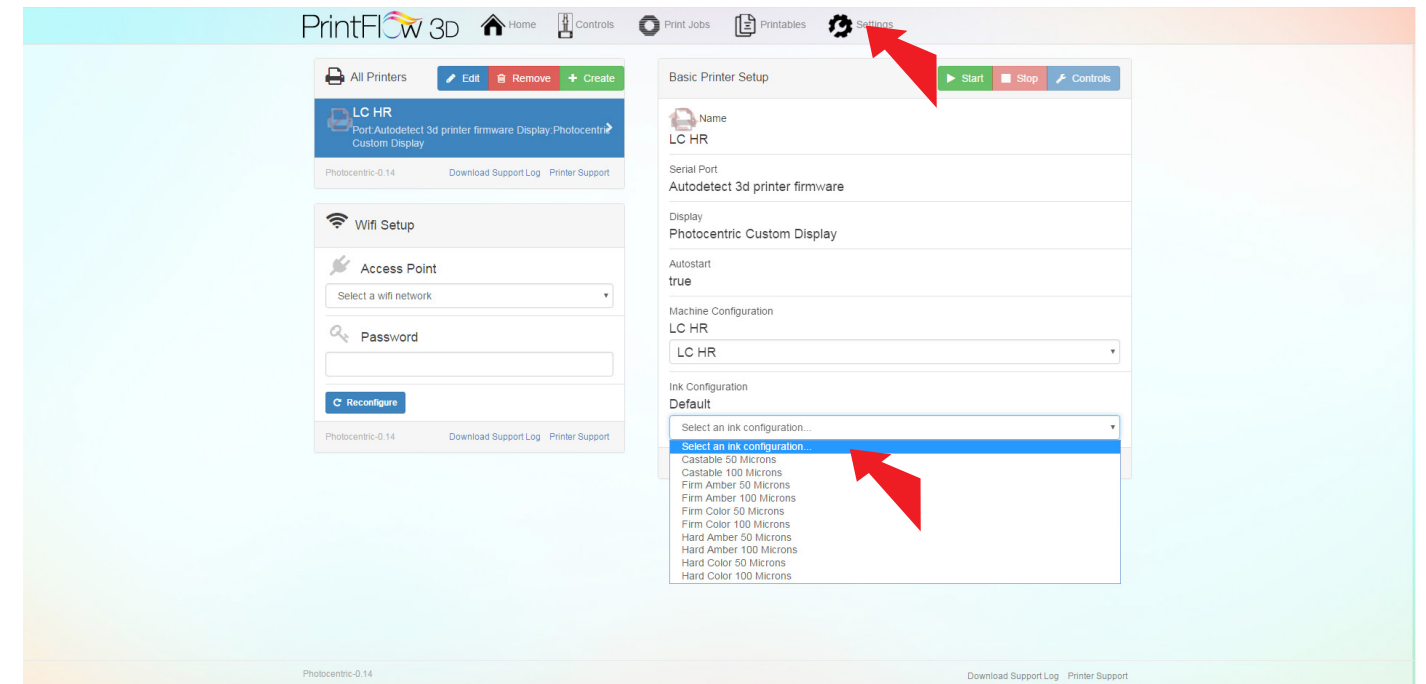
4. When your printer has been found successfully, it should open up the following window.



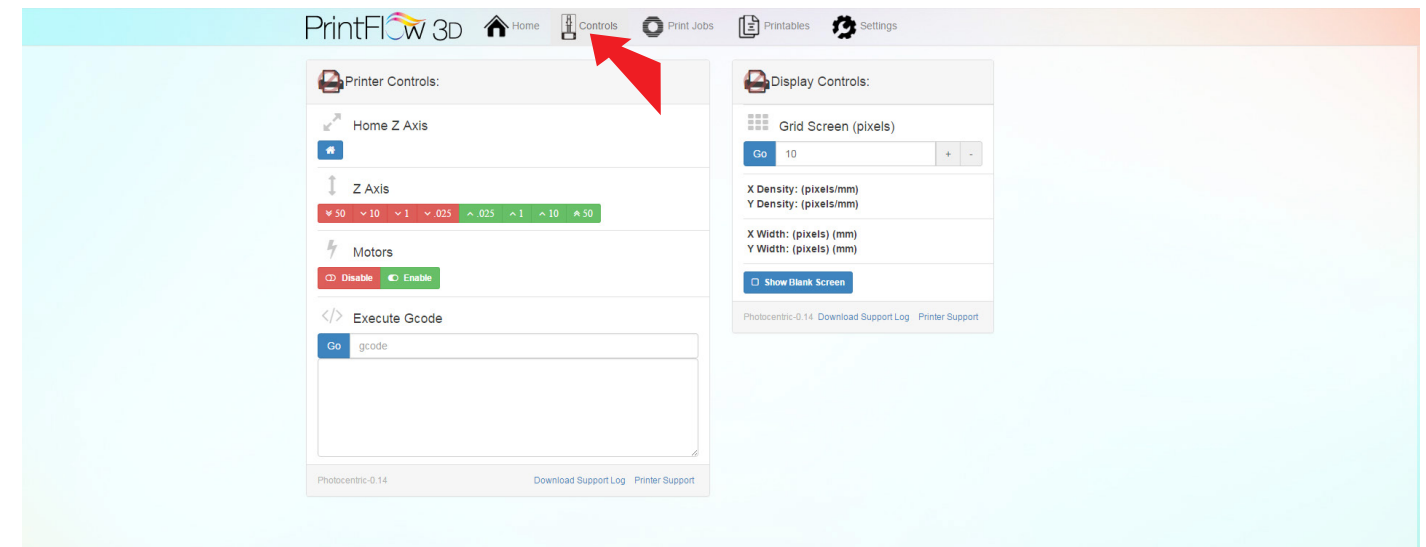
5. Click “Browse” and upload the printable in .stl file format; your window should look like this. Apply any desired modifications as described later in this document.



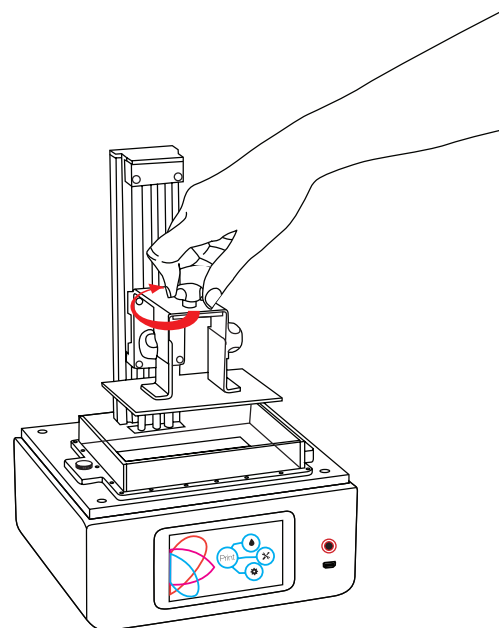
6. Once the print is ready, select the resin profile from the “Settings tab” / “Resin configuration”.



