INTAMSYS

FUNMAT PRO 310 3D PRINTER

User Manual

CONTENTS

Change Record and Version Description

Version	Time	Description
E01	2023.04	Initial version of the manual
E02	2023.07	

1 Service and Support

The information in terms of service and support for FUNMAT PRO 310, as well as the safety information and safety label position are provided in this chapter.

1.1 Service

Please contact INTAMSYS customer support for any problem not covered by this guide during your use of the printer.

Region	E-mail	Tel.
Asia Pacific	Support_APAC@intamsys.com	+86-21-5846 5932
Europe, Middle East and Africa	Support_EMEA@intamsys.com	+86-21-5846 5932
North America / Latin America	Support_America@intamsys.com	+86-21-5846 5932

1.2 Safety Instructions

Following basic safety instructions are provided to ensure the safe installation, operation and maintenance of INTAMSYS equipment, which shall not be regarded as the comprehensive safety problems. FUNMAT PRO 310 Printer is a safe and reliable 3D printer in industrial grade. There is potential hazard in the printer overhauling area.

1.2.1 Classification of hazards

It is recommended by INTAMSYS that all services should be executed by qualified personnel. All personnel operating the printer or near by the printer shall understand the meaning of following hazard classification used in this guide.

[HIGH VOLTAGE]: The sign of high voltage indicates the existence of high voltage. Be sure to keep away from exposed circuits. It is suggested to take off all accessories.

[HIGH TEMPERATURE]: It indicates that the equipment is in high temperature. Take extra care when working near by heated components. Be sure to wear the safety gloves provided in the attachment tools.

The temperature of printing nozzle in the printer can reach up to 300°C.

The temperature of printing buildplate in the printer can reach up to 160°C.

The temperature of chamber in the printer can reach up to 100°C.

[PINCH POINT]: It indicates that you may have a risk to pinch hand between two objects. There are one or multiple objects moving in your working area.

RISK OF FIRE
Install only on concrete
or other non-combustible floor

This equipment is not suitable for use in locations
where children are likely to be present.

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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.

This equipment complies with FCC/IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

ce matériel est conforme aux limites de dose d'exposition aux rayonnements, FCC / CNR-102 énoncée dans un autre environnement.cette eqipment devrait être installé et exploité avec distance minimale de 20 entre le radiateur et votre corps.

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

l'appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux CNR exempts de licence d'Innovation, Sciences et Développement économique Canada. L'exploitation est soumise aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage,

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

1.2.2 Potential safety hazard area

The following components and areas have been highlighted as having potential safety hazard. Failure to follow the safety procedure will cause system fault or problem in reliability.

Nozzle

[HIGH TEMPERATURE] Warning: During the heating of nozzle, please be sure to wear the safety gloves when maintaining the nozzle or working in the chamber.

Printing buildplate

[HIGH TEMPERATURE] Warning: During the heating of hot bed, please be sure to wear the safety gloves when taking off the buildplate or working in the chamber.

Chamber

[HIGH TEMPERATURE] Warning: During the heating of chamber, please be sure to wear the safety gloves when working in the chamber.

XY movement frame
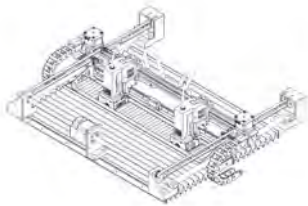
[PINCH POINT] Warning: Do not wear tie, loose clothes or hanging ornament when working near by any moving component of the printer.

Never click HOME when there is a model on the platform.

Take extra care when maintaining such moving components.

Z-axis buildplate
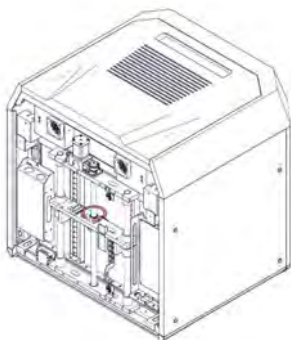
[PINCH POINT] Warning: Do not wear tie, loose clothes or hanging ornament when working near by any moving component of the printer.
Don't put anything on the bottom of the chamber.

1.3 Door lock

The sensor is used to transmit the state of chamber front door and top door. For safety reason, the chamber front door and top door must be closed before the chamber is heated or the X/Y/Z motor starts working. The electromagnetic lock can ensure that the chamber door and cap are firmly closed when the printer is executing the printing operation.

前门传感器
前门电磁吸
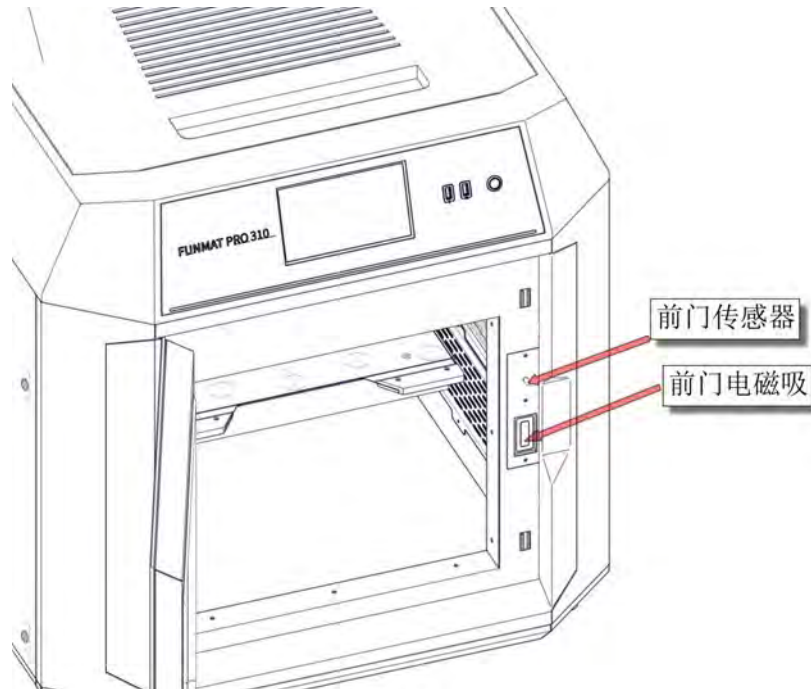
Figure 1.1 Security door lock

1.4 Environmental Requirements

- The printer is for indoor use only.
- The condition of air quality with excessive solid particles (conductive or non-conductive) may cause damage to the system.
- The system operating temperature shall be kept between 15°C and 30°C (59°F to 86°F), and the relative humidity shall be kept between 30% and 70% (non-condensate).
- The system storage temperature shall be kept between 0°C and 35°C (32°F to 95°F), and the relative humidity shall be kept between 20% and 90% (non-condensate).

2 Setup and Installation

The basic setup and installation of FUNMAT PRO 310 are described in this chapter.

2.1 General Information

2.1.1 Attachment tools

Please check the attachment tools in the packing list. These attachment tools are the frequently used tools in printing and spare parts in maintenance of the printer.

2.1.2 Working space requirements

It is the guide for installation site preparation, which can ensure the efficient and safe preparation of related facilities to install the printer.
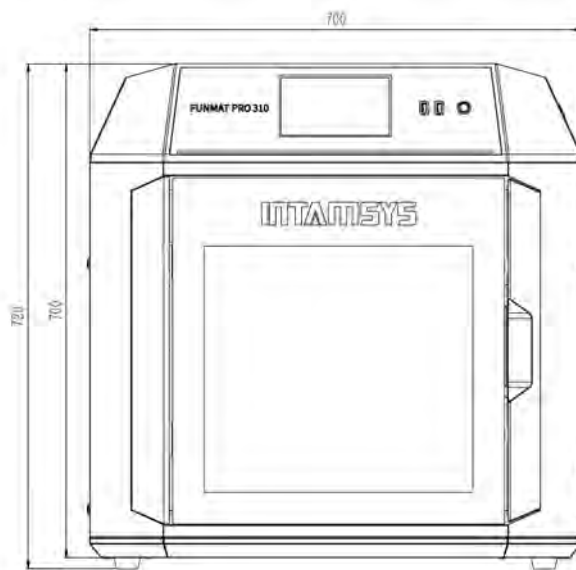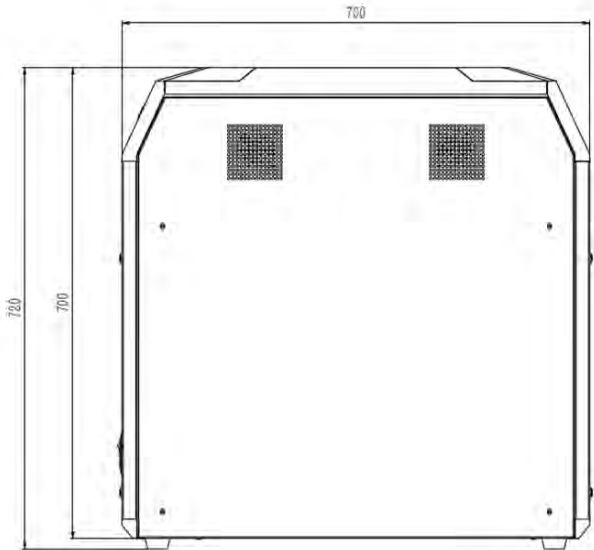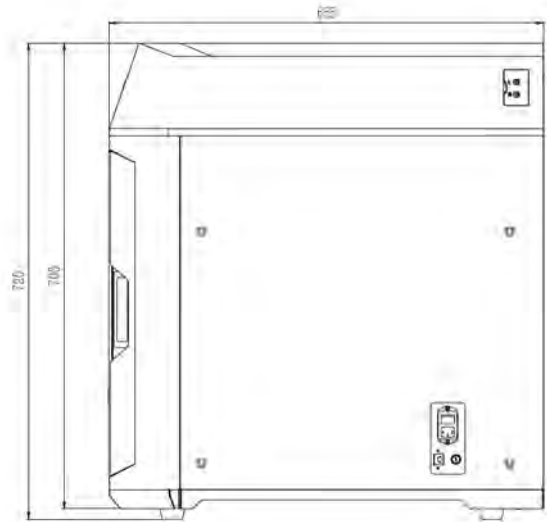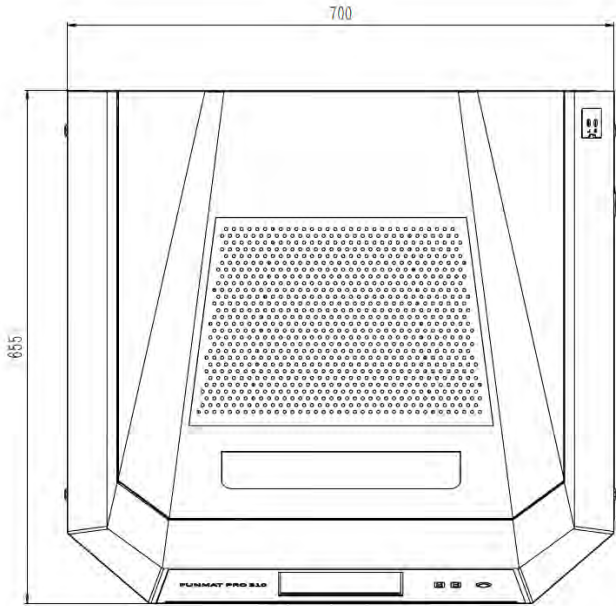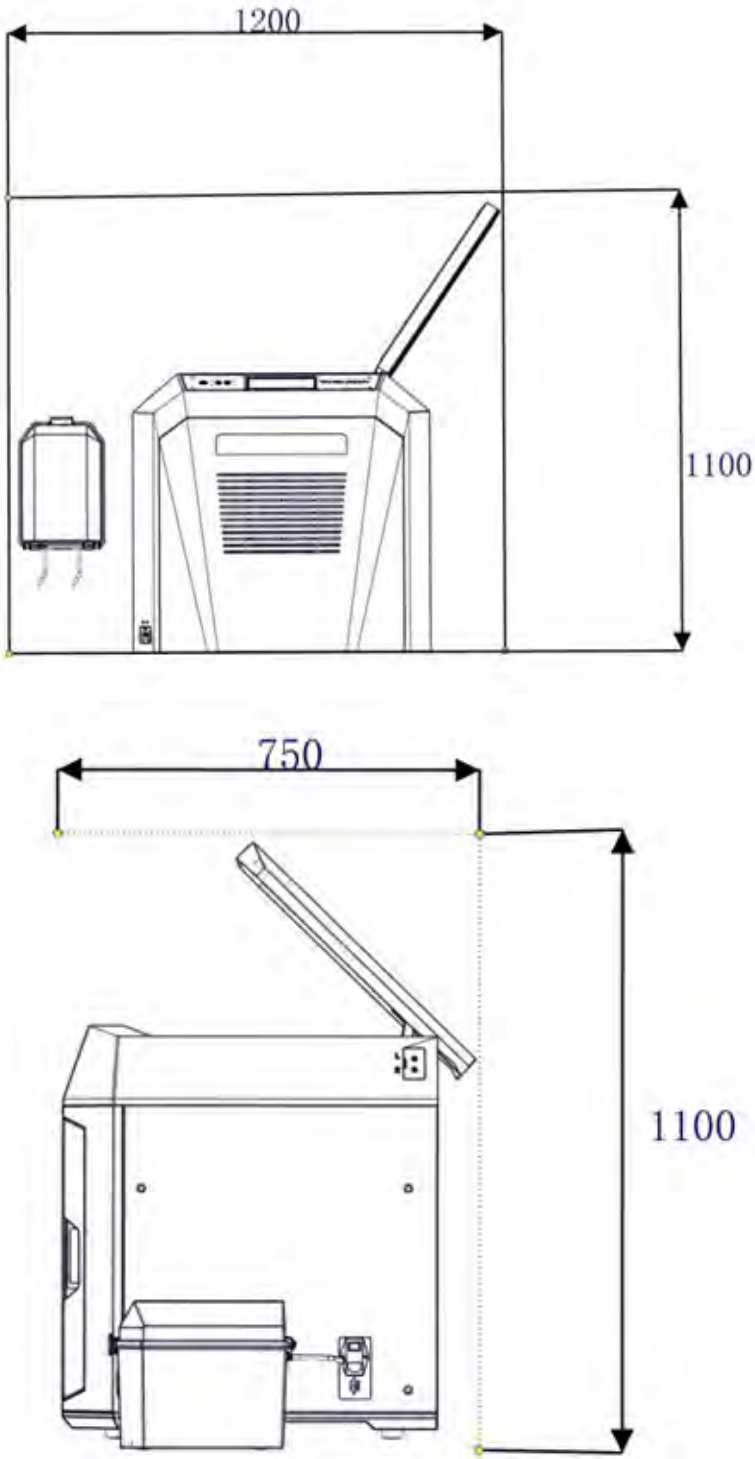
Figure 2.1 Installation and maintenance space requirements (Unit mm)

2.1.3 Inspection of the printer's nameplate

There is a warning label and product nameplate attached to the back side and bottom right corner of the printer.

Identify your printer by following figure.

FCC Warning Statement

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.

Product Certification

Product Name: 3D Printer
Model Number: FUNMAT PRO 310
Rated Voltage: 100-120V~ 50/60Hz
Max. Power: 1500W

CE FC
RoHS
PS E SGS 800647
020-230230
KC UKCA

SN: ITM0910112300001
FCC ID: 2AWSZ-PRO310   IC: 25341-PRO310
Manufacturer:
Intamsys Technology Co., Ltd.
Address: 1st and 4th Floor, Building 2, No. 24 and 26, Gubo Road, Pudong New District, Shanghai, P.R.China
Authorized representative:
Intamsys Technology GmbH
Address: Zeppelinstr. 35, 73760 Ostfildern Deutschland
Made in China   MFG Date : 2023/07   Net Weight: 80kg

Figure 2.1 Printer nameplate

Model designation: It lists the product name, the model number and power requirement of the printer. The nameplate also lists the related certification information and the company information of INTAMSYS.

Serial number: It lists the serial number of the printer, which will be provided to agent or INTAMSYS for requesting services, so that the service personnel can quickly identify the configuration of your printer.