7. Go to the “Control” page.

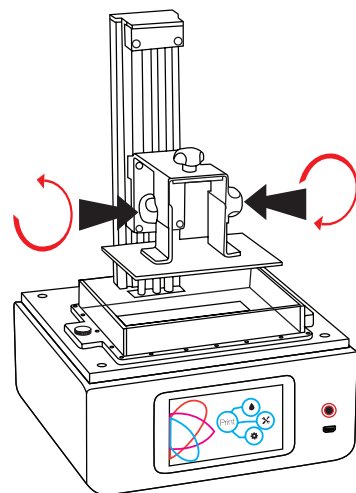


8. Your platform and vat should now be assembled. Tighten the central knob to lock the platform.

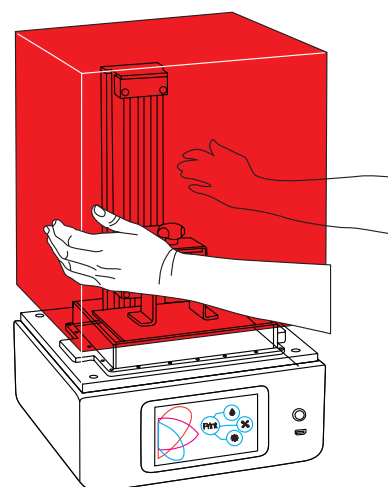


9. Ensure the two side knobs are completely loose. Pressing 'Home' with them locked could damage the screen.

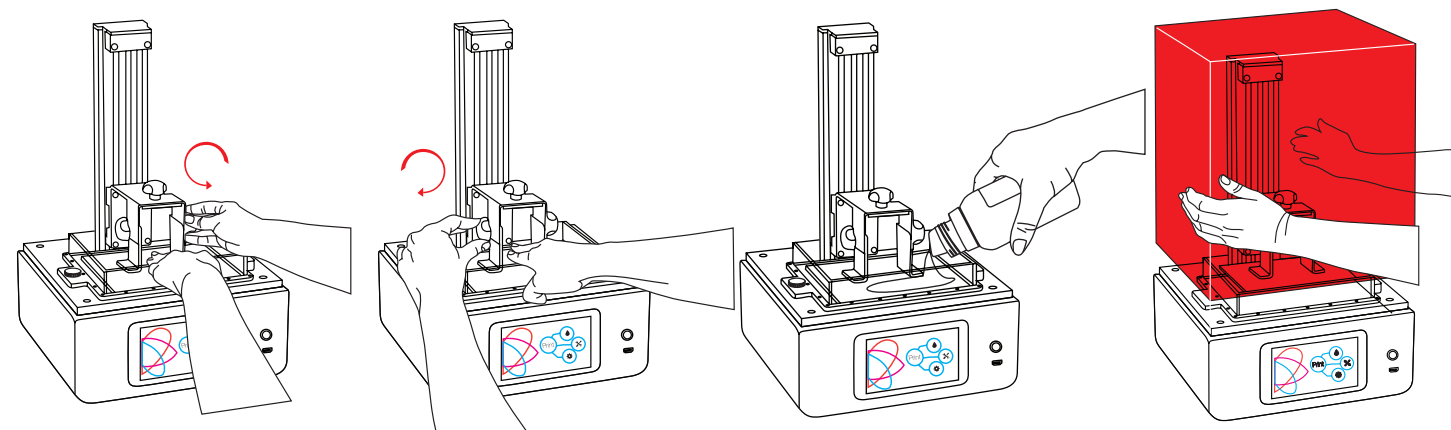
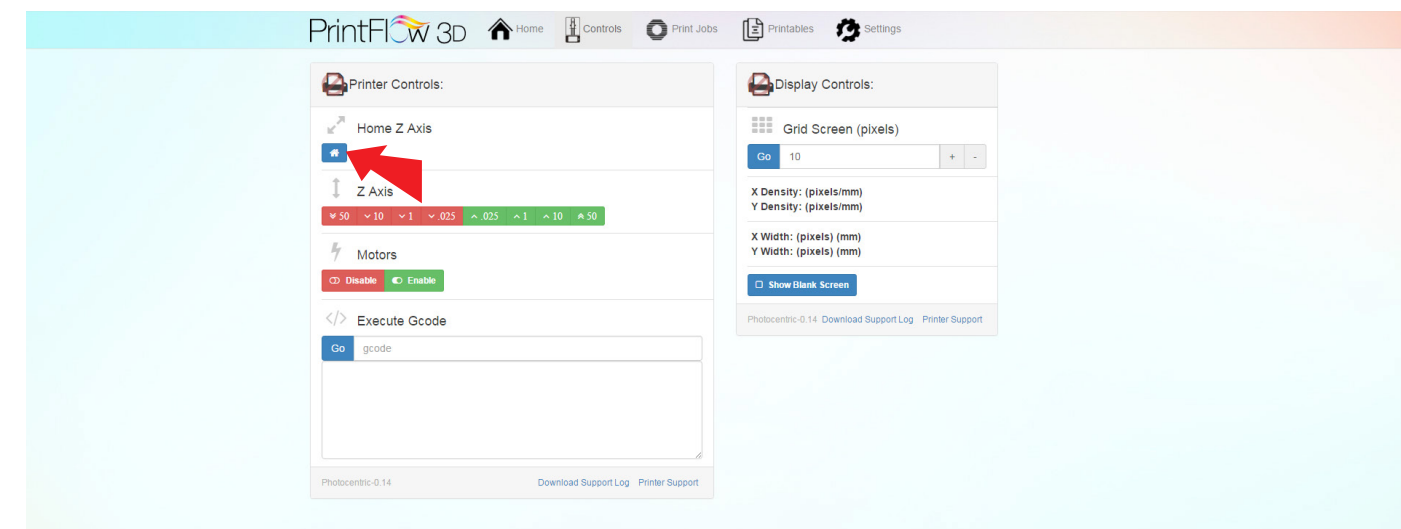
IMPORTANT: If these knobs are not completely loose you could crush the bottom screen when lowering it with the home function.



10. Place the hood back onto the printer (for safety reasons, printer will not respond mechanically until it has the hood on).



11. In the controls section of PrintFlow 3D, click the blue button with a home icon. The platform will move down to rest on the screen (level 0 in Z axis) and stop. Remove the hood. With the vat empty and wearing gloves, press down in the middle of the glass platform to ensure the platform is in contact with the vat film across its entire area. You will see the screen go white in all four corners. Then with the other hand tighten one of the side bolts and then tighten the other. It is now locked in the home position. You can now fill the vat with resin.



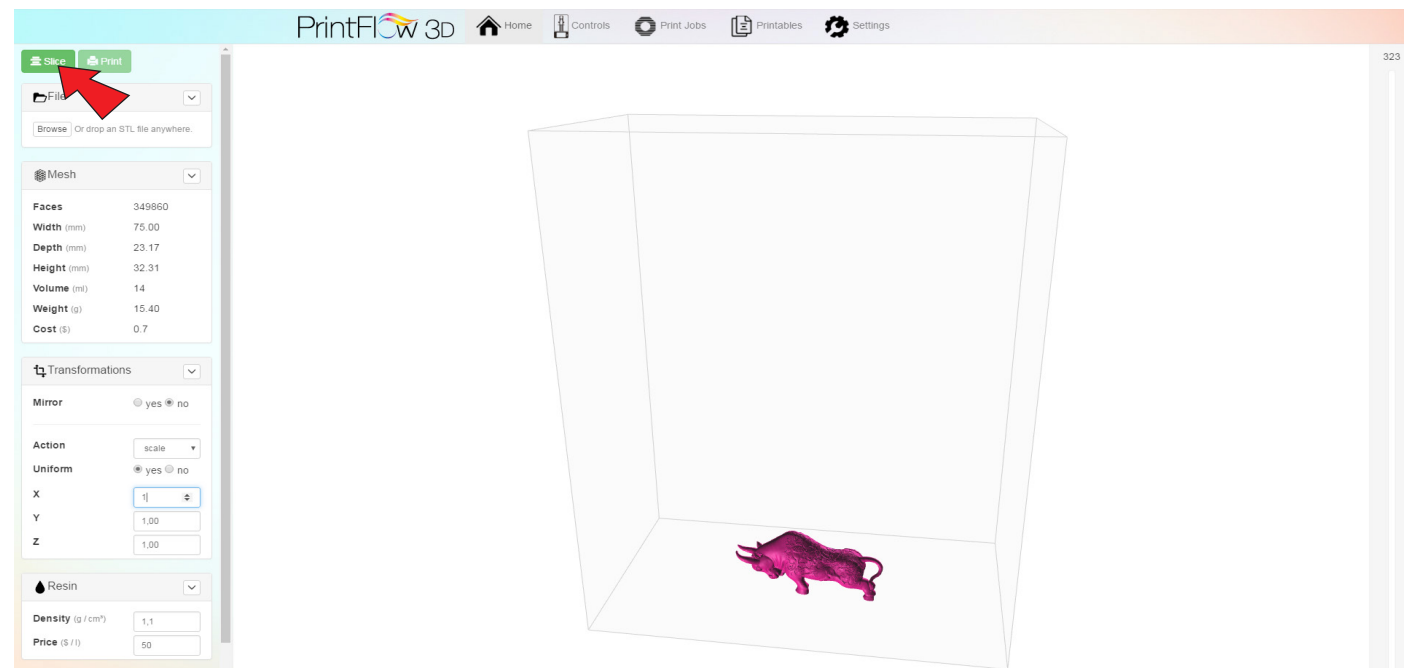
NOTE: You can check the screen is working by pressing the "Show calibration" button located in the "Control" tab and a grid will appear.

NOTE: Prints consume around as much resin as the volume of the object. If you have an object that is 100 cm³ then it will use 110g of resin. For most prints, filling the vat to 1/3 full is more than enough. Make sure that the bottom of the vat is always covered with resin. Place the hood back on the printer.

NOTE: Don't remove the hood during the operation or the print will stop.



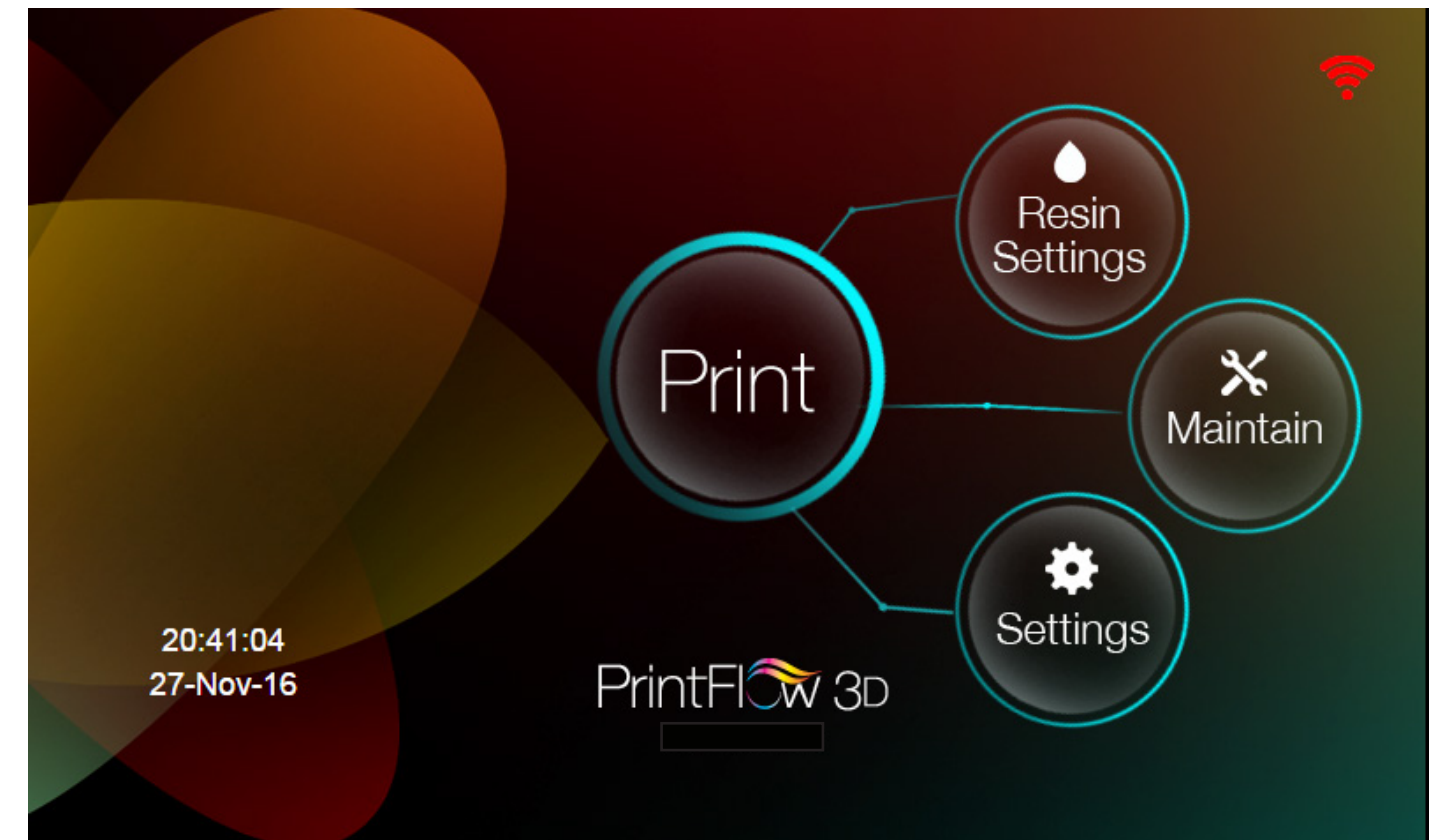
- Go back to the tab “Home”, press “Slice” and then finally, press “Print”. This will cause the software to slice the object and begin printing afterwards. Please note that during slicing your browser page should remain open.



STARTING A PRINTER FROM THE TOUCHSCREEN OR A USB.

To start a print from a touchscreen you can either use print files already loaded on the printer or you can upload presliced .zip files from a USB stick. To upload files from the USB stick, simply insert the USB in the front of the printer, go to the homepage and wait. After a few seconds, press the Print button and all of the .zip files should be uploaded to the printables and be available to print.

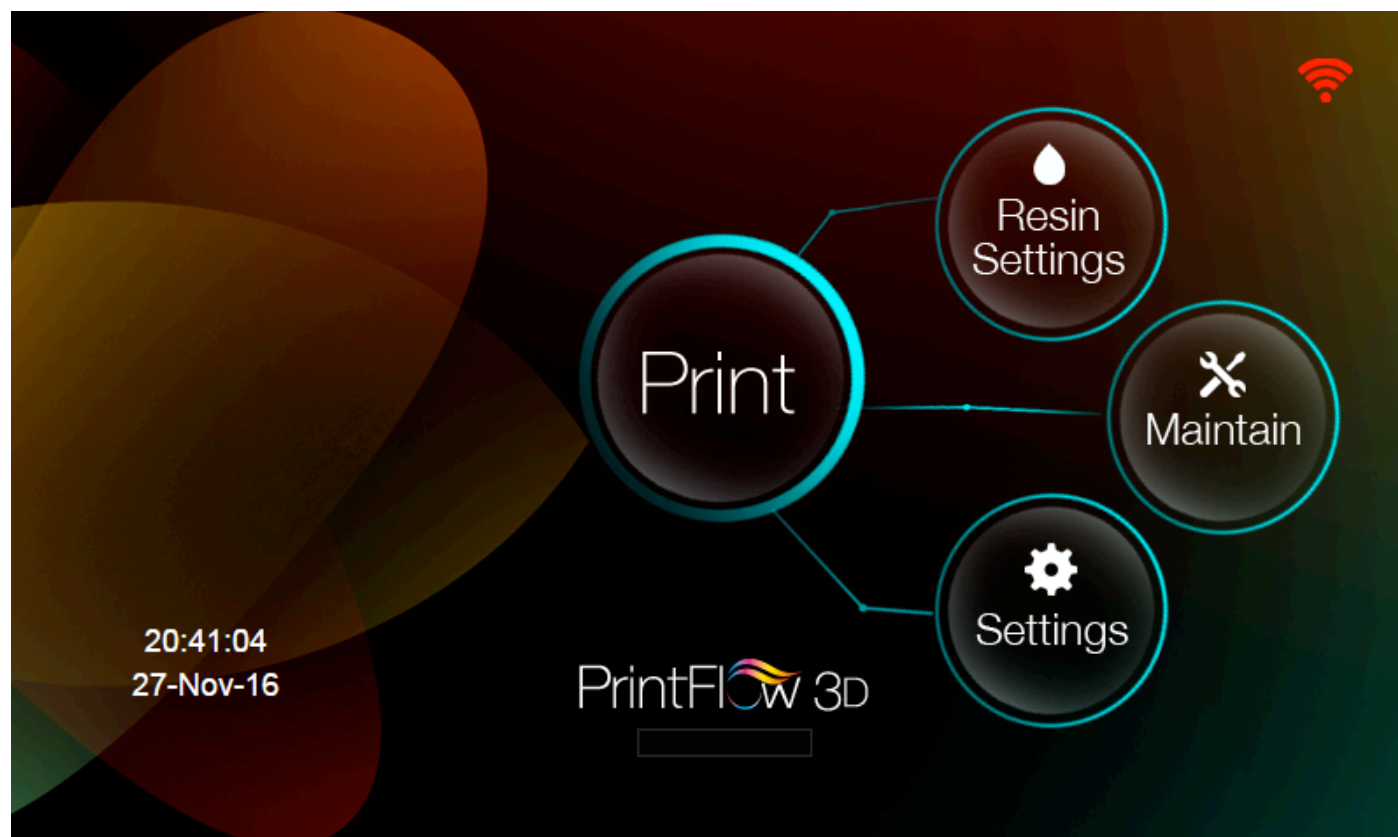
- On the homepage, click on “Resin settings”.