2.2 Machine Preparation

2.2.1 Remove package

Step 1: Remove the fixing strap on the packing box and remove the board on the top of the packing box

Step 2: Remove the foam and wrapping film

Step 3: Remove the top cover of the packing box

Step 4: Remove the cardboard and foam around the box

Step 5: From the bottom of the left and right sides of the printer, lift the printer to a stable desktop (at least two people are required).
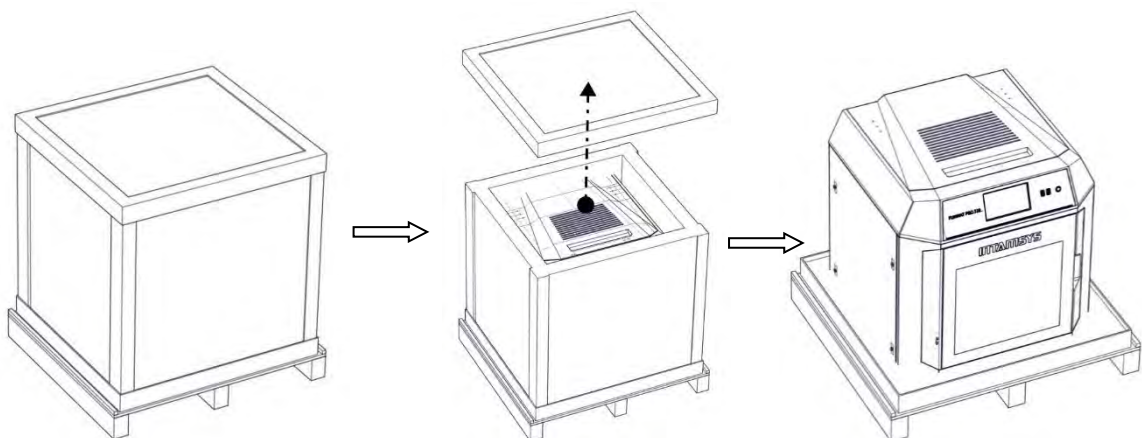
Figure. 2.3 Schematic Diagram of Package Removal

2.2.2 Take out the accessories

Open the front door of the equipment from the front and carefully take out the accessories and material boxes from below.
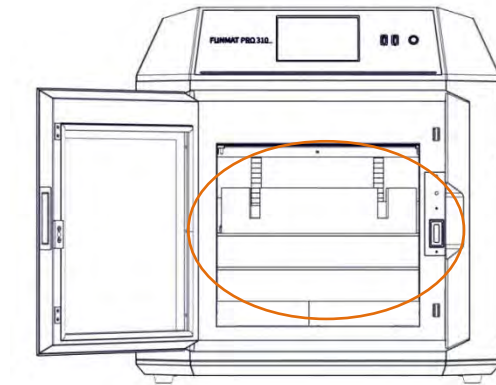
Figure 2.4 Matching Box Picture

2.2.3. Release XY modules

Step 1: Open the printer top cover

Step 2: The fixed block on the X-axis guide rail is used to ensure the stability of the nozzle device during transportation. Use M4 Allen wrench to unscrew the two screws on the fixed block (4mm Allen wrench is located in the spare parts box), and the X-axis fixed block can be removed;

Step 3: Remove the Y-axis fixing block fixed on the front side sealing plate, and then put the spare screw in the plastic bag back to the original position;

Step 4: When the power is turned off, gently push the print head to the left in the X direction to move out of enough operating space, and remove the Y-axis right fixing block in the same way.
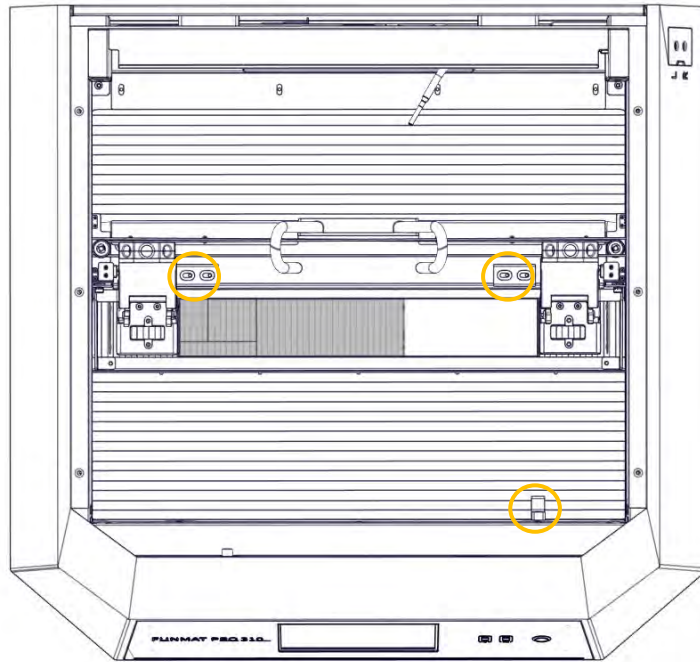
Figure. 2.5 Position of XY Axis Fixing Block

Step 5: Install the left and right nozzles in the nozzle holder as shown in the figure.
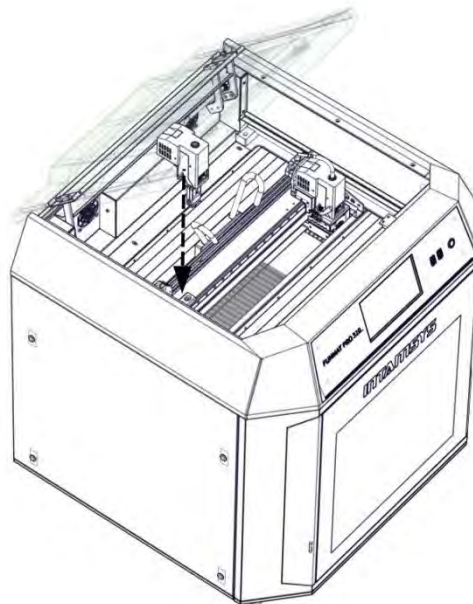
Figure 2.6 Print head installation

Step 6: Rotate the pressure rods on both sides of the nozzle holder, firmly fix the nozzle in the nozzle holder, and plug in the nozzle cable.
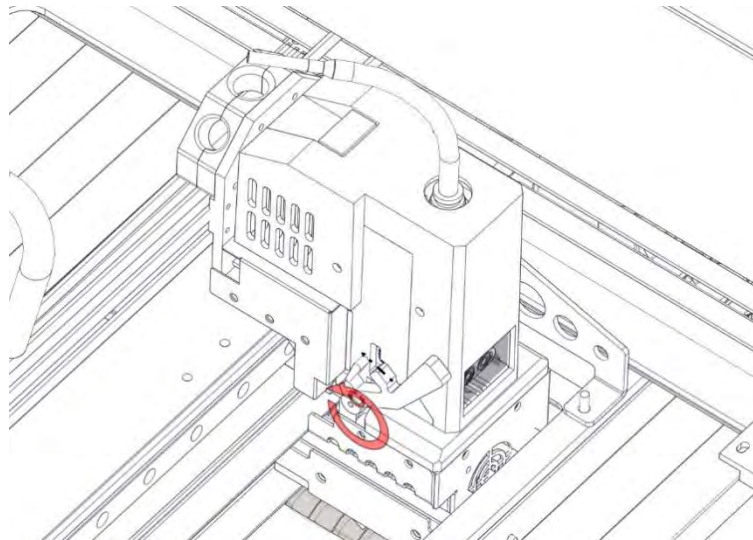
Figure 2.7 Print Head Fixing

2.2.4 Power on

Step 1: The printer has 110V and 220V power specifications. Please check whether the socket power supply meets the requirements before use

Step 2: Insert one end of the power cord into the right power connector of the printer, and insert the other end into the prepared power socket

Step 3: Turn on the switch, press the start button, and the printer enters the operation interface
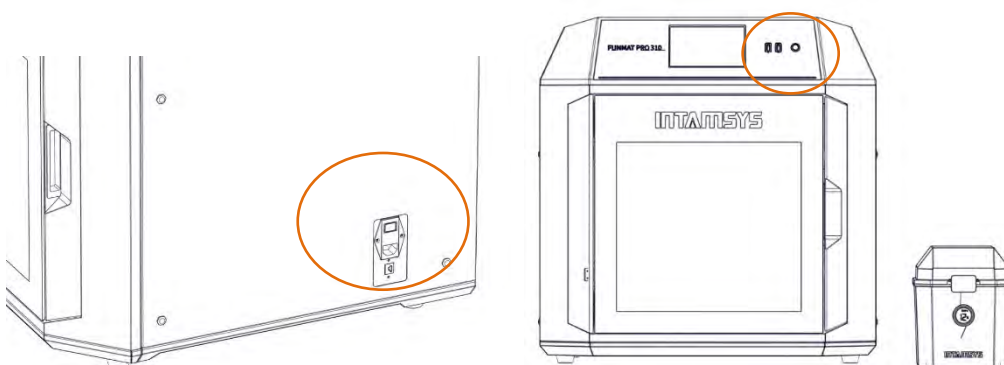
Figure 2.8 FUNMAT PRO 310 Power on

2.2.5 Install the printing build plate

Step 1: Click the "Home All (Home XYZ)" key in the "Toos/Axis" interface.

Step 2: After selecting the "Z-Bottom" option in the "Z Build plate" above, move the print platform to the bottom.

Step 3: as shown in the figure, the printing board is evenly adsorbed on the magnetic attraction platform along the guide grooves on both sides of the platform.
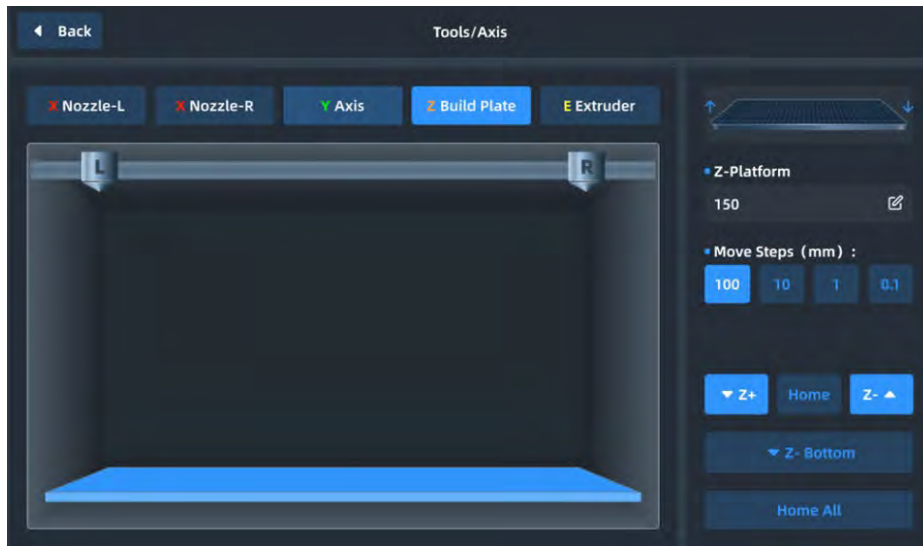
Figure 2.9 Platform Descent Method
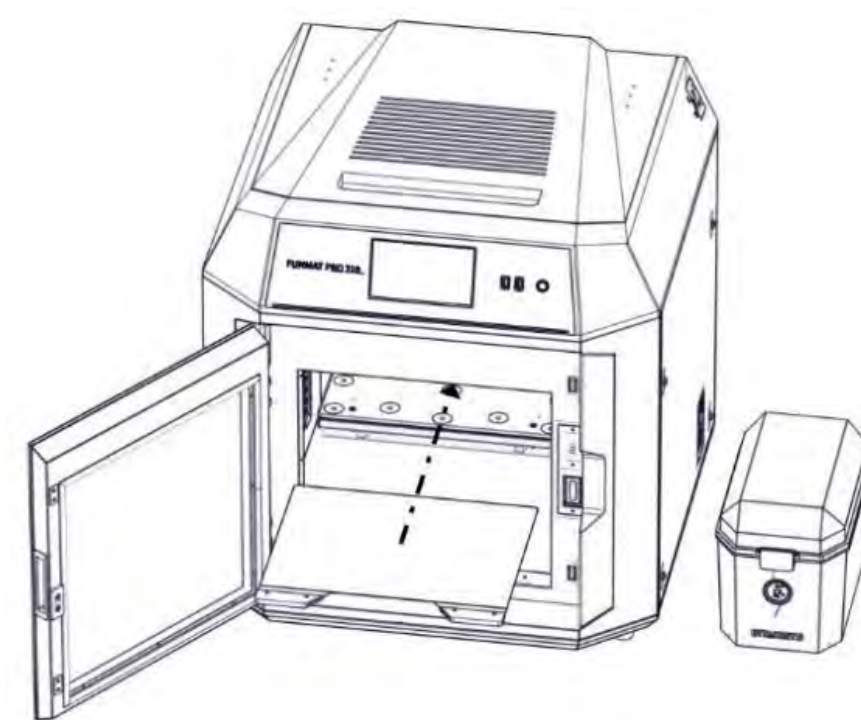
Figure. 2.10 Installation Direction of Platform

3 System Components

The system components of FUNMATPRO 310 are described in this chapter, to help users better understanding the composition principle of the printer, and knowing about the functions of each part.

3.1 Overview of the Printer

The visible part of the printer appearance is shown in the following figure. Among them:
The right side panel, the left side panel and the rear side panel of the cover are removable for inspection and repair of internal components; the top door and the front door must be closed during printing and locked by electromagnetic locks

开关按钮　USB口　触摸操作界面　前门观察窗　顶门　进料口　电源接口　独立料箱　打印底板　前门传感器　前门电磁吸
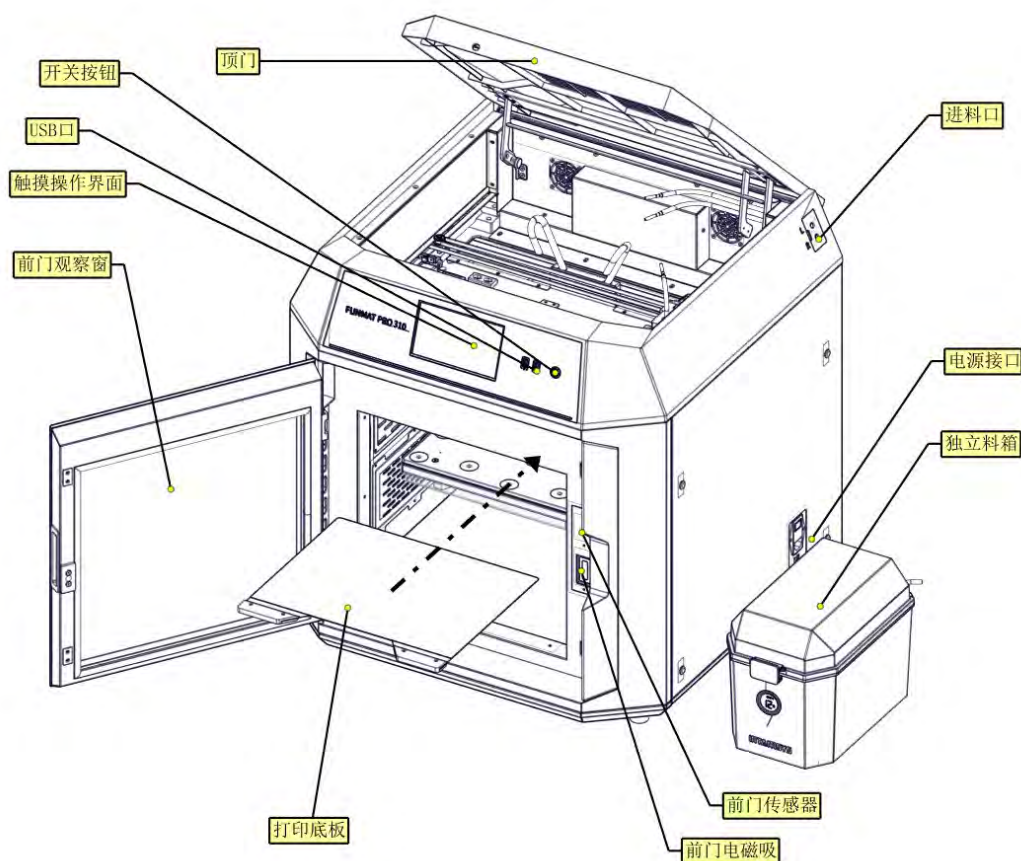
Figure 3.1 Front view of the printer

顶部出风口
顶门扣手位
后侧出风口
罩壳后侧板
罩壳左侧板
罩壳螺丝
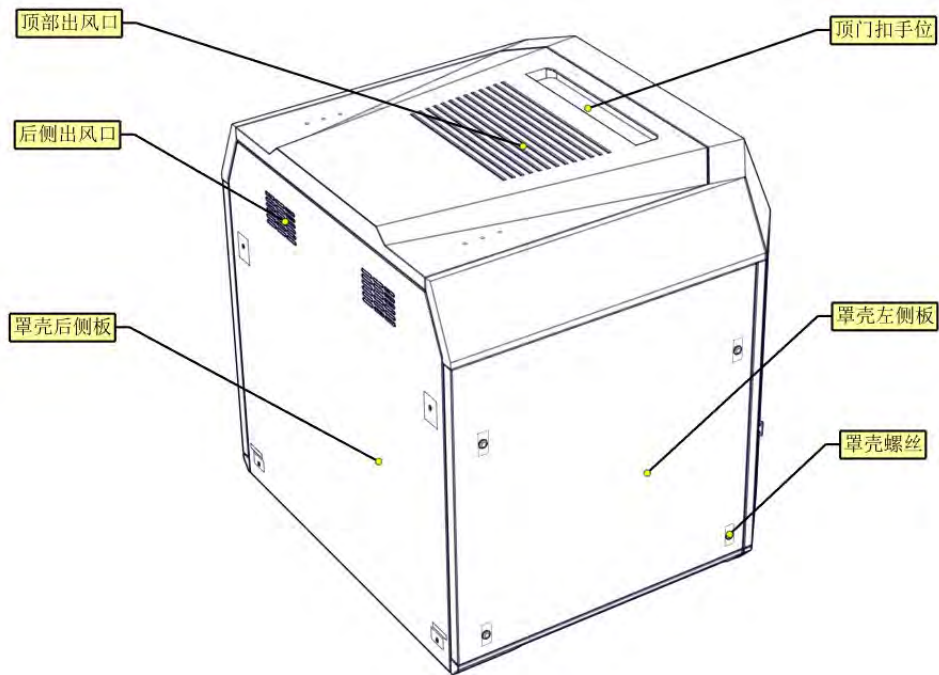
Figure 3.2 Rear view of the printer

3.2 top door and user interface

Push the top door upward to observe the printing situation from above, and also to facilitate the maintenance of XY stage and print head assembly.