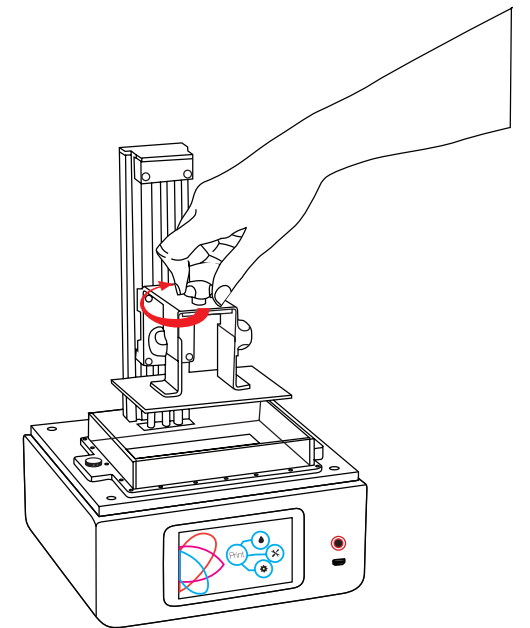
2. Make sure that the resin profile on this page is set correctly.



3. Return to the homepage by clicking the “Home” icon.

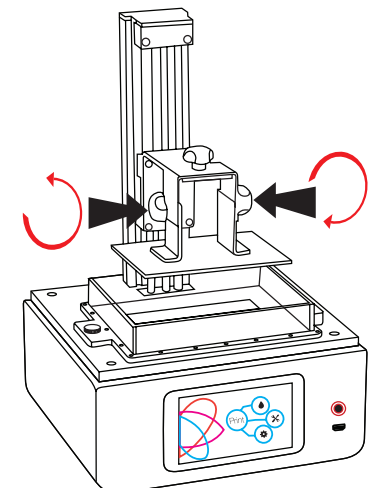


4. Your platform and vat should now be assembled. Tighten the central knob to lock the platform.

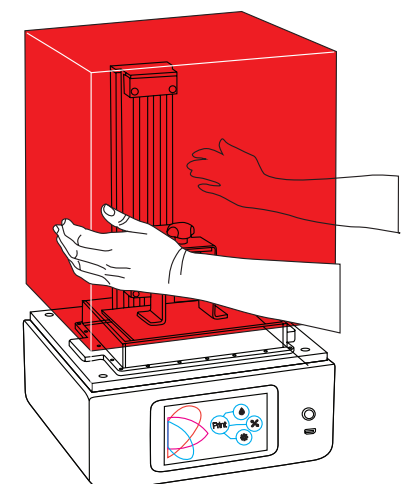


5. Ensure the two side knobs are completely loose. Pressing 'Home' with them locked could damage the screen.

IMPORTANT: If these knobs are not completely loose you could crush the bottom screen when lowering it with the home function.



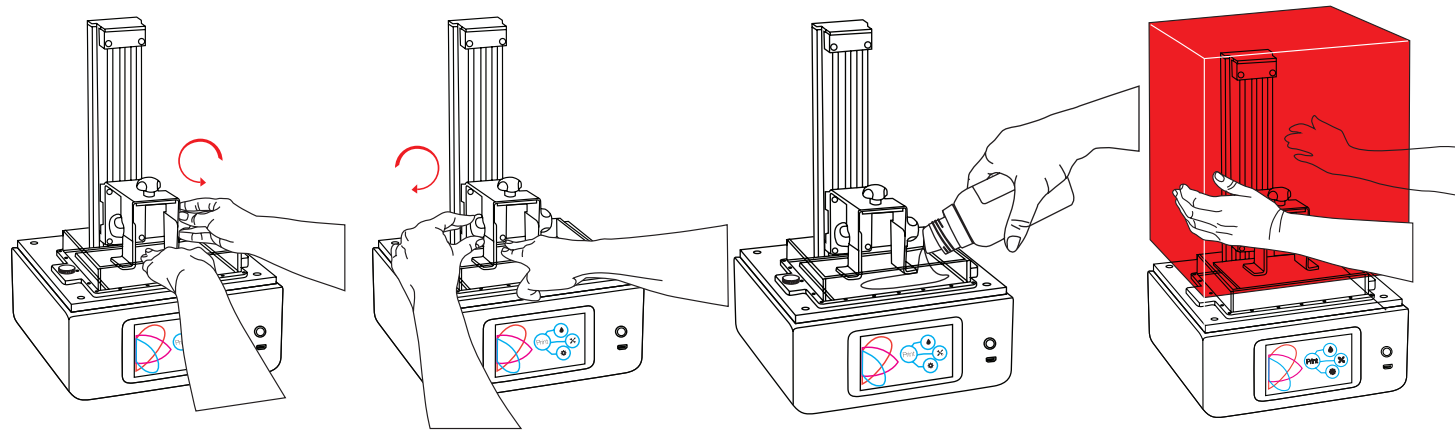
6. Place the hood back onto the printer (for safety reasons, printer will not respond mechanically until it has the hood on).



7. Click the settings button which should show the following screen: In this menu click “Home Z Axis”. The platform will move down to rest on the screen (level 0 in Z axis.) and stop.



8. Remove the hood. With the vat empty and wearing gloves, press down in the middle of the glass platform to ensure the platform is in contact with the vat film across its entire area. You will see the screen go white in all four corners. Then with the other hand tighten one of the side bolts and then tighten the other. It is now locked in the home position. You can now fill the vat with resin.



NOTE: You can check the screen is working by pressing the “Show calibration” button located in the “Control” tab and a grid will appear.

NOTE: Prints consume around as much resin as the volume of the object. If you have an object that is 100 cm³ then it will use 110g of resin. For most prints, filling the vat to 1/3 full is more than enough. Make sure that the bottom of the vat is always covered with resin. Place the hood back on the printer.

NOTE: Don't remove the hood during the operation or the print will stop.



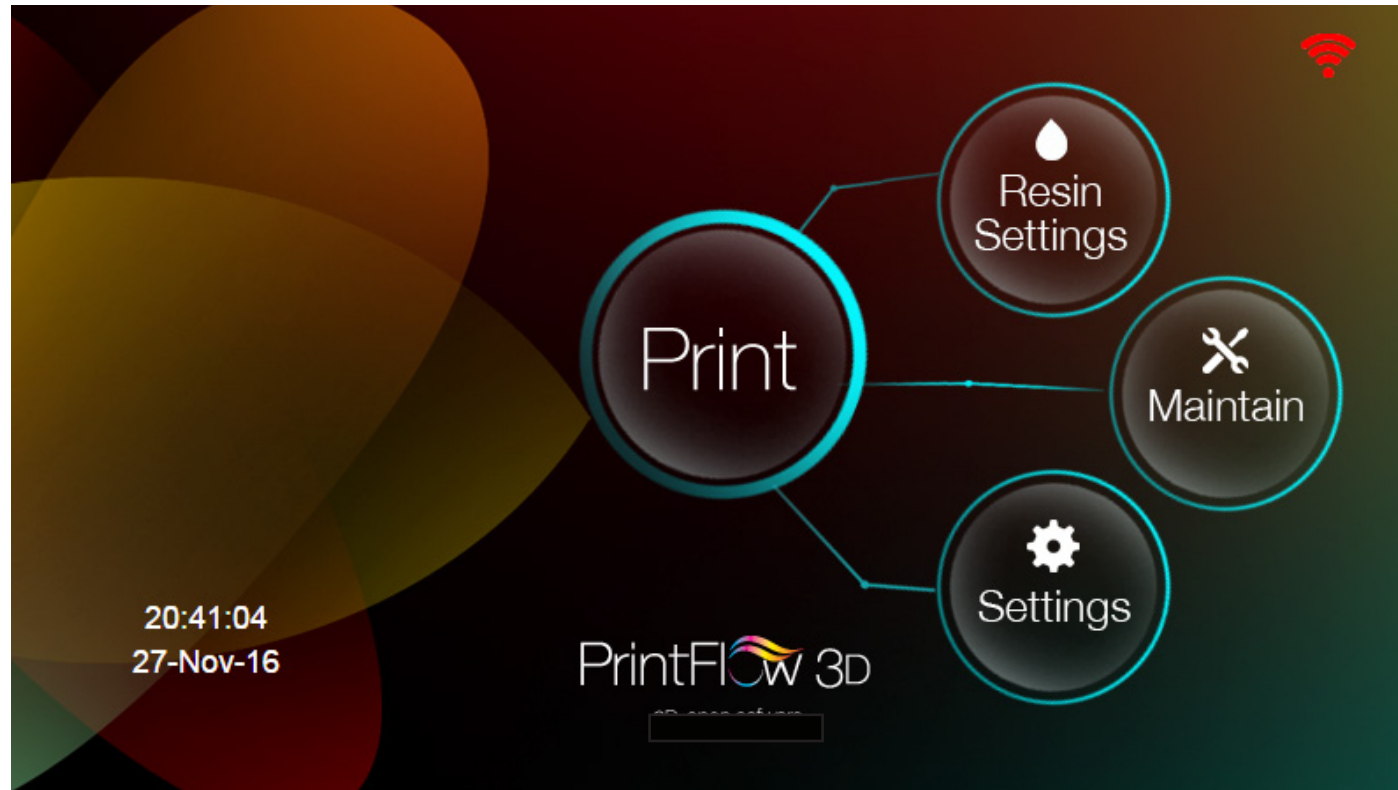
9. Press the “Print” button, which will display the following screen:



10. Click the item you want to print and press “Print!”. The print will start.

REMOVE A FILE FROM THE TOUCHSCREEN

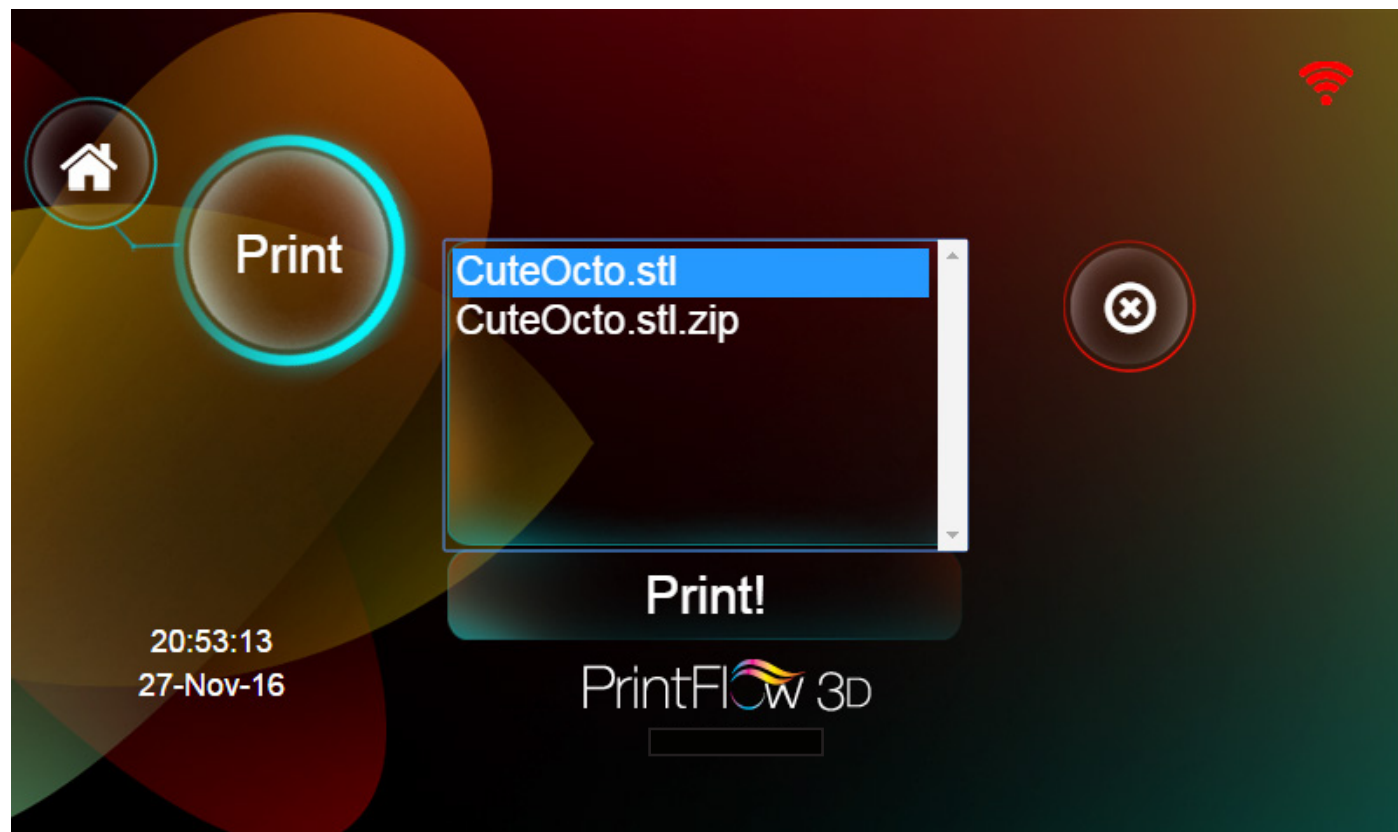
1. From the home page press "Print".