The top door can be pushed upward by releasing the electromagnetic lock through the screen operation, and the top door is supported by the damping hinge. The damping hinge can ensure that the top door stops at any opening and closing position.

Below the top door is the user interaction area, including touch screen, USB interface, button switch. The user realizes the control of the printout through the touch screen and obtains the machine status information. The USB on the left is only used to connect to the computer for printing and firmware upgrade, and the USB on the right is used to insert the USB disk for printing. The push button switch is used for normal on/off and emergency shutdown.
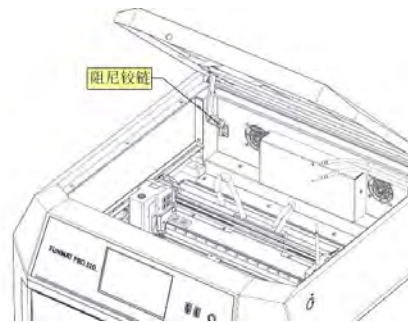
Figure. 3.3 Schematic Diagram of Opening Top Door

Figure. 3.4 Schematic Diagram of User Operation Area

3.3 Printing Chamber Subassembly

By releasing the electromagnetic suction of the front door through the screen operation, the front door can be pulled away from the right side, and then the printing chamber can be seen to contain: front door, hot bed, double nozzle assembly, electromagnetic suction, magnetic suction, door sensor, etc. When the printing chamber is heated, the stainless steel bottom plate and side plate have a higher temperature, please do not touch it to avoid scalding.

Four leveling knobs under the hot bed are used to manually level the printing platform.
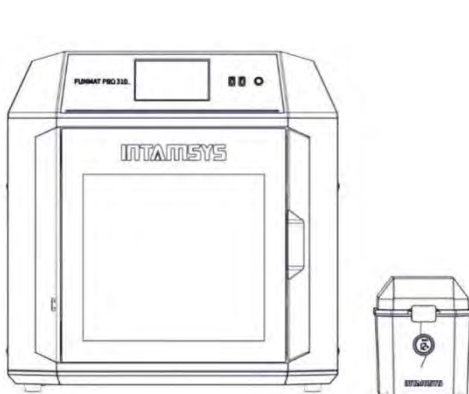
Figure. 3.5 Schematic Diagram of Opening Mode of Front Door
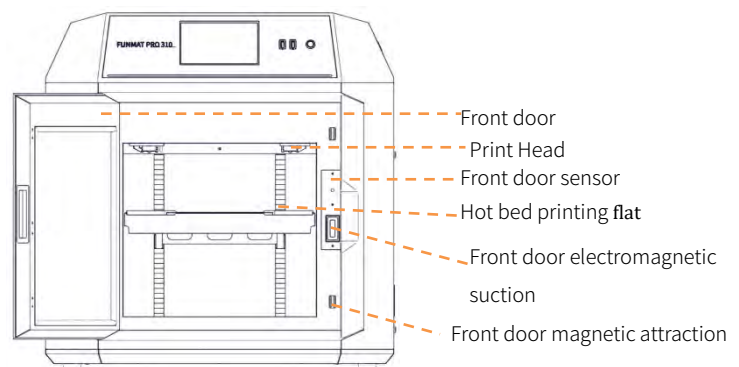
Figure 3.6 Printing Chamber

3.4 independent consumable box assembly

The printer is equipped with an external INTAMBox sealed drying consumables box, which can hold up to two rolls of 1Kg of material. The consumable box is surrounded by sealing rings and buckles to ensure the sealing performance of the consumable box. The consumable box is equipped with a drying box, and the inside of the drying box is equipped with 4A molecular sieve desiccant, which can ensure the low humidity environment inside the consumable box. The upper cover of the consumable box is equipped with a tray tensioning device to ensure that the wires will not spread out during printing and that the wire reel will not topple when the wire in the tray is exhausted. Specific use can refer to the INTAMBox sealed drying consumables box instructions.
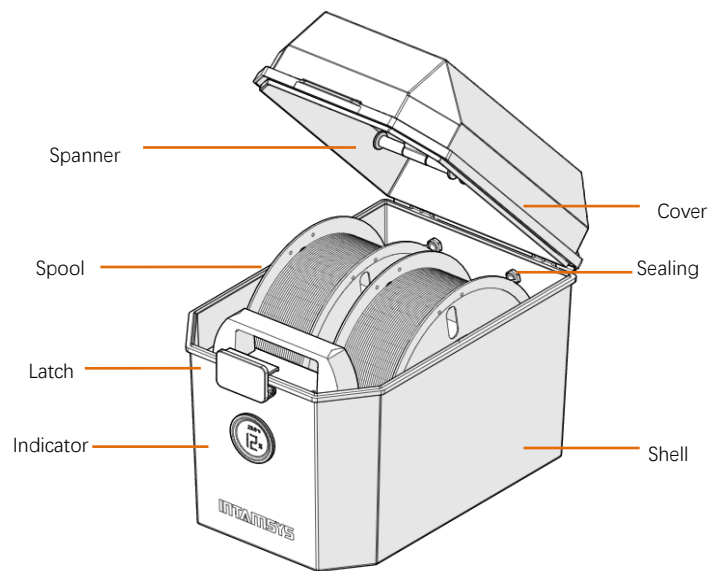
Figure. 3.7 Schematic Diagram of Consumables Box
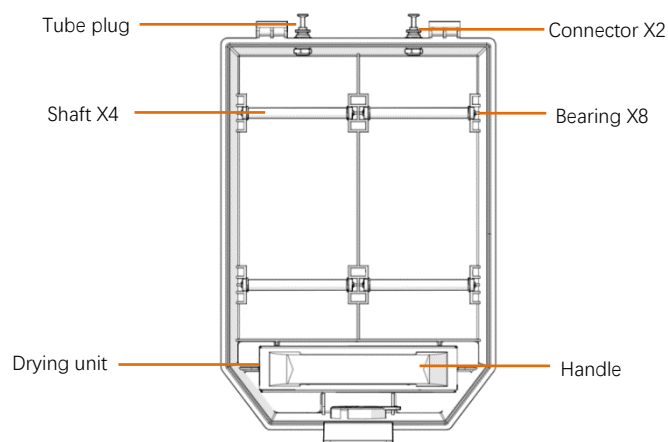
Figure. 3.8 Schematic Diagram of Top View of Consumables Box

Torsion spring X4 ——— Shaft X4

Press bracket X4 ——— Finale X8
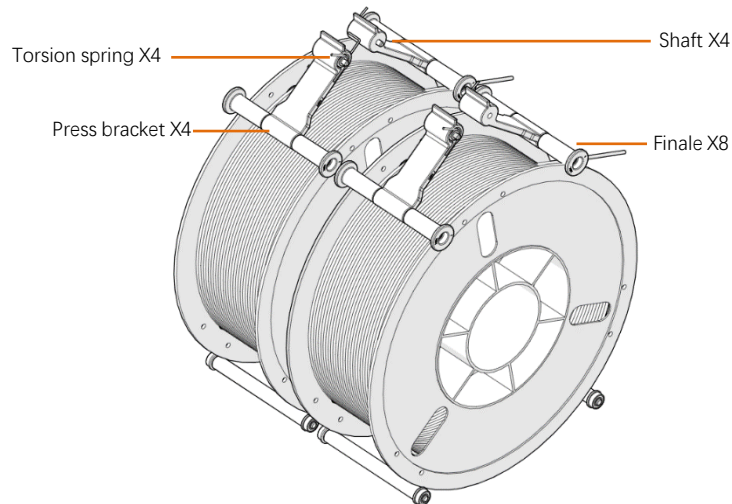
Figure. 3.9 Schematic Diagram of Tensioning Device

3.5 Printing Head Subassembly

The print head assembly is used to melt the wire and, in conjunction with the movement of the XYZ axes, form the desired pattern on the print substrate. A machine contains two independent print heads, usually, the head mounted on the left is used to print the model material, and the head mounted on the right is used to print the support material. Generally, only one nozzle executes printing at the same time, and the other nozzle will stand by at the edge of the x-axis. When copying or mirroring printing, two nozzles move at the same time to print.

See Chapter 5 for material loading and unloading.
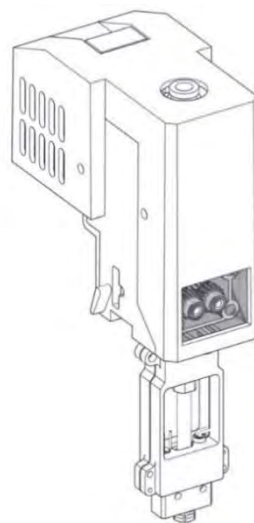
Figure 3.10 Print Head Assembly

3.6 XY Axis Subassembly

The XY axis assembly drives the dual-nozzle extruder to move in the XY plane as commanded.
Both the X-axis and the Y-axis are driven by synchronous belts. When the machine leaves the factory, the tension of the synchronous belt has been adjusted to a suitable state, and no adjustment is required during use. After a period of use, when it is found that the printing quality has obviously decreased, it may be caused by the relaxation of the timing belt due to various reasons. After removing the left and right side shells of the machine, you can see and check the tension of the left and right timing belts of the Y axis. When removing the rear side shell, you can adjust the tension of the Y direction timing belt. Open the top door to see and check the tension of the X axis timing belt. If it is found that the tension of a timing belt is too small, it can be adjusted according to the method shown in the figure below. The left and right timing belts of the Y axis should maintain the same tension.
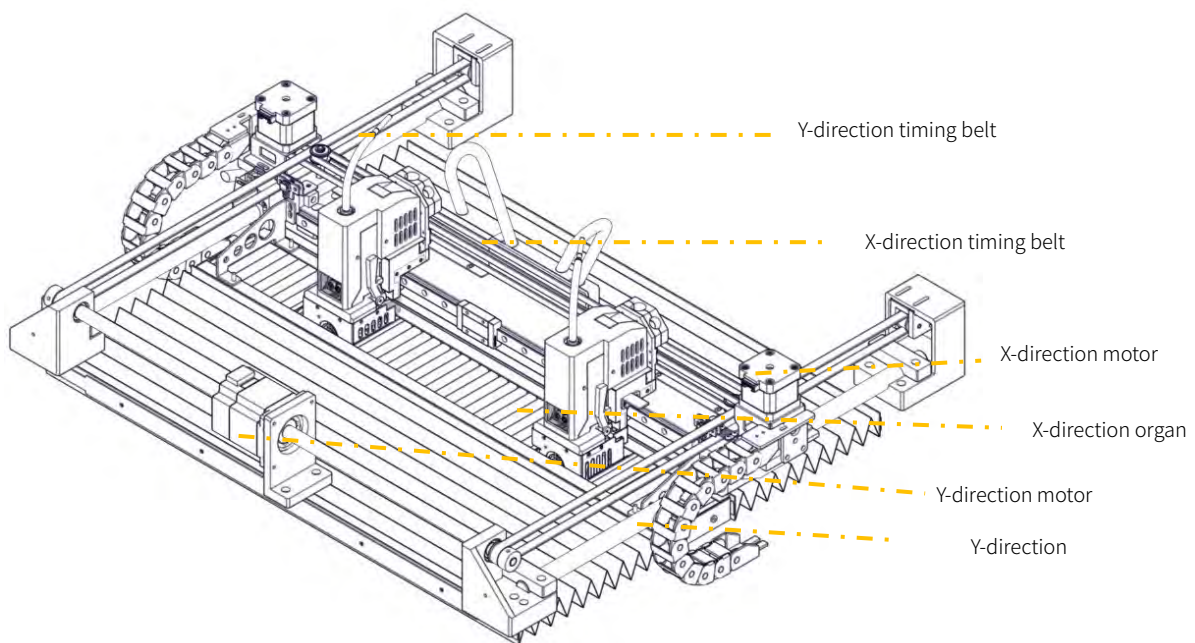
Figure 3.11 XY Assembly
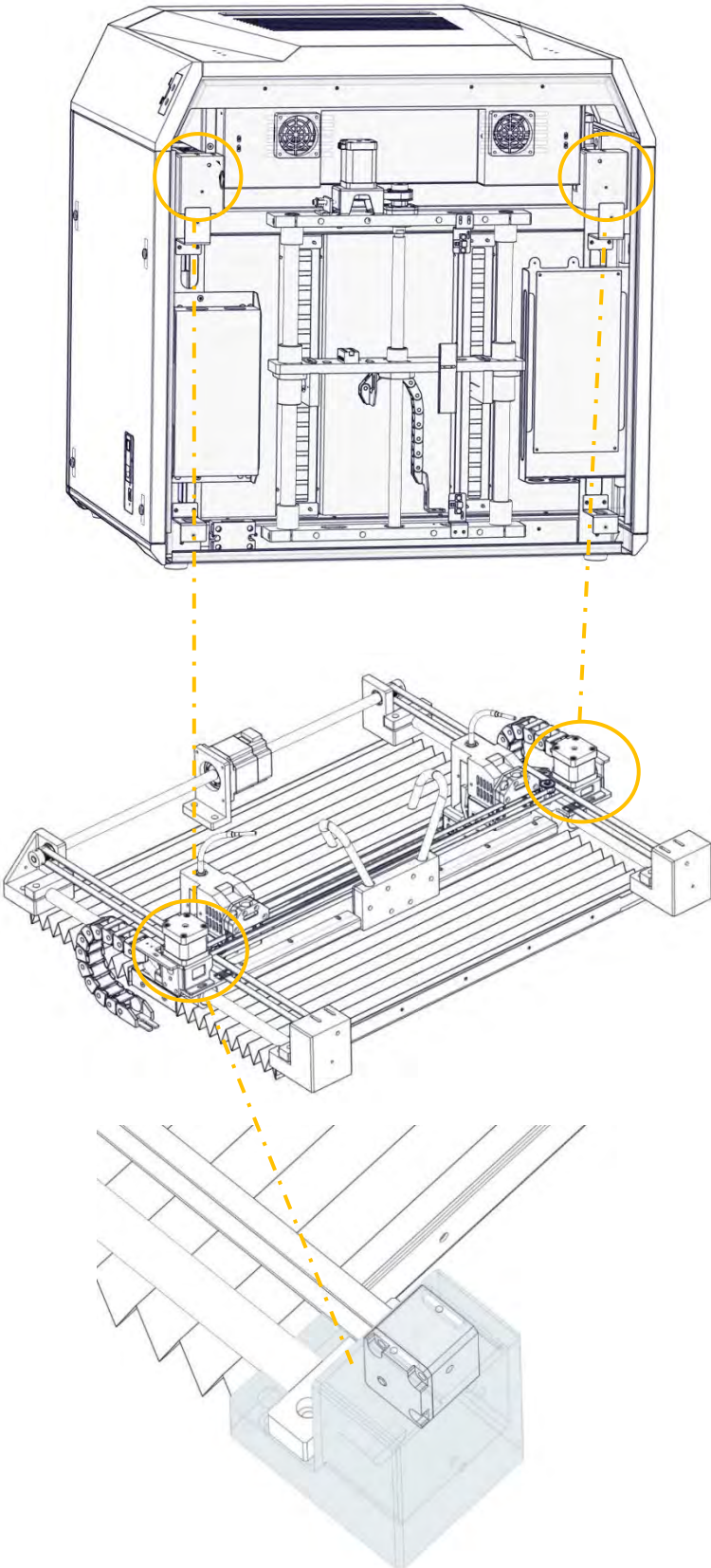
Figure. 3.12 Adjustment of Y-axis Synchronous Belt Tightness
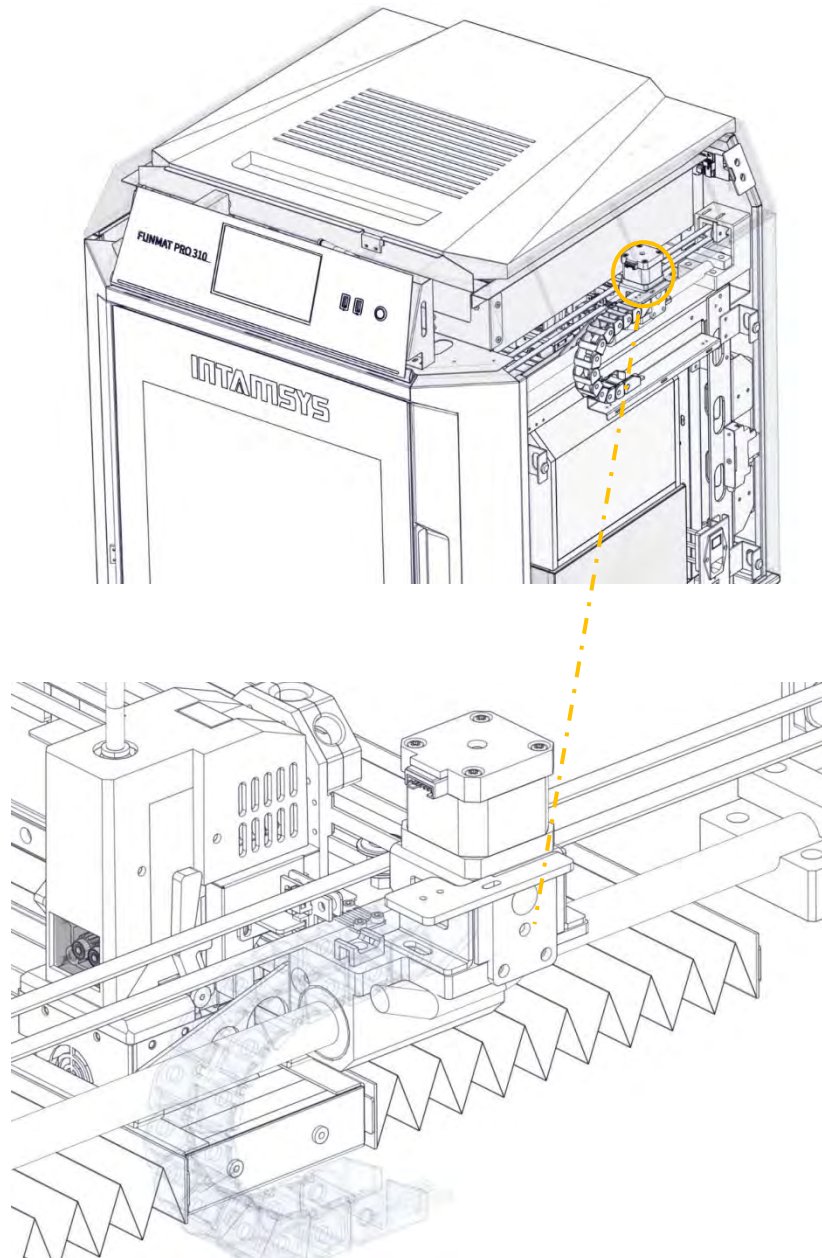
Fig. 3.13 Tightness Adjustment of X-axis Synchronous Belt

3.7 Z Axis Subassembly

Z axis subassembly drive the hot bed to move up and down. Z axis subassembly can be maintained by removing the rear lateral plate.