3. Click "Yes" to delete the file.

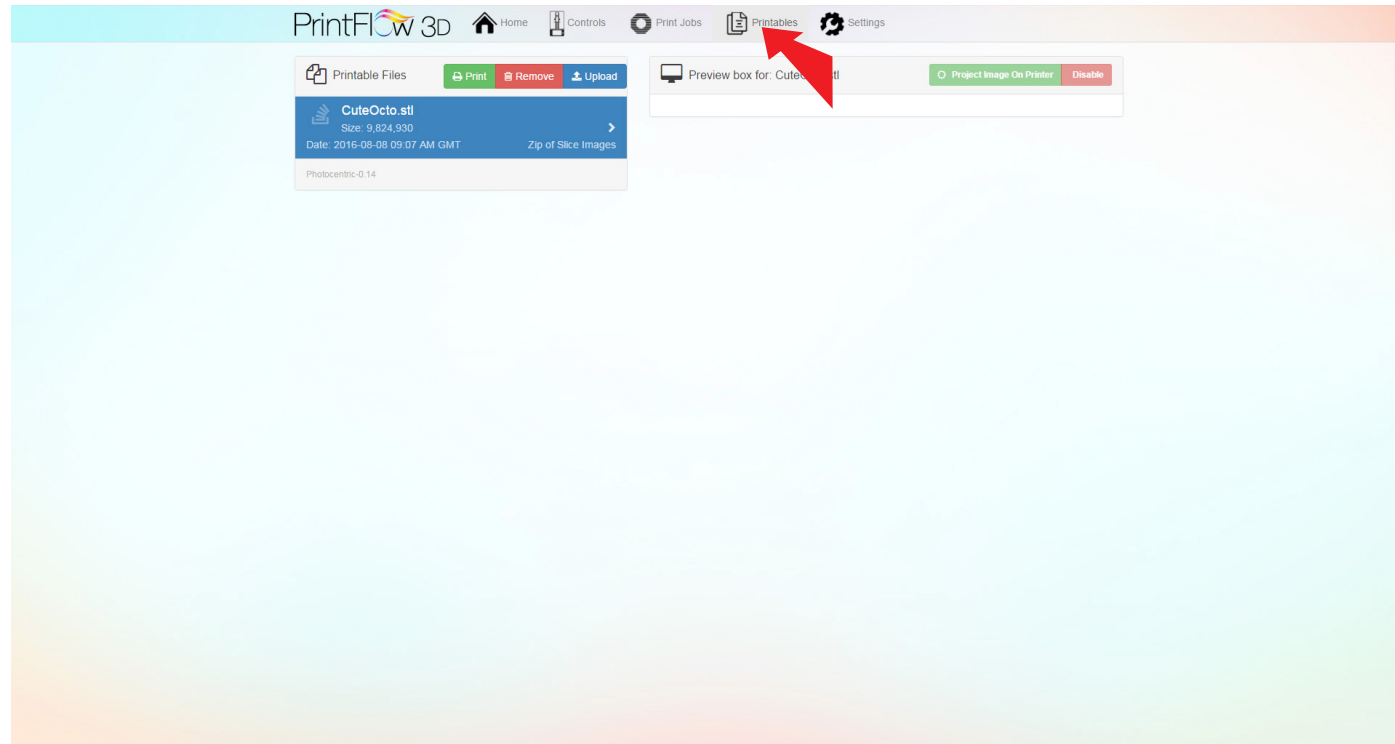


2. Select the printable you want to remove and click the red button with the X on the right.

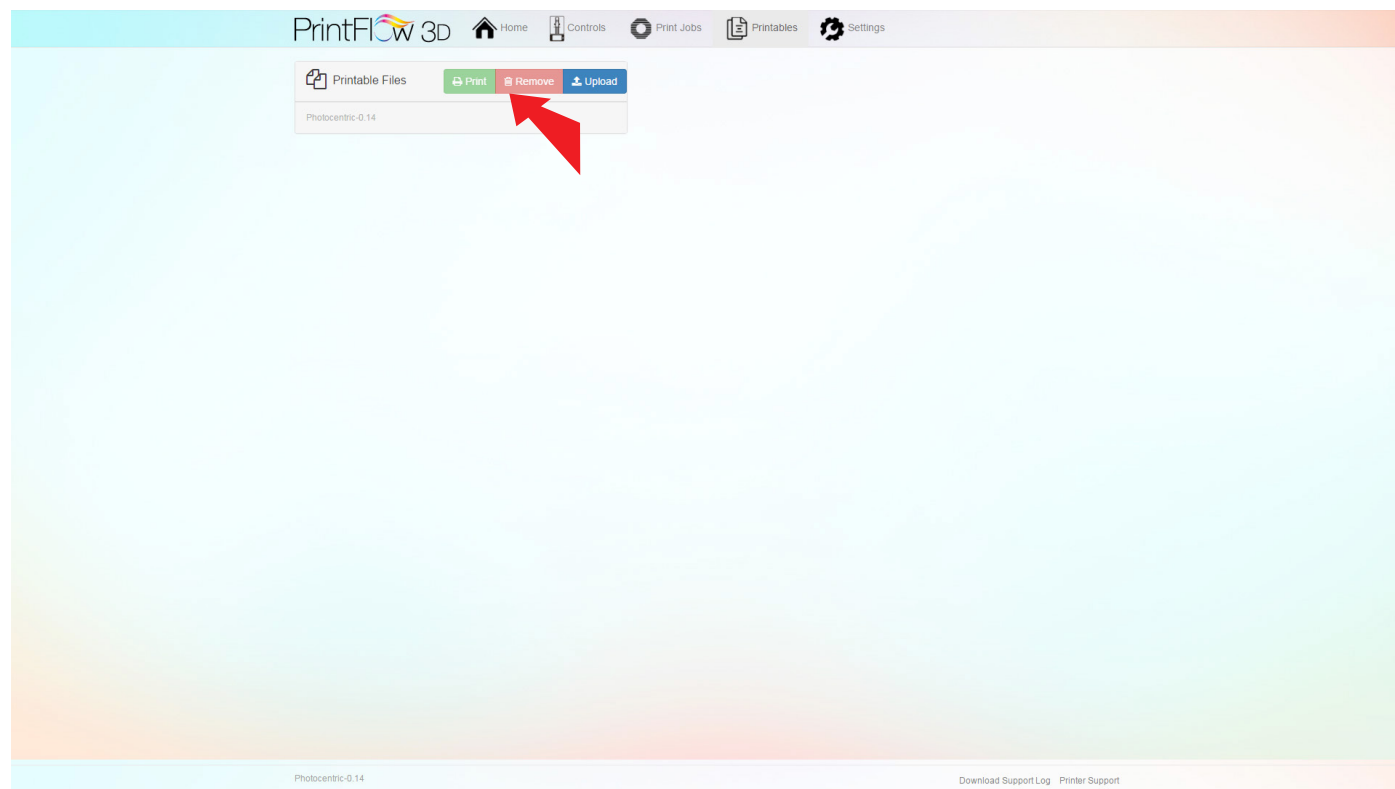


DELETING FILES FROM THE WEB INTERFACE

1. Open "Printflow3D_opener.exe" on the computer. From the home page navigate to the "Printables" tab. It will display this window.

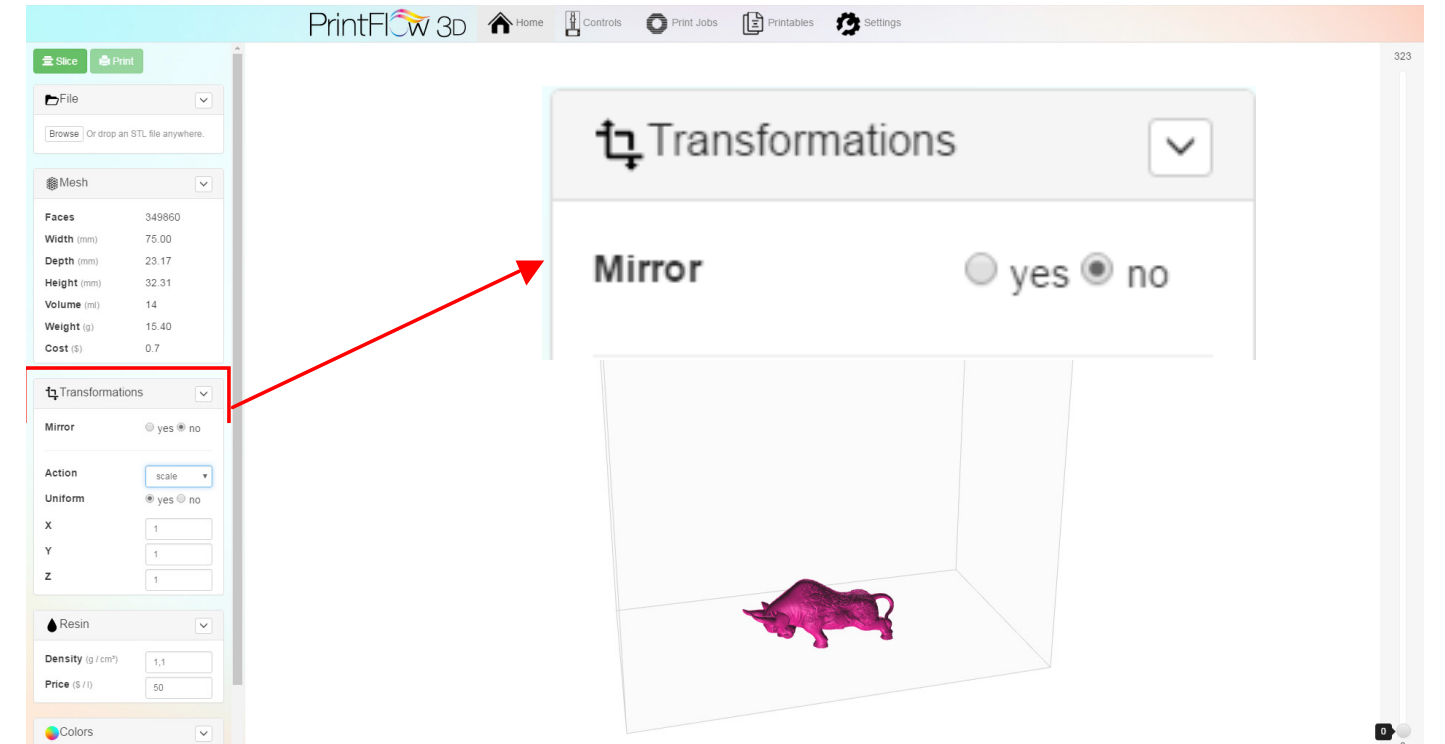


2. Select the printable you wish to delete and click the "Remove" button.

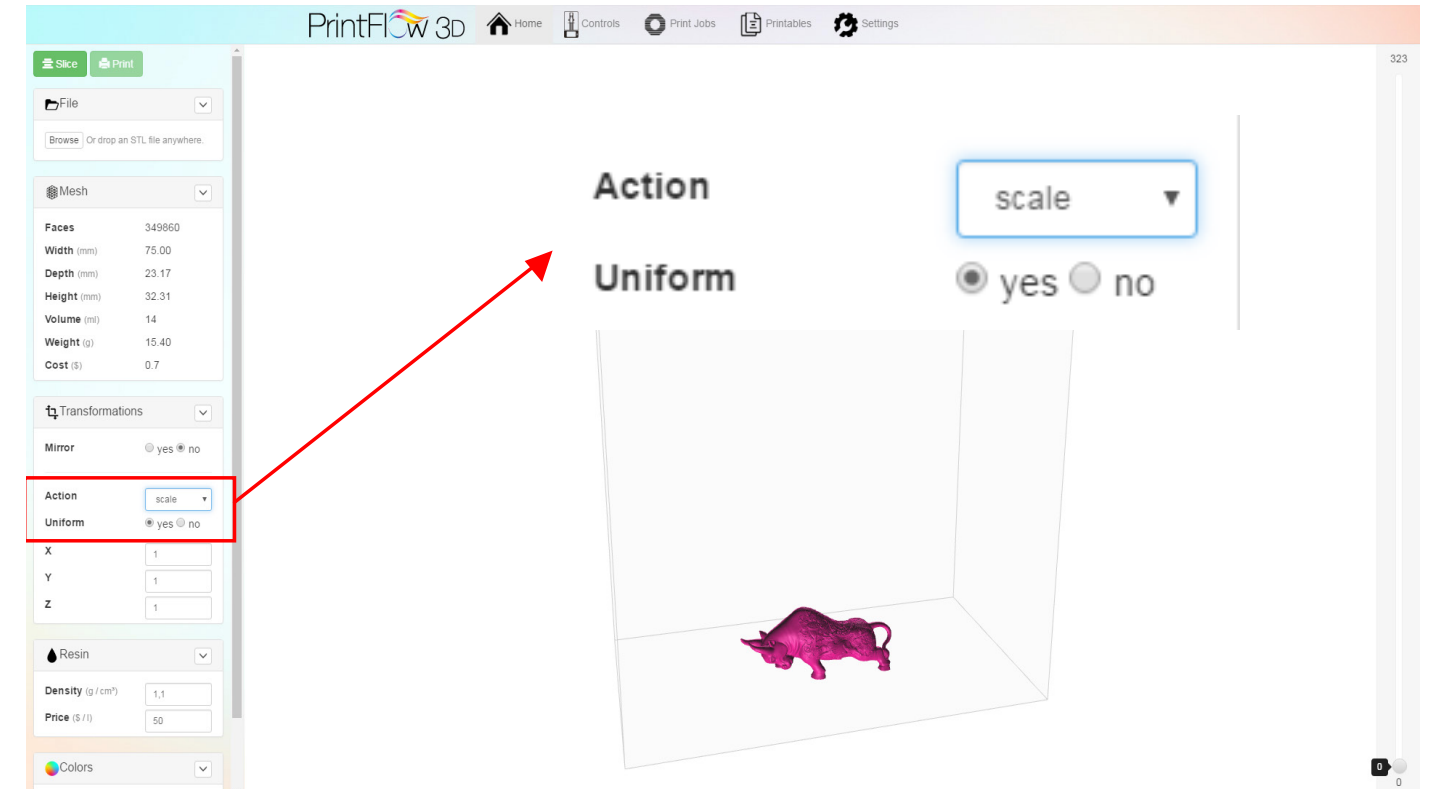


APPLYING TRANSFORMATIONS TO YOUR FILE

Printflow3D allows for some different transformations. These transformation include mirroring, translating, rotating or scaling. To apply mirroring on your part from the 3D view set mirroring to "Yes" in the left sidebar.



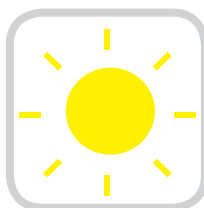
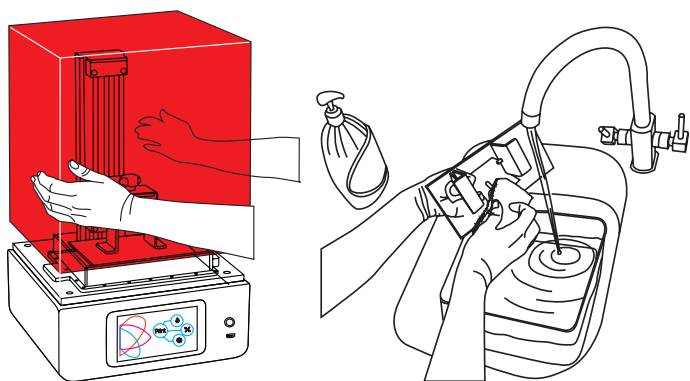
To apply a translation, rotation or scaling also use the sidebar and select the transformation you want to do and in the case of scaling you want to do the transformation uniform.



CLEANING THE MACHINE AND YOUR PRINTED OBJECTS

These steps will minimise any resin spillage and keep your machine clean.