The trigger plate of photoelectric sensor has been in its position, no further adjustment by user is required. Only when there is any problem in manual leveling of the hot bed, users may be required to inspect and adjust the position of the trigger plate. Upward adjustment of the trigger plate of

photoelectric sensor can make the zero point of hot bed move downwards, and downward adjustment of the trigger plate of photoelectric sensor can make the zero point of hot bed move upwards.

Z-direction motor

Timing belt

Ball screw

power supply

synchronizing wheel

Guide shaft x2

Linear bearing X2

Sensor Trigger

Motherboard

Photoelectric sensor x2
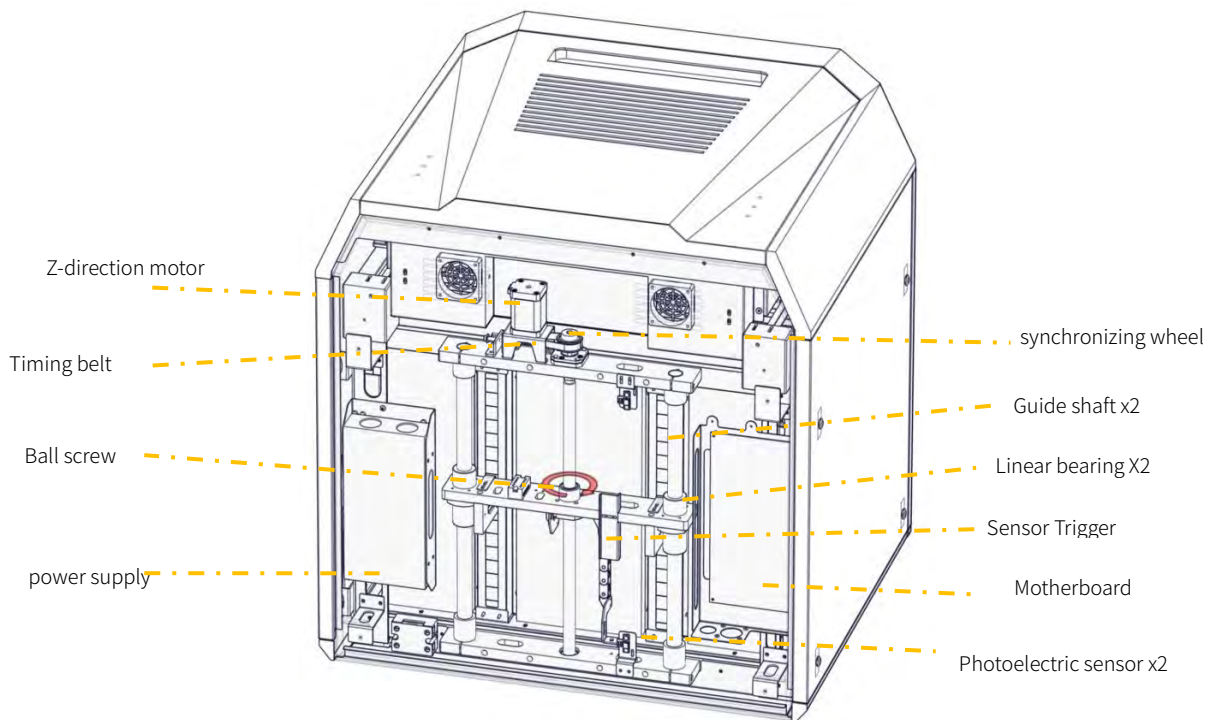
Fig. 3.14 Z-Axis Components

3.8 hot bed assembly

The hot bed assembly includes a printing base plate, a high temperature resistant magnet, an enclosure plate, a heating film, etc. The printing bottom plate of the printer is a magnetic absorption bottom plate, and the hot bed substrate is equipped with 18 high temperature resistant magnets, which can smoothly and firmly adsorb the printing bottom plate on the hot bed substrate. The hot bed bottom plate has four leveling screws, which can be manually leveled according to the operator interface guidance if necessary.

加热膜
围板
磁吸热床基板
耐高温磁铁
打印底板
打印板把手
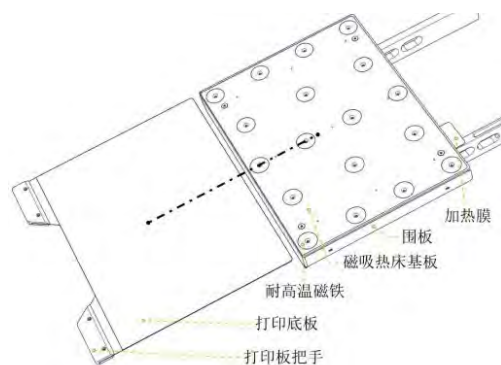
Fig. 3.15 Hot Bed Assembly

4 User Interface

4.1 Overview

Before using the touch screen, both the printer and touch screen must be powered on. FUNMAT PRO 310 User Interface is composed of the touch screen in the middle of the printer's front side.

The main interface of the touch screen contains three main functional areas: Status bar, Navigation bar, and Display area.

Figure 4. 1 Overview of User Interface

On **Status Bar**, besides checking the WIFI, USB Disk, and Network status, we can perform
- Camera display (camera icon)
- Error diagnosis (information Icon)

Navigation Bar is on the right side of the panel, we can enter the main features through corresponding commands.

On the **Display area**, we can select G-code files to print, start/pause/resume the printing job, and preview the printing status on the model picture.

4.1.1 Status Bar

The status bar is on the top of the touchscreen display, appearing on each page of the user interface. Various information is displayed, including network state indicator, camera, USB Flash Disk, etc.
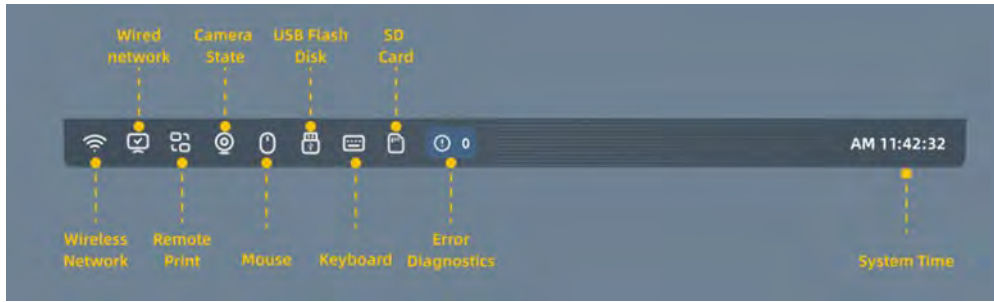
Figure 4.2 Status Bar

4.1.2 Navigation bar
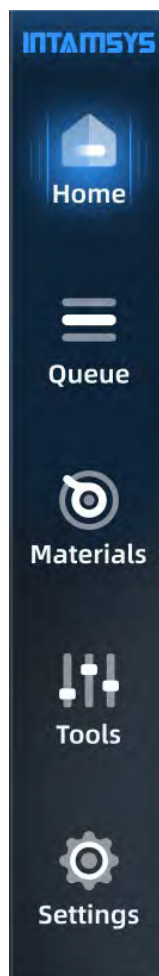
Figure 4.2 Status Bar

The following operations can be performed through the screen Navigation Bar:

Home: Normal printing process, preheating, heat maintaining setting, progress display on model graphic, temperature display, etc.

Queue: Importing g-code/printing files and managing the sequence, the engineer can manage their daily routine task on it.

Material: Loading and unloading, material management, and other operations related to specific materials

Tools: **Axis** for inching operation of each axis and extruder, Calibration for leveling, XY offset and Z offset, **Tune** for the setting of parameters related to printing

Settings: View of system parameters and related system settings

4.1.3 Display area

The display area is used to display the relevant information corresponding to the functional module selected, including the operation button, text description, image display or motion graphics schematic, etc.

After **both the machine and Touch Screen** are **powered on**, the display area will be displayed as the **Home** interface by default.

Once the corresponding button in the **Navigation bar** is selected, the display area will be switched to the related interface

The **screen saver** is invoked if we don't touch the screen for 5 minutes (the time can be set in the settings interface), Press any place can go back to the **home** page.

Figure 4. 3 Screen Saver Interface

4.2 Home

The **Home** interface mainly introduces the relevant parameters of the printing process. On the left side, it includes a model printing progress preview and main operation buttons to start/pause/stop printing jobs.

On the right side, it includes L-Nozzle temperature, R-Nozzle temperature, Chamber temperature, and Heatbed temperature.
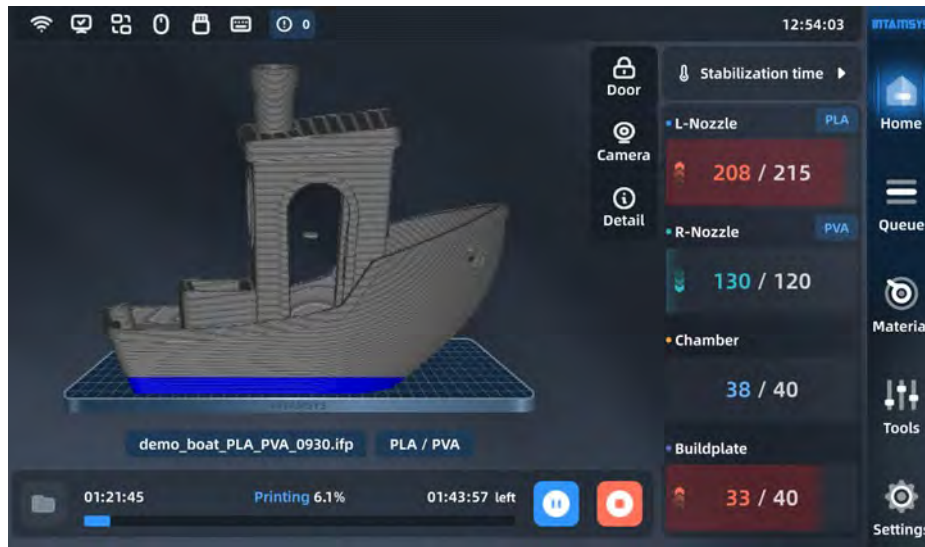
Figure 4. 4 Screen Saver Interface

4.2.1 Open the printing files

Once the touch screen is launched, It provides 2 ways to open printing files on USB and local storage if they are available. click the buttons it goes to the navigation path step by step to find printing files (G-code or *.ifp file generated by INTAMSUITE, our slicing software). Press Print to load the printing file to print instantly or Add to Queue to load the file to the queue to print it later.
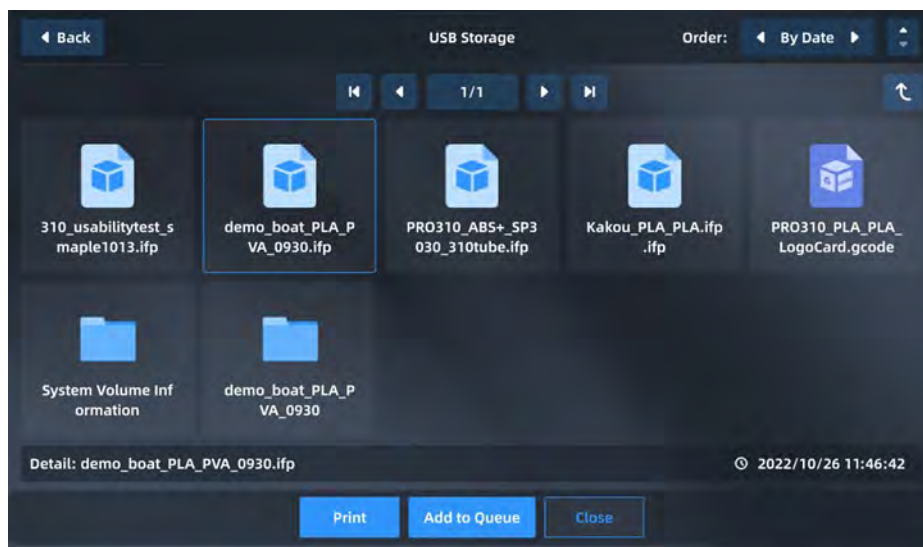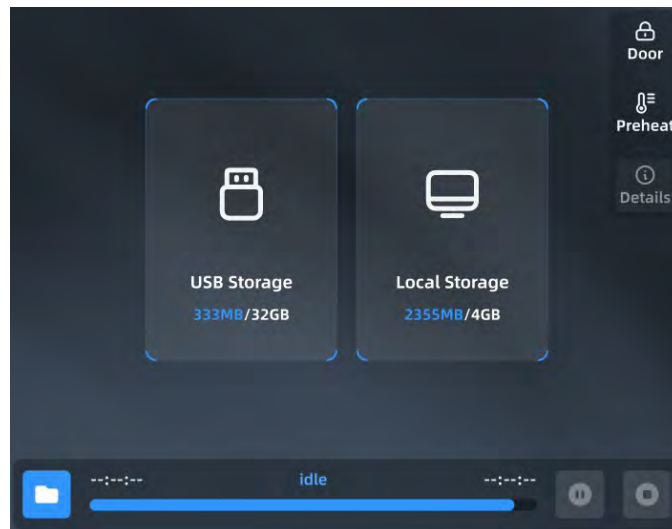
Figure 4. 5 Loading the print file

4.2.2 Main state area

It displays the model picture and progresses accordingly to printing progress. if the model is filled with the color, the printing job will be finished. If the model picture is not available, it shows a default picture. Under the model picture, it displays the file name and also the material it requires.
In the top right corner, we can close the door and show the camera video. The details button will display detailed information related to the print file.
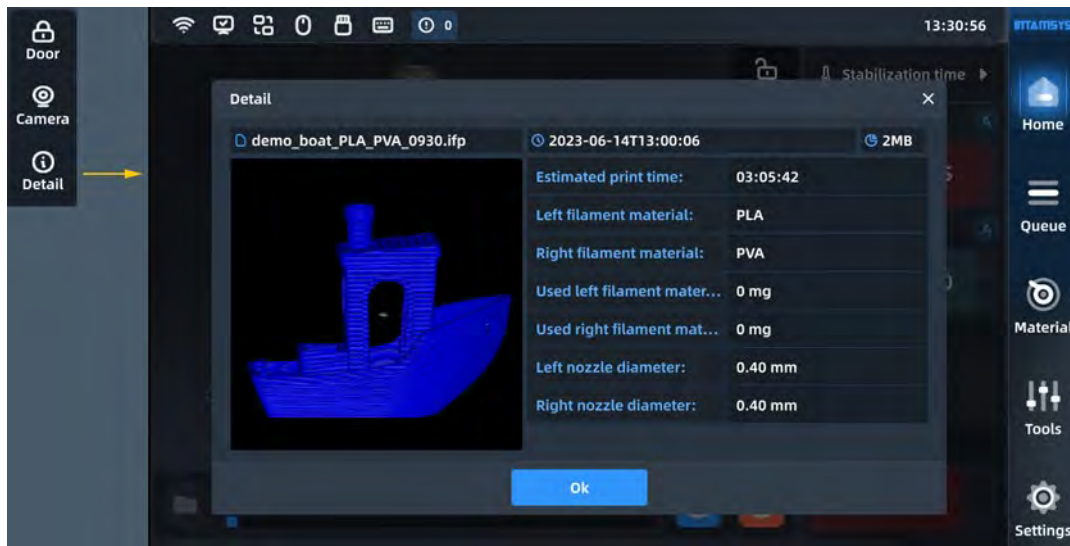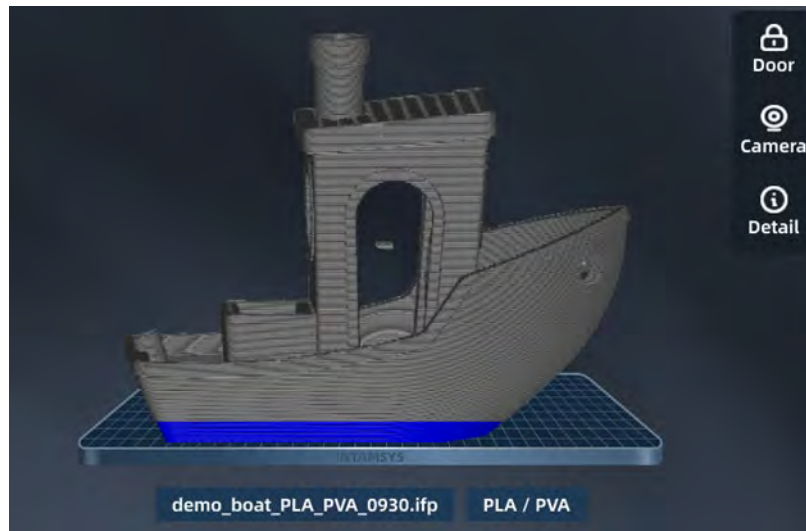
Figure 4. 6 Main status bar

4.2.3 Auxiliary state area

It displays the temperature of the L-Nozzle temperature, R-Nozzle, Chamber, and Heatbed. The left side displays the current temperature, on the right side displays the target temperature. The arrow icon and filling color animation indicate the heating/cooling progress, it is filled if it meets the target temperature.