1. After printing press the '+50' button and the platform will rise to above the level of the vat. Remove the hood and loosen the two side bolts, tilt the platform slightly to allow the resin to drip off.
2. With absorbent paper under it, remove the platform completely and set it down on a surface that will not be affected by resin. Place the hood back on immediately to protect the resin in the vat from light.
3. Remove any excess polymer with paper first. Place the platform in a washing-up bowl and remove the objects by sliding the scraper in at their base. Wash off any liquid polymer by running hot water over it. You can gently clean it with a soft brush or sponge, taking care not to damage it, it will not achieve full hardness until after post exposing in light. An ultrasonic cleaner is useful for cleaning delicate objects.
4. When fully clean leave it in light to harden. The part will only have around 1/4 of its final strength before post-exposure and strength increases slowly in light. Full strength is achieved with 30 mins in a UV unit or a strong daylight source, or 60 mins under a normal 60W table lamp at a distance of about 5cm. In a window it depends upon sunlight strength but may take up to 12 hours.
5. Clean the build platform with hot water and soap, chip off any cured resin and dry it well before inserting it back into the printer.
6. You should empty the vat and clean it after every print, in case you have any solid pieces on the bottom, as these would prevent the platform from homing correctly. Loosen the thumb screws and remove the vat from the printer; pour the resin back into the bottle through a strainer.
7. If you have a leak on the screen it is easy to remove the hardened resin without damaging the screen by shipping it off with a credit card or plastic scraper.

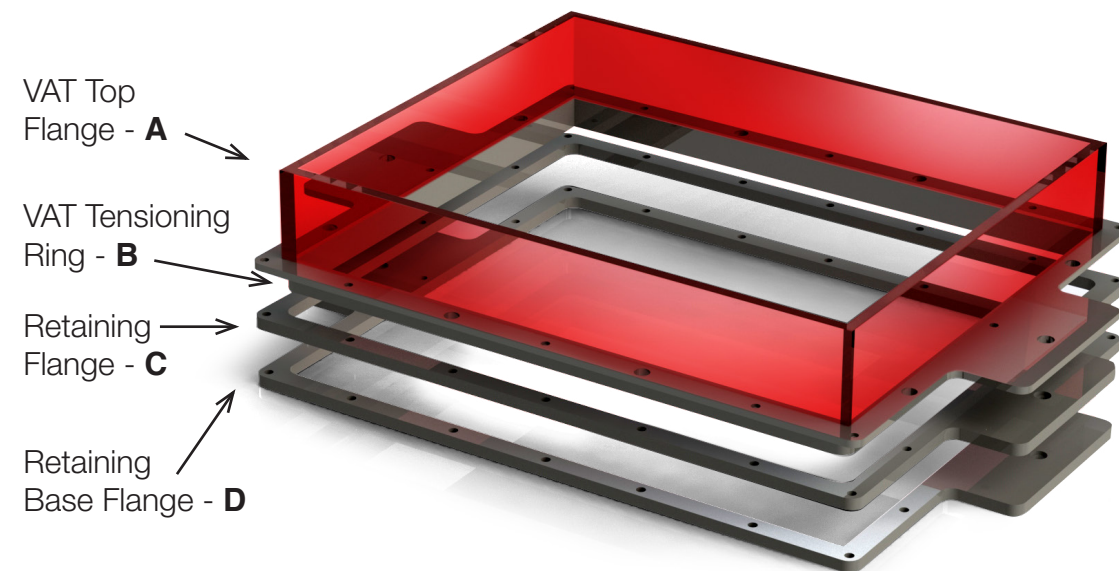


6 - 12 h
post exposure

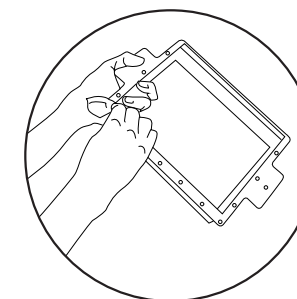


60 min.
post exposure

RE-SKINNING THE VAT

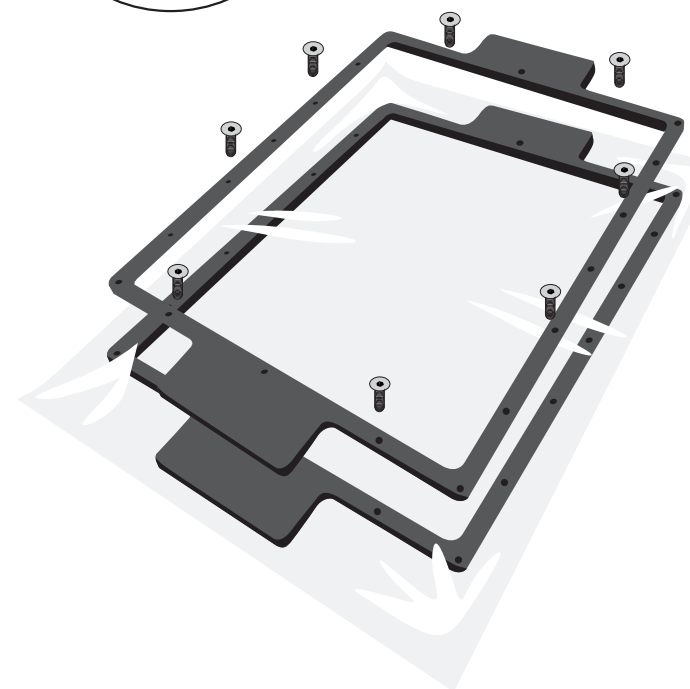


You should empty the vat and clean it after every print, in case you have any solid pieces on the bottom, as these would prevent the platform from homing correctly. Loosen the thumb screws and remove the vat from the printer; pour the resin back into the bottle through a strainer.



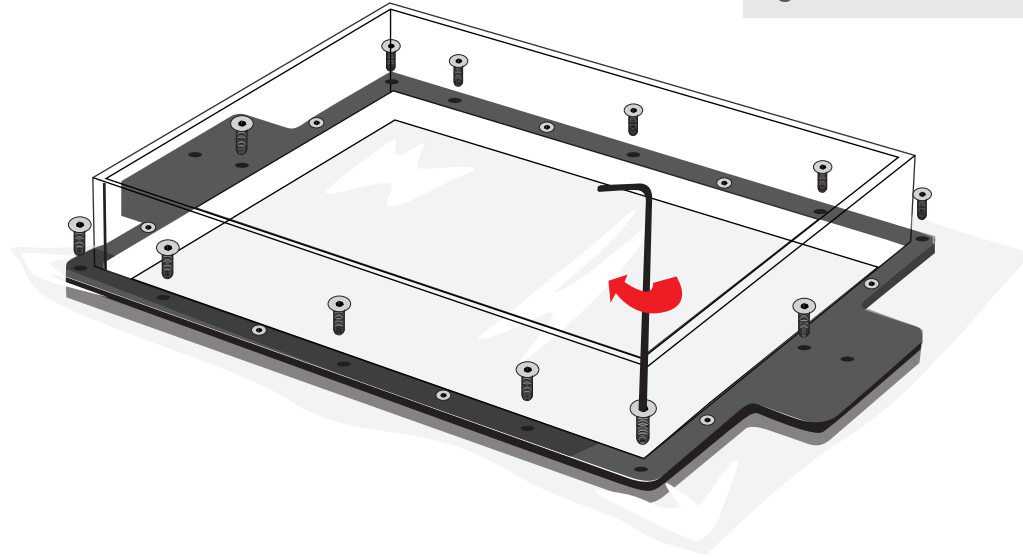
Important:
Clean all the
parts before

1. Remove all the retaining bolts from the vat.
2. Wipe the vat clean and wash all parts with soap and water. Dispose of the vat film.
3. Place the "Vat Base Flange D" flat on a table" with the brass inserts pointing down.
4. Check the new vat film isn't pierced or dented and lay it on top of the "Vat Base Flange D".
5. Place the "Vat Retaining Flange C" on top of the film, aligning the holes with the corresponding ones on the "Base Flange D".
6. Tighten the 8 x M3 8mm bolts as shown.



7. Place the main vat tray over the film and gently press down. Screw the remaining 12 x M3 12mm screws in and the film will tighten.

Note: Refrain from fully tightening each bolt individually. This will cause the Main Vat to tension at an angle. Aim to half tighten the bolts and fully tighten once all the bolts are secured.



8. The vat should now be tensioned. Trim excess edges.