There are also material labels related to the L-Nozzle and R-Nozzle, so we are aware of the material installed in the material box.

Figure 4. 7 Auxiliary Status Bar

To get better print quality, we can set preheat or maintain time before or after the printing job, Press the Stabilization time button, we can adjust the settings. The preheat and maintain temperature/time is preset in the material database.
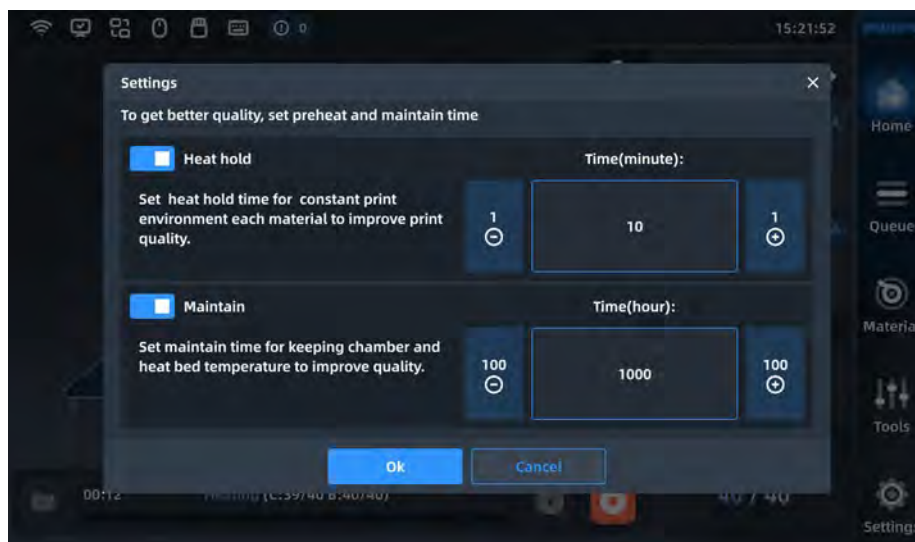
Figure 4. 8 Preheating and insulation settings

4.2.4 Control area

It includes Open, Start, and Stop buttons and a progress bar to control or check printing progress.

25

- When clicking the Open button, it will go to the File Navigation interface to open files.
- The start/Pause/Stop button is available in different printing stages.
- On progress bar, it includes the task progress and the time used/left.
- When the printing job is finished, it will provide **print once again** or **print the next job in the queue** commands.
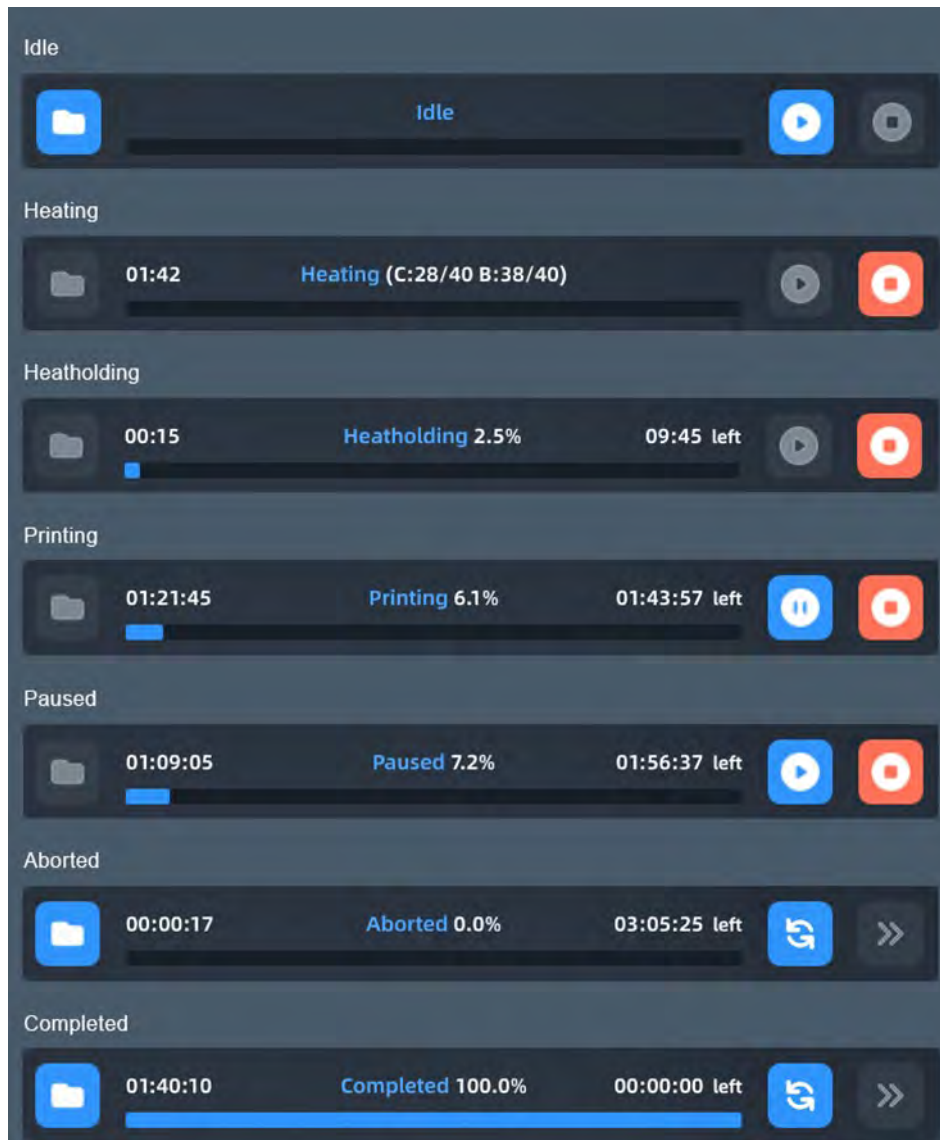
Figure 4. 9 Print Control

4.3 Queue

It includes Samples, the Current task queue, and also the history job list.

- In the Sample queue, it provides sample printing files and we can't modify the order to change the files.

26
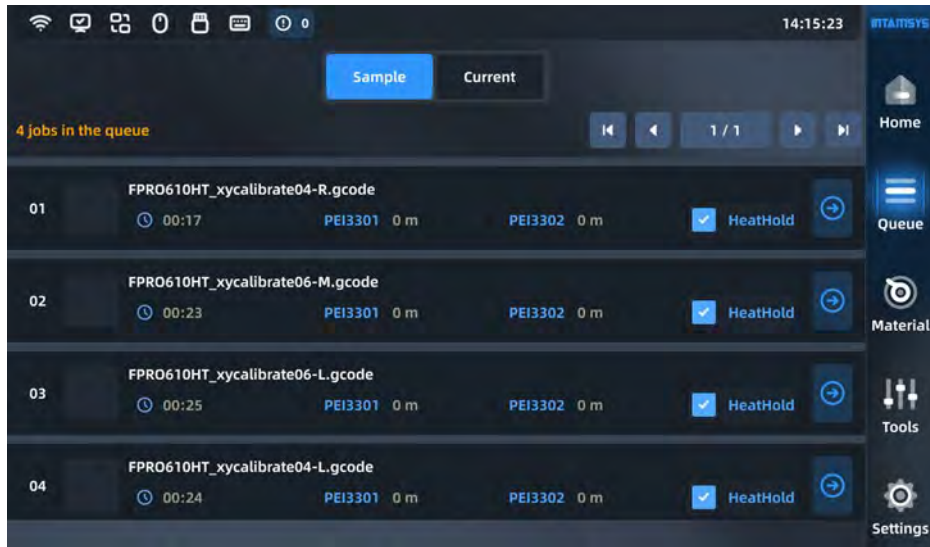
Figure 4. 10 Print sample queue

- In the Current task queue, It provides Import and Edit commands in the top right corner. We can add files or modify the order of the tasks. The next job will be listed automatically once the previous job is done in the queue (refer to section 4.2.4).
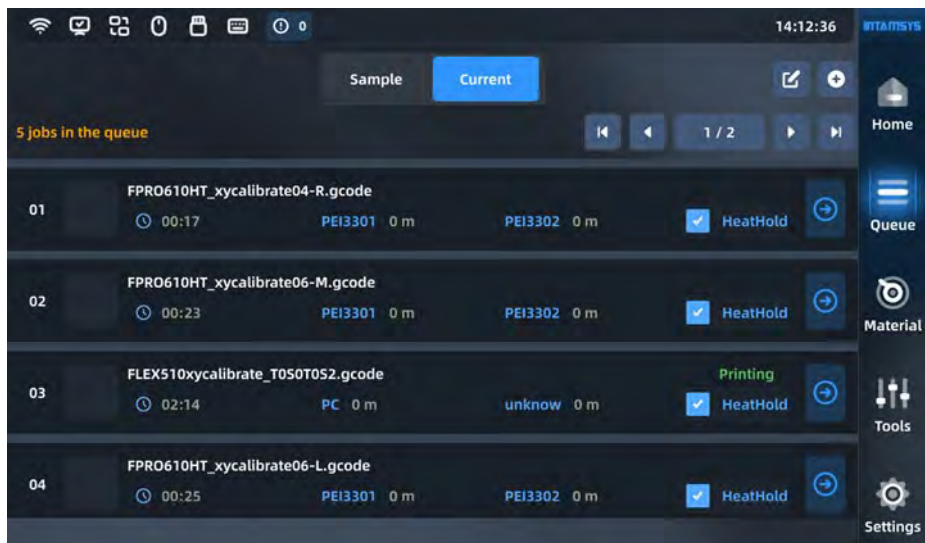
Figure 4. 11 Current Queue
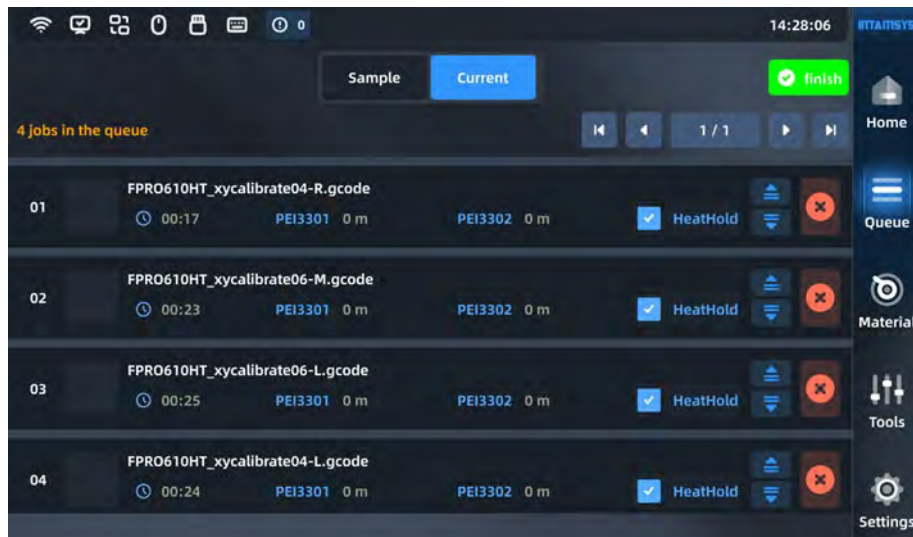
Figure 4. 12 Current queue editing

4.4 Materials

The Material interface is used for material setting, material loading/unloading, and material database management.
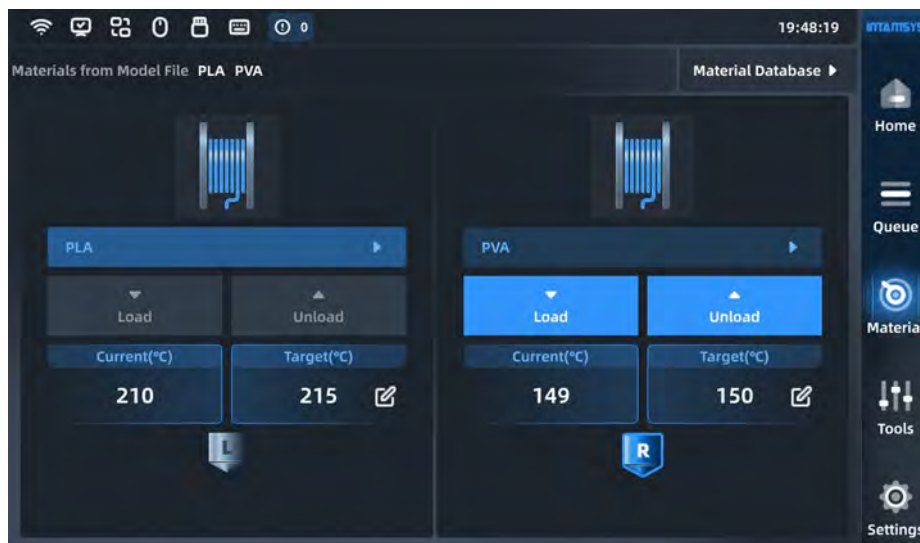
Figure 4. 13 Material interface

4.4.1 Material Selection

Press the Material name list button, and it will display the INTAMSYS Material and also the custom material.

Recently and often used material is listed at the top, we can scroll down to select the available materials.

Custom material can be configured in the material database
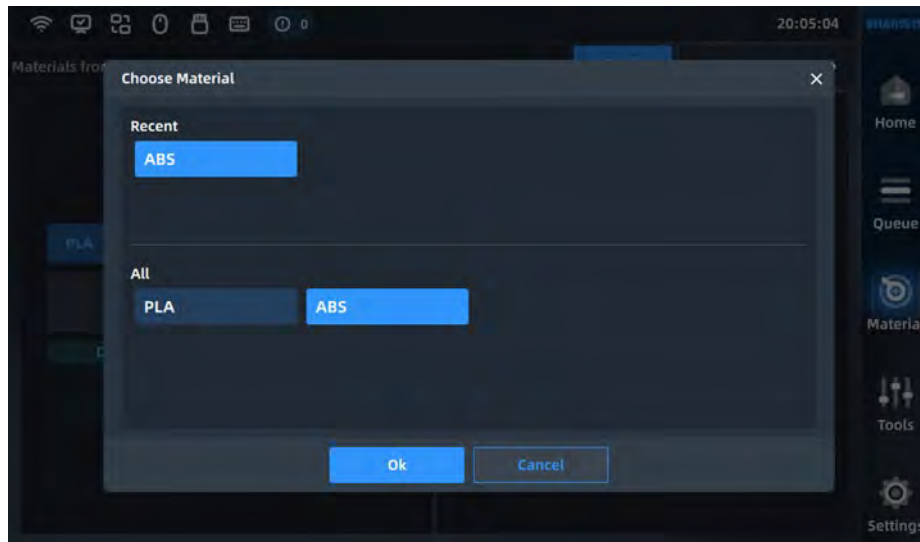
Figure 4. 14 Material selection interface

Especially, if the materials don't match the material settings in the G-code printing file, it will remind the user to Apply the materials. Press Apply and the material is automatically applied to the left and right nozzles.

Note: We need to manually unload/load the corresponding material.
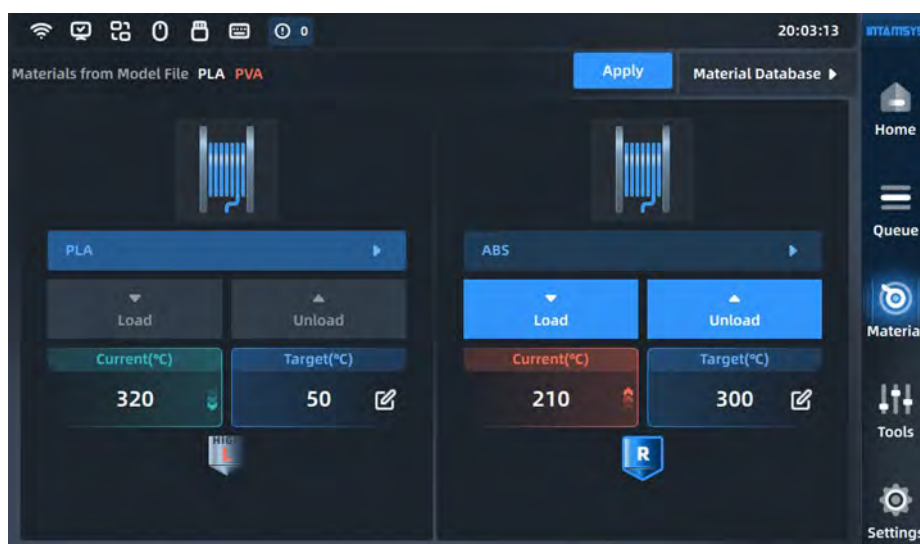
Figure 4. 15 Material proofreading

4.4.2 Material Load

After selecting the material, press the Load button to load the material step by step:

- It will automatically heat the nozzle to the target temperature, we can prepare materials and follow the tips to prepare material on the right side.
- Users can press the loading button or other blank area to quit the loading process
- Users can press the close button on the guide tips dialog, it will fold the tips button for us to check later
- Press the Target Temperature, we can manually edit it.

(1/4)
- Please Insert the filament and push it into the tube until the nozzle.

(2/4)
- Press the quick disconnect and drag out the tube.

(3/4)
- Please Insert the filament and push it towards the nozzle.
- Ensure the filament touch the gears.

(4/4)
Repress To Stop

Loading
- Observe the melted filament extruding out the nozzle contiually.
- Insert the tube back into quick disconnect and press the Loading button to stop extruding.

Figure 4. 16 Material loading

4.4.3 Material Unload

Press Unload button to unload material step by step, a similar process as the Load process.
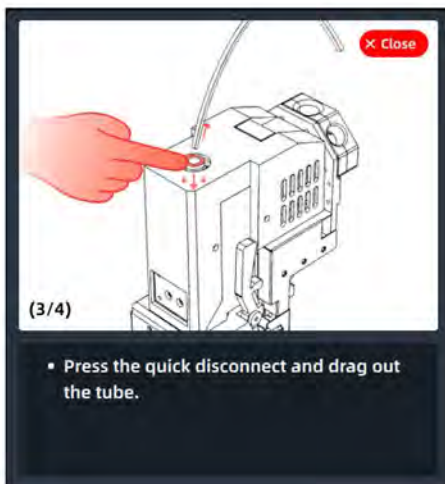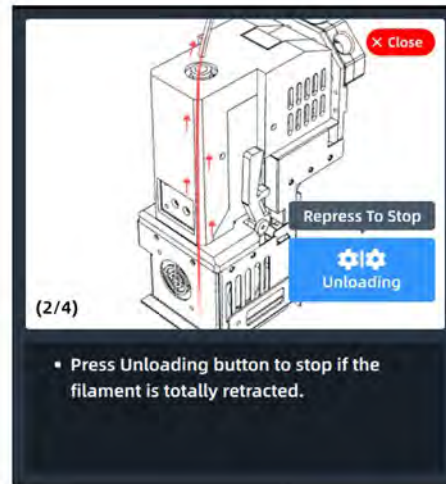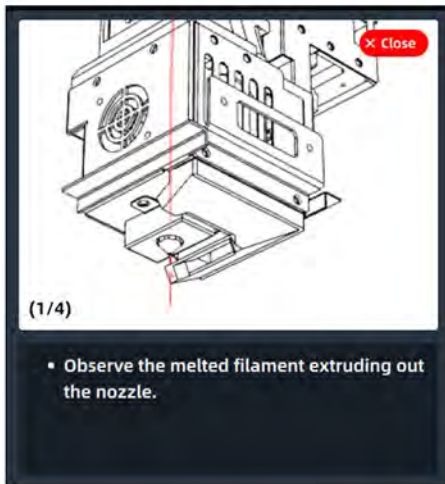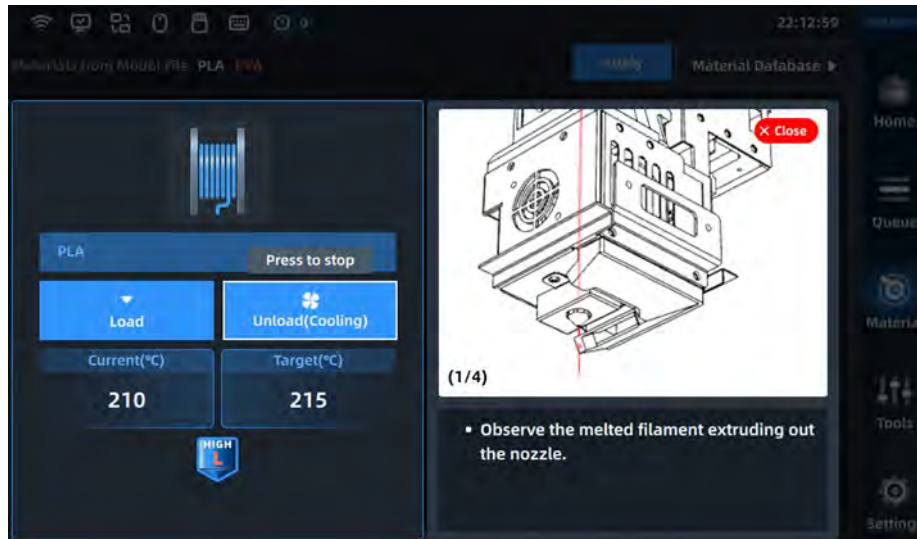
Figure 4. 17 Material unloading

4.4.4 Material Database Management

Press the Material database in the top right corner of the material interface, we can enter the material database, to check material properties details.
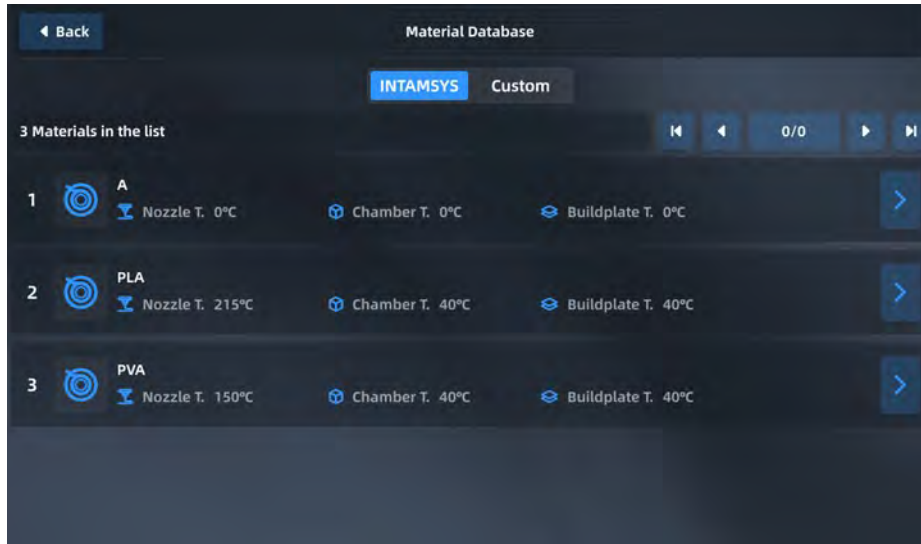
Figure 4. 18 Material database

In the Custom tab, we can import/export, create and Edit material data.
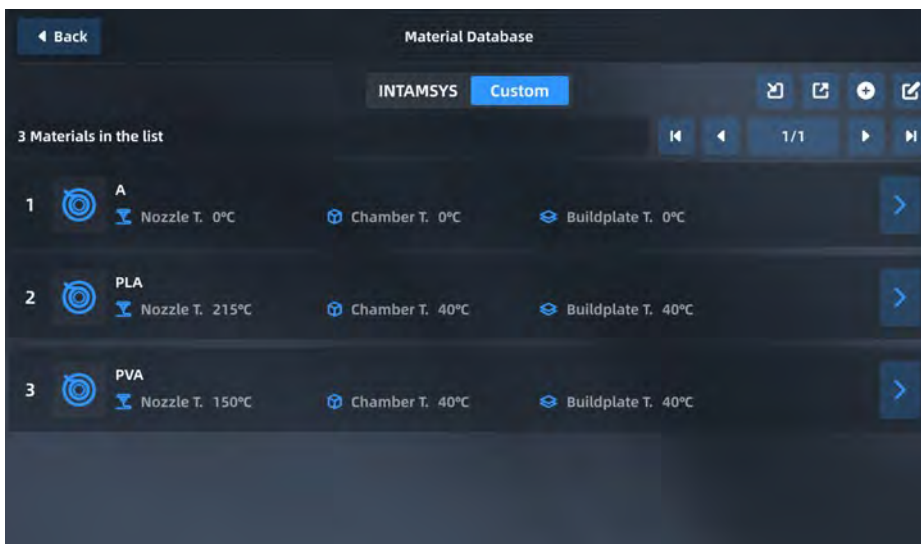
Figure 4. 19 Custom Material Database
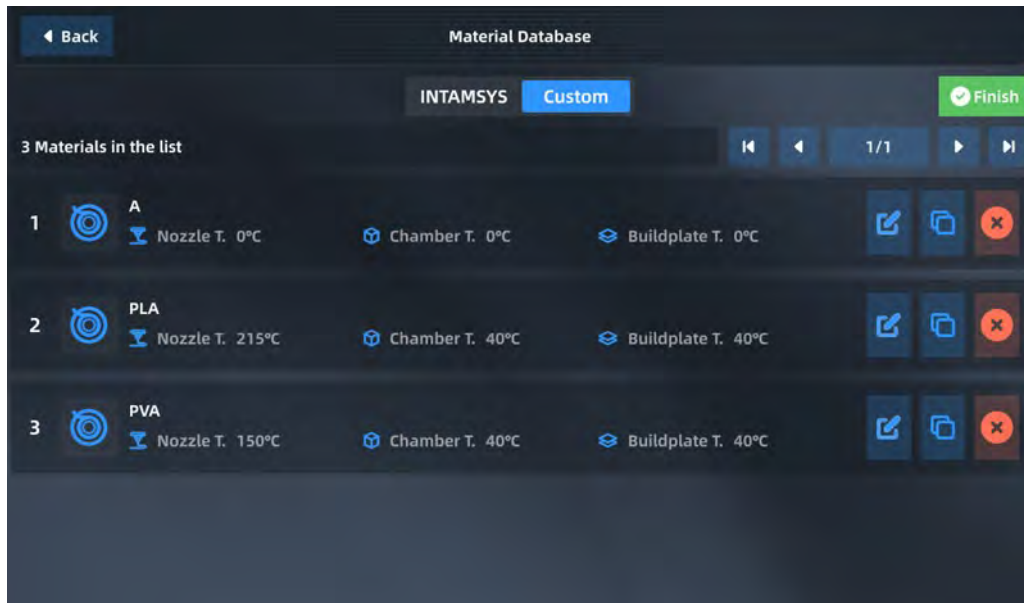
Figure 4. 20 Custom Material Database Modification
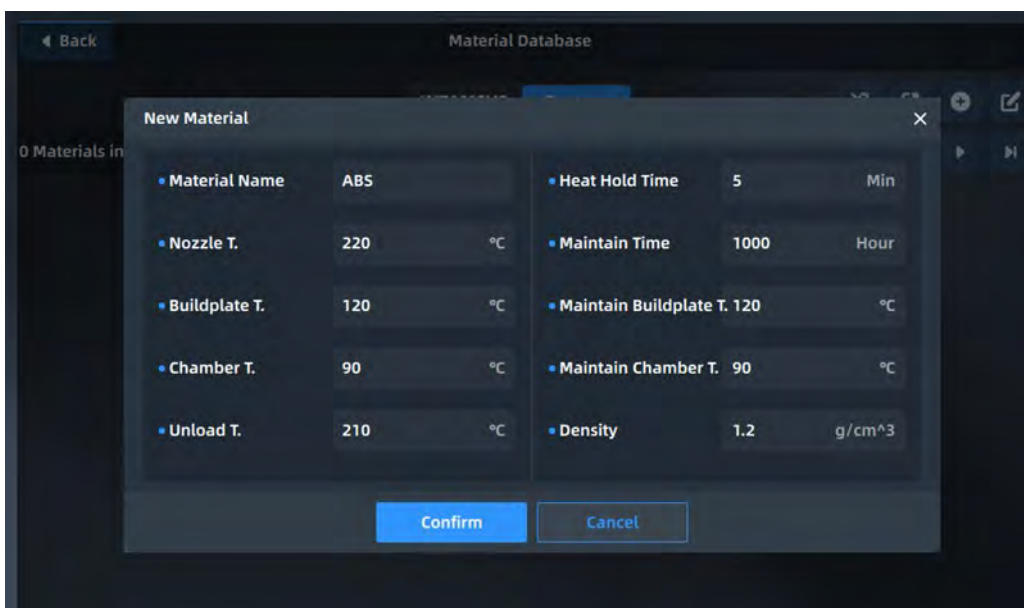
Figure. 4. 21 New materials

4.5 Tools

The Tools page is divided into three functional modules, Move Axes, Calibration, and Tune. The position of the nozzle and heat bed can be adjusted on the Axis page. On the calibration page, we can carry out the flatness detection of the heat bed on the Levelling page.
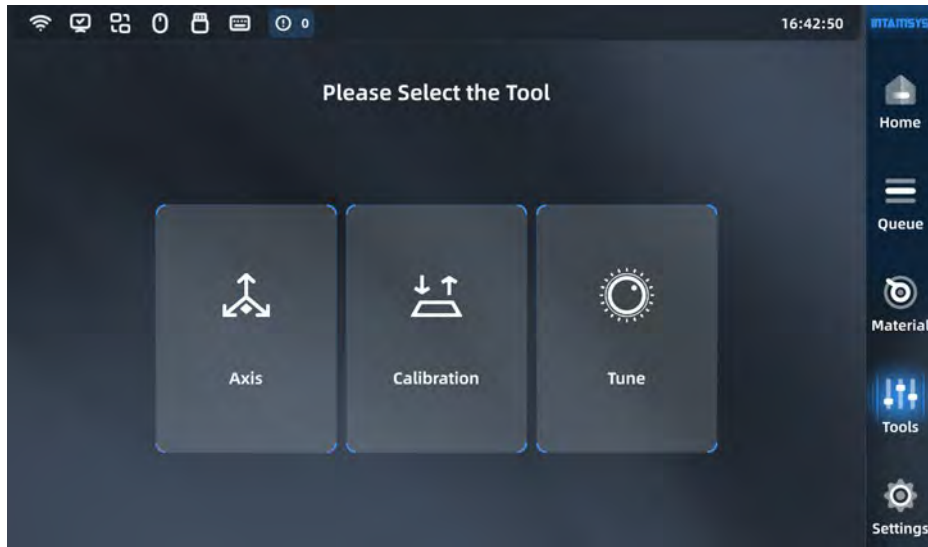
Figure. 4. 22 Tool Interface

4.5.1 Axis

The Axis interface is used to manually operate the build plate 、printing head、extrude and retract back materials.

- Select the move steps and hit the bottom right arrow buttons to move. The preview picture on the left side will also be updated.
- We can also Edit the value to move directly
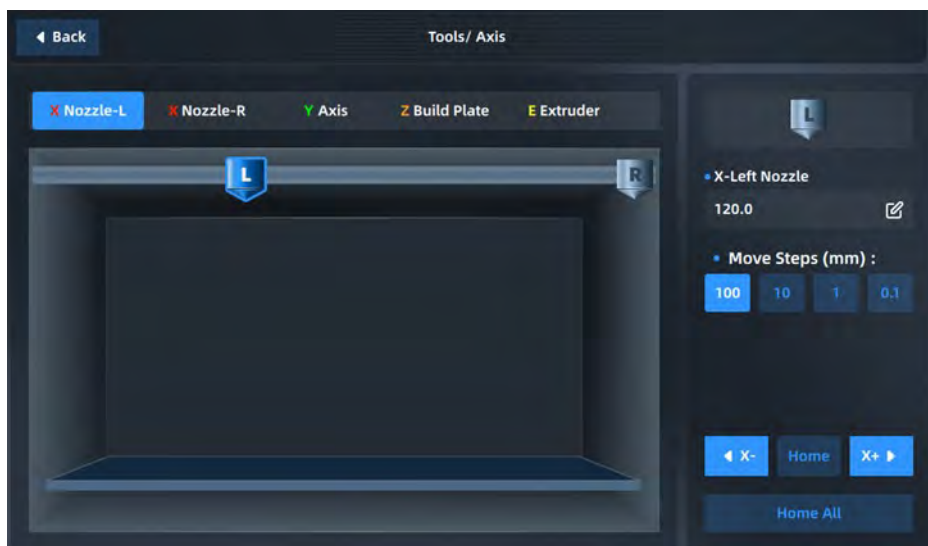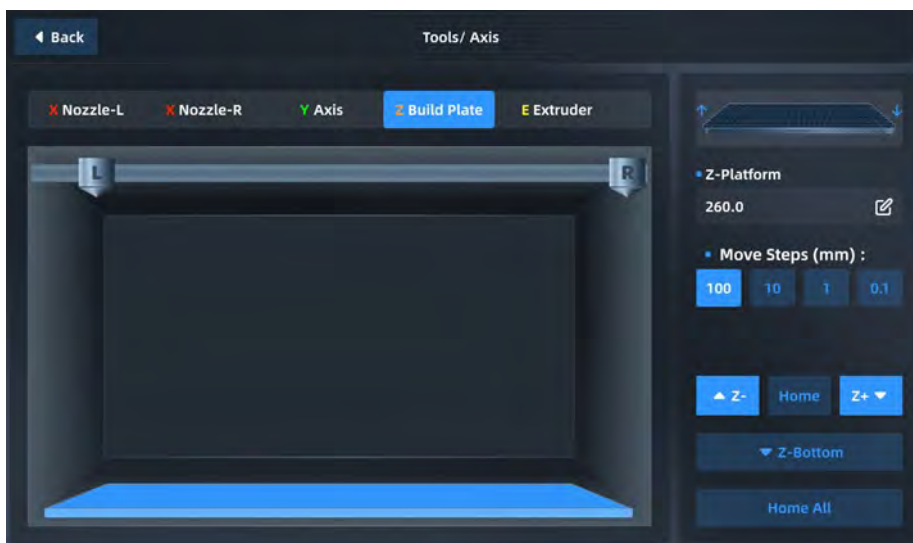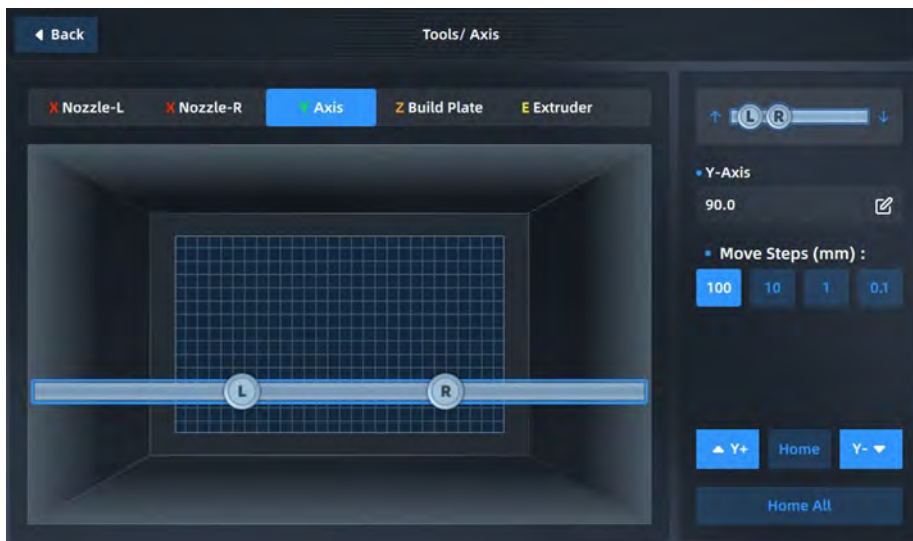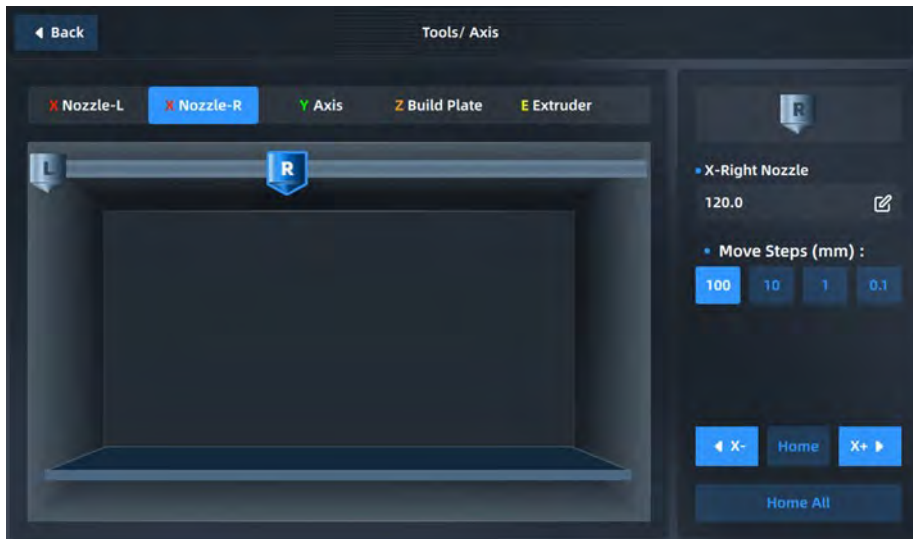
Figure. 4. 23 Tool /Axis

4.5.2 Calibration

Press the calibration button to enter the leveling, Nozzles Z offset, and XY Offset tools.

- Multiple Meshing automatic Leveling: Use the sensors to auto-detect the flatness of the build plate.

- L&R - Nozzle Z offset: manually measure the Z offset distance

- Nozzles XY Offset: print samples to decide the XY offset value
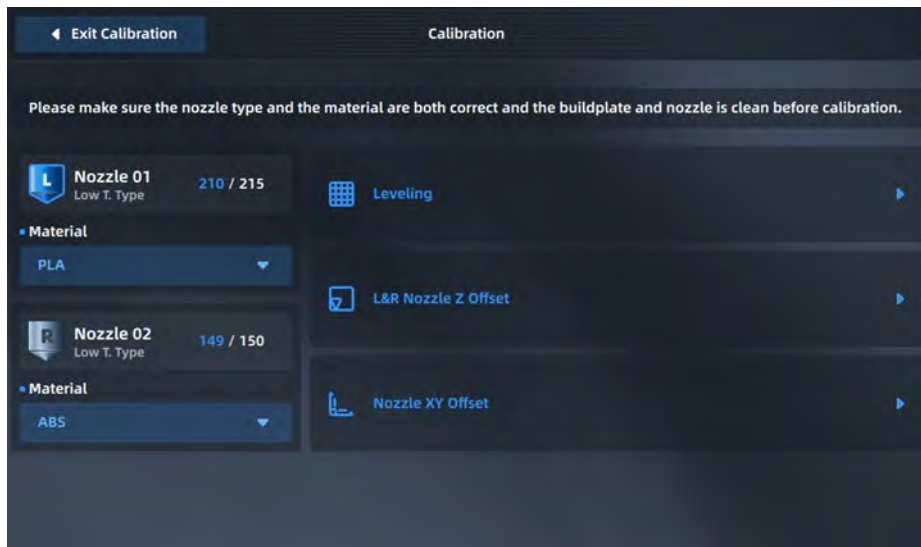
Figure. 4. 24 Tool /Calibration

4.5.2.1 Leveling Build Plate

Following the process, it will automatically level the build plate. If it is a successful leveling we can start the printing.
If it is a failed leveling, we can go through the manual leveling process.
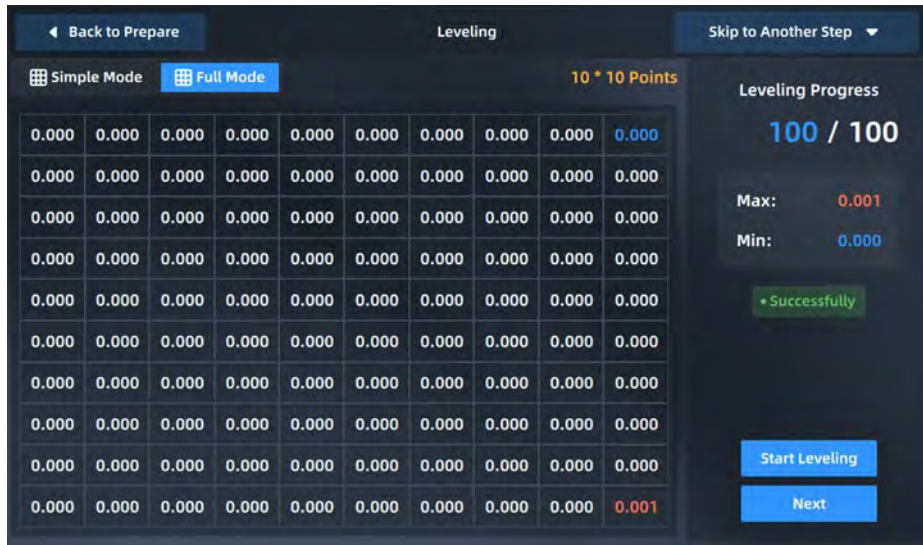
Figure 4. 25 Auto leveling
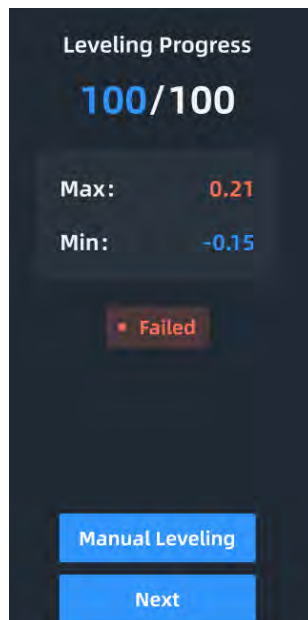
Figure. 4. 26 Auto leveling failed

After the auto leveling fails, it is recommended that the user manually level it first.

After entering the manual leveling interface, according to the diagram to guide the operation steps, we can get a better leveling result. It is recommended to carry out the automatic leveling compensation module again to obtain better printing accuracy.
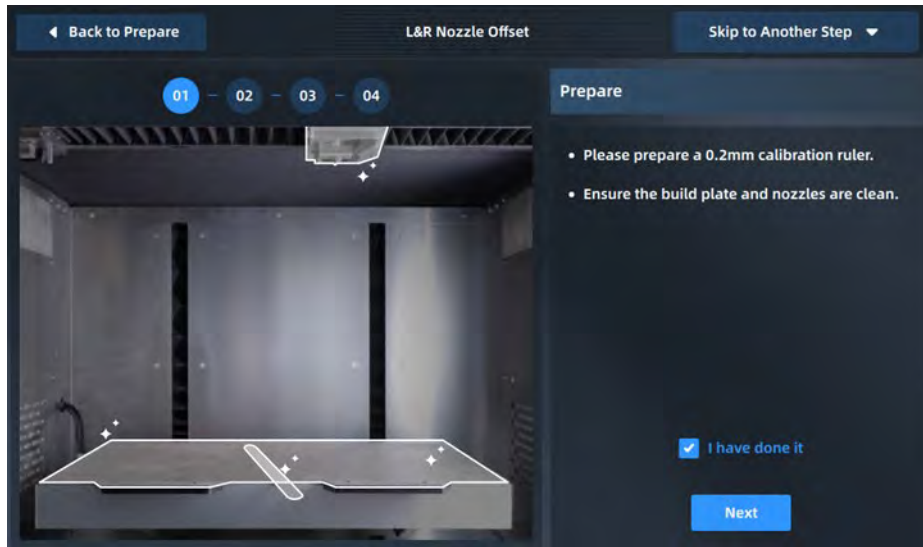
Figure. 4. 27 Manual leveling

4.5.2.2 L&R - Nozzle Z offset

Following the below process step by step, it will adjust the Z offset of each nozzle to compensate during printing.

40
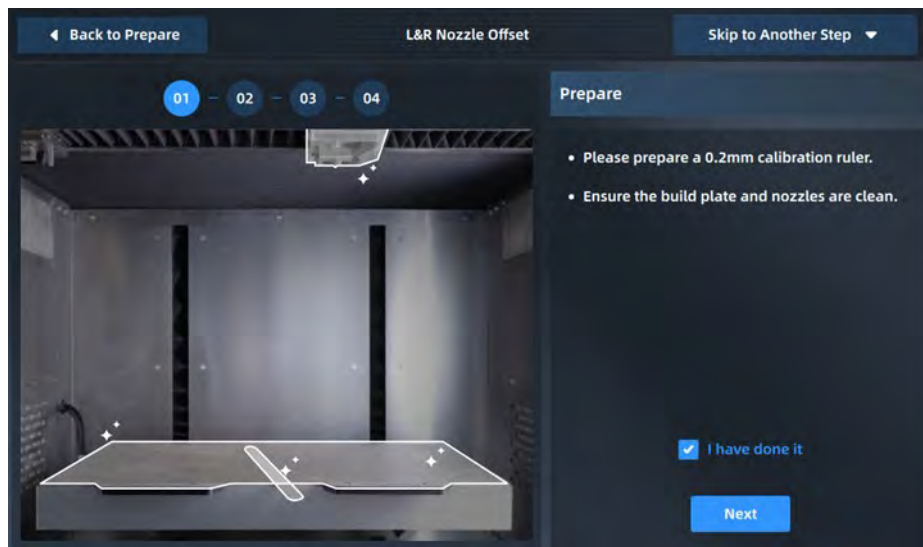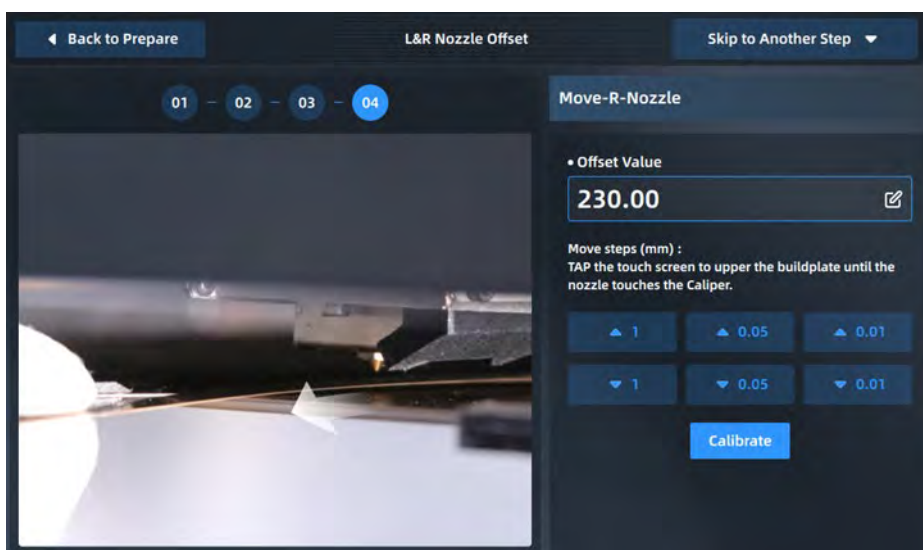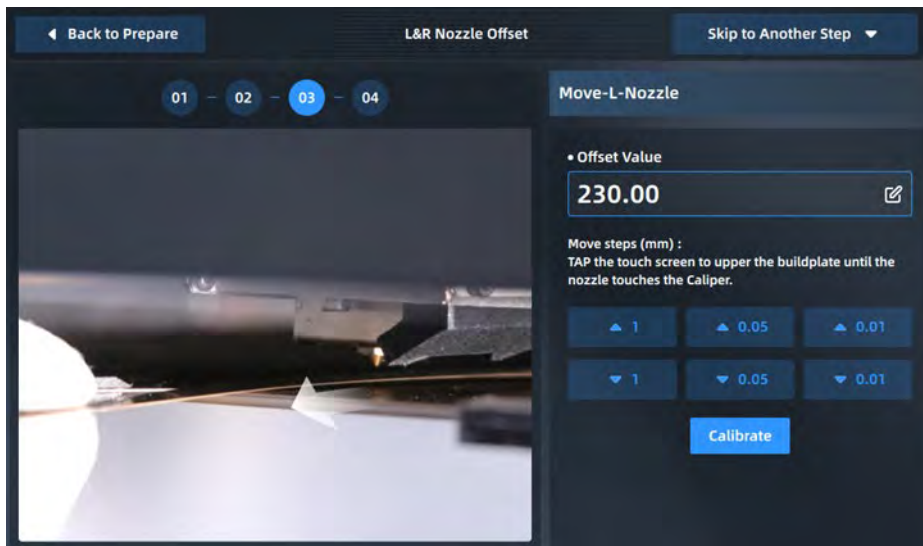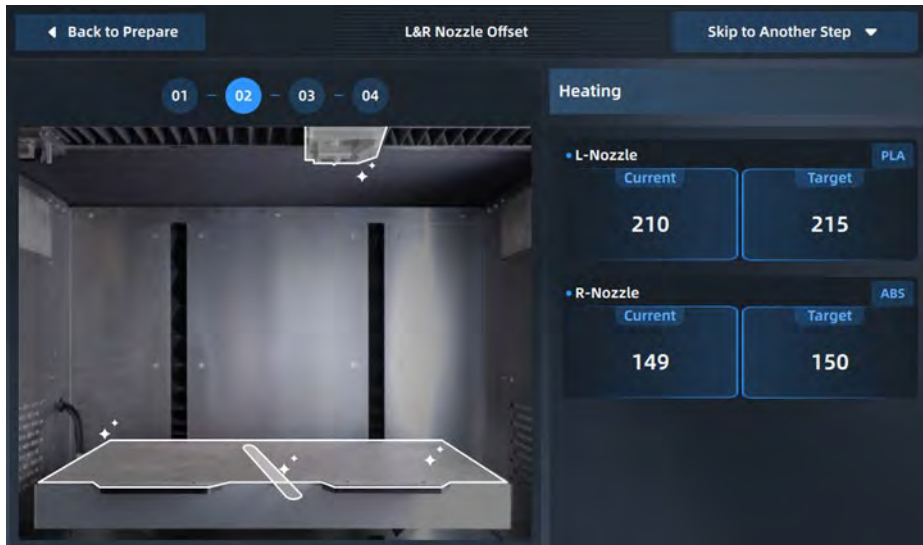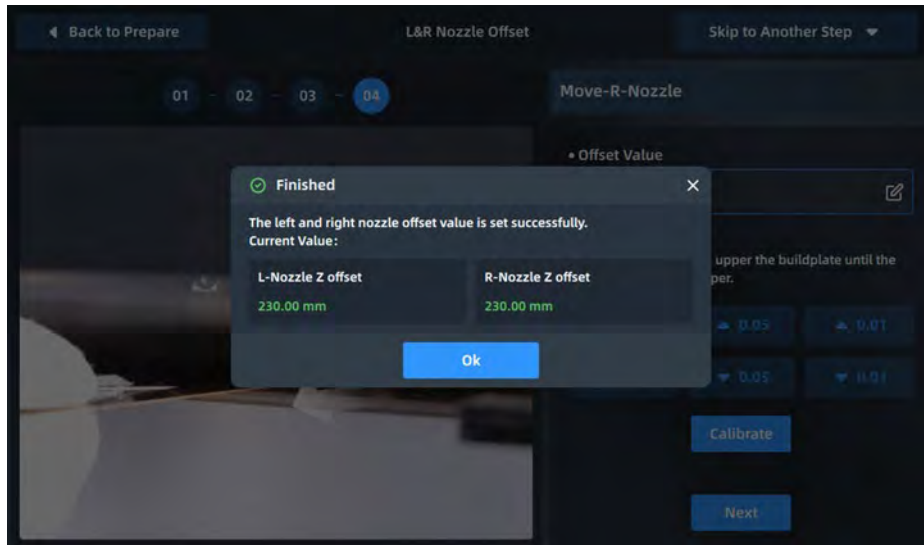
Figure. 4. 28 Z L&R - Nozzle Z offset

4.5.2.3 Nozzle XY offset

Following the below process step by step, it will adjust the XY offset of each nozzle to compensate during printing.
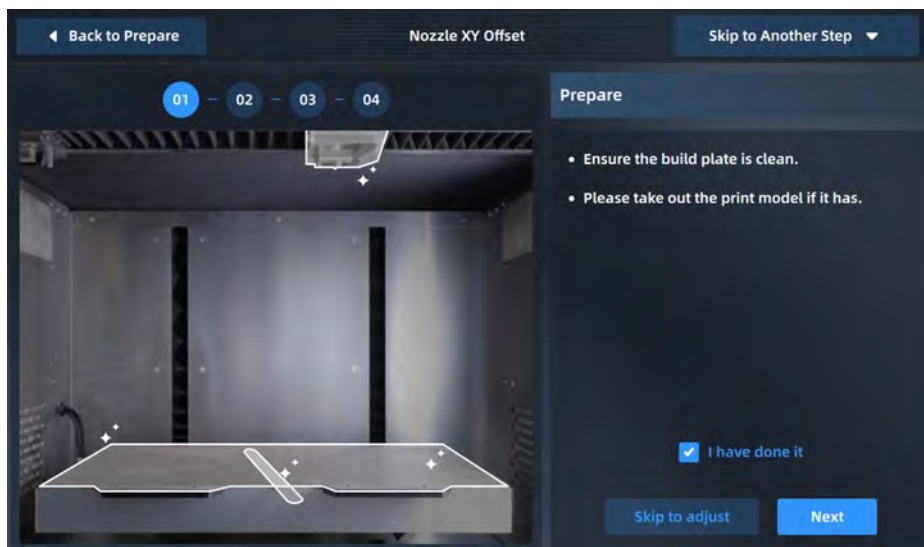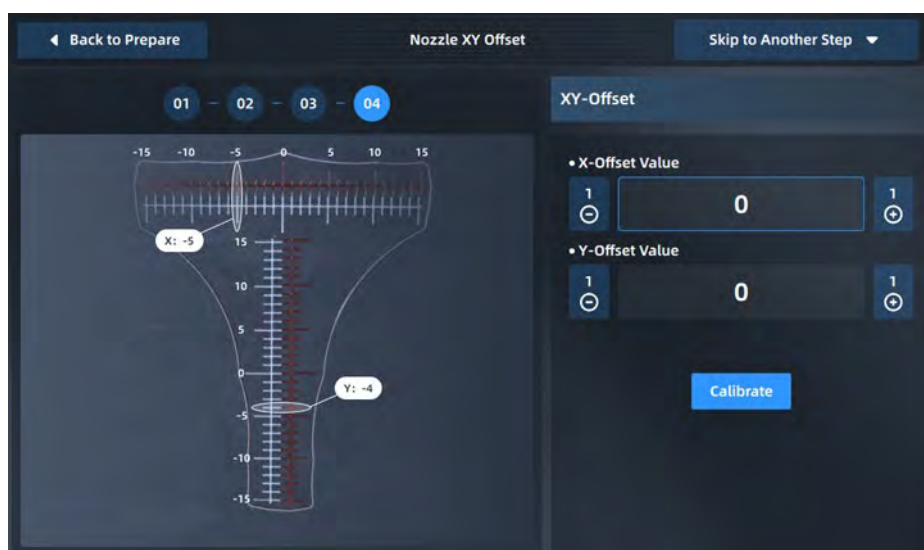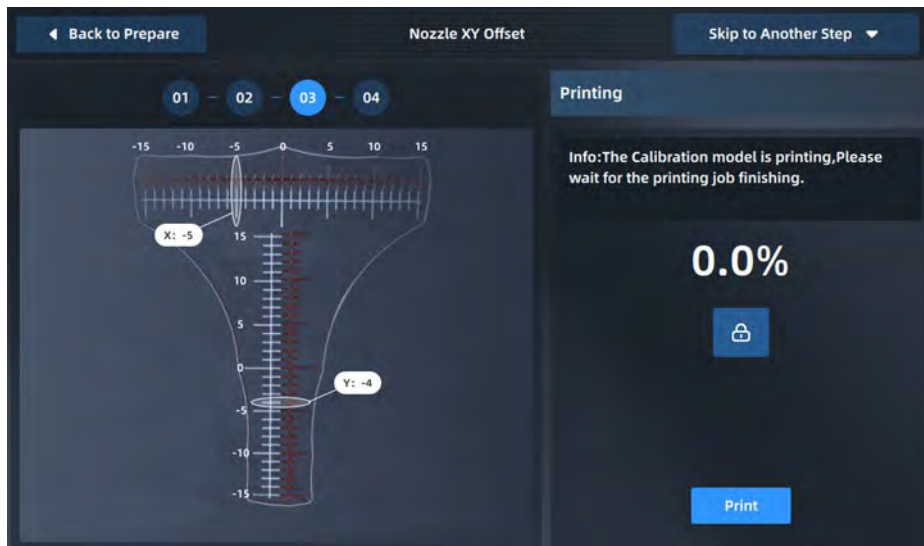
Figure. 4. 29 Nozzle XY offset

4.5.3 Tune

During the printing, the following processing parameters of the printer may be tuned in the "Tune" interface: temperature of the left nozzle (L-nozzle), the temperature of the right nozzle (R-nozzle), build plate temperature (Buildplate T), chamber temperature (Chamber T), material chamber temperature (Filament T), Print Speed, Material Flow, speed of the left fan (L-Fan Speed), and speed of the right fan (R-Fan Speed). The steps to tune parameters are as below:

1. Click the icon of the parameter to be tuned to make it be highlighted;

2. Change the parameter value by clicking the "-"/"+" on the right side or turning the rotary knob below, where the exact value is displayed in the box;

3. Click the "Apply" button to complete setting such parameters.
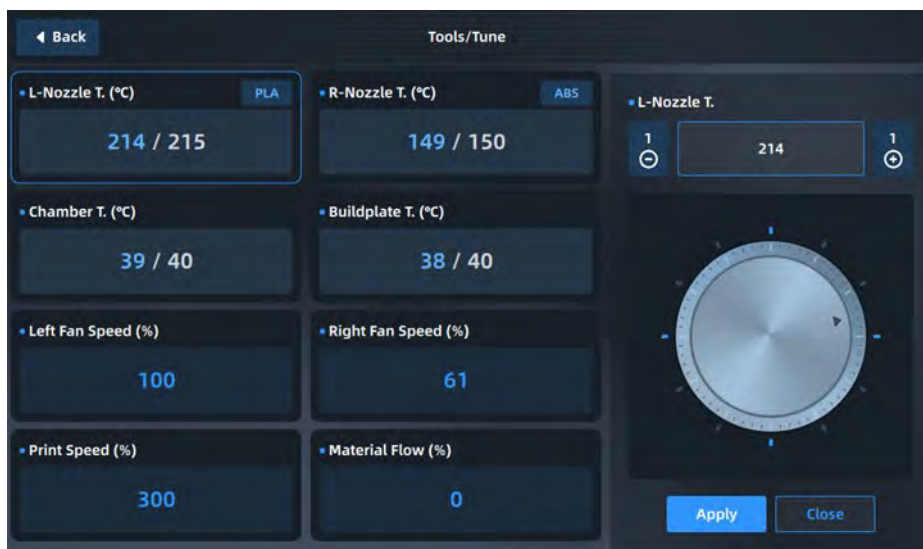
Figure. 4. 30 Tools/Tune

4.6 Settings

The system interface is used for the relevant settings of the system, including the view and upgrade of system information, setting of relevant parameters, setting of printer system parameters, etc.
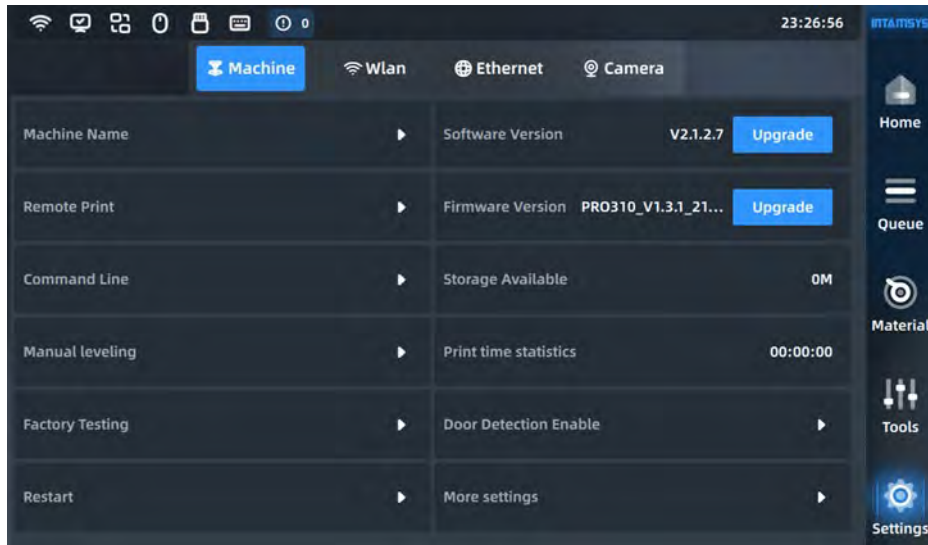
Figure. 4. 31 Settings

4.6.1 Machine settings

We can set the printer on this page including the machine name and more settings:

- Upgrade Software and Firmware

- Brightness

- Screen save time

- Language

- Data & Time

- Auto Leveling Enabled

- Door Lock

- Expert Mode

- etc.
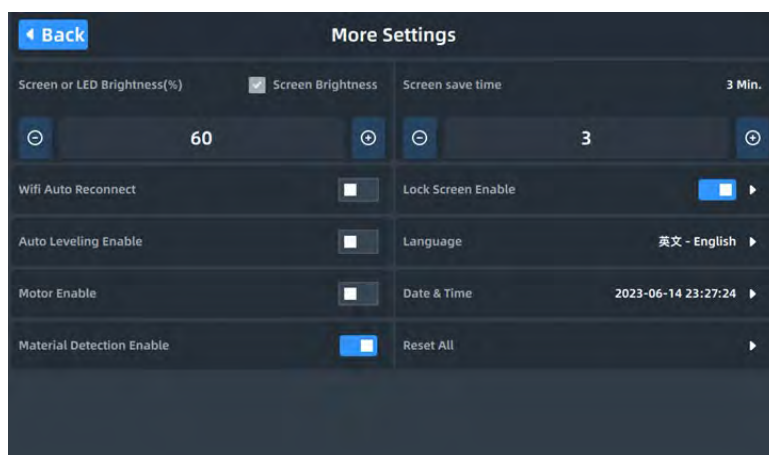
Figure. 4. 32 More Settings

44

4.6.2 Camera settings

Set the Camera parameters and also preview the graphics here. The Video can be also checked on the Home page.
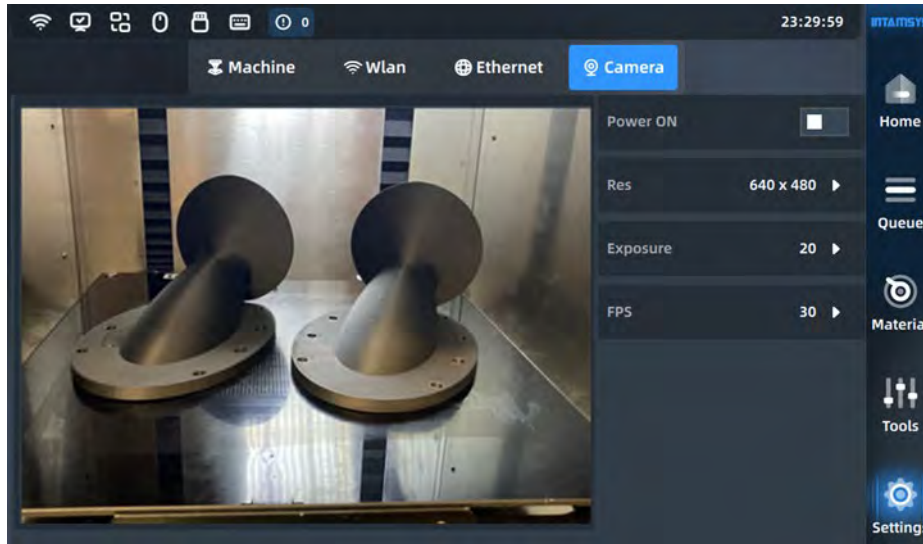
Figure. 4. 33 Camera Settings

4.6.3 Wired network settings
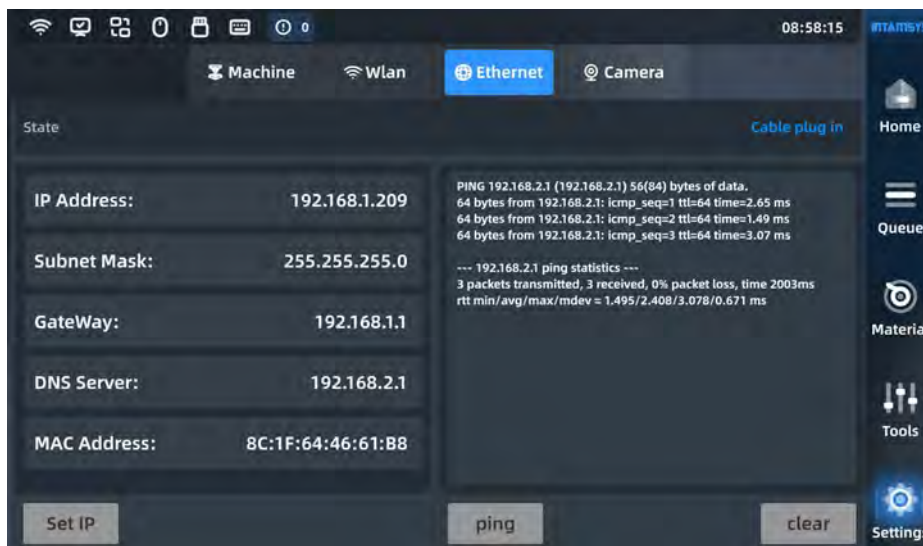
Figure. 4. 34 Wired network settings

4.6.4 WIFI network settings
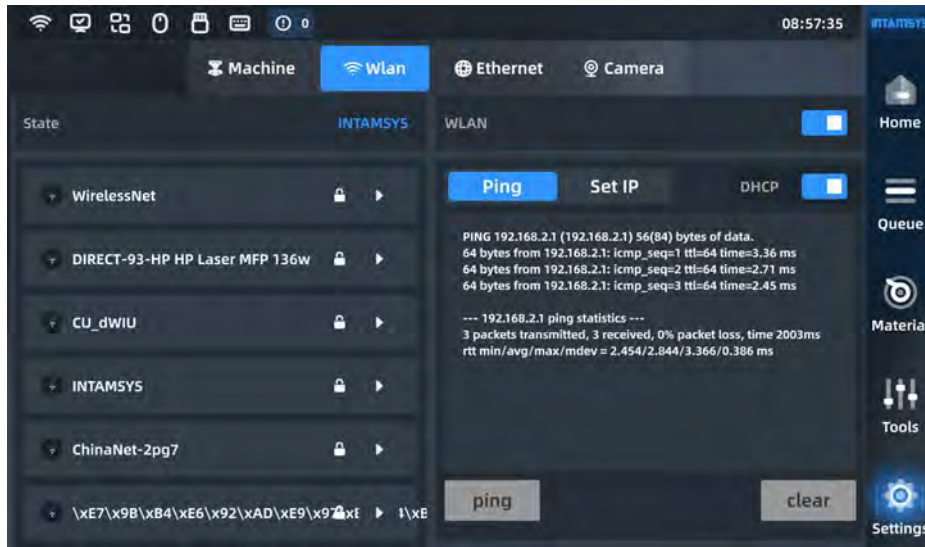
Figure. 4. 35 WIFI network settings

4.6.5 Remote Print

In Machine settings, press the Remote Print command, Enable the remote print, and select the IP address on this page. We can check the logs when it is connected.
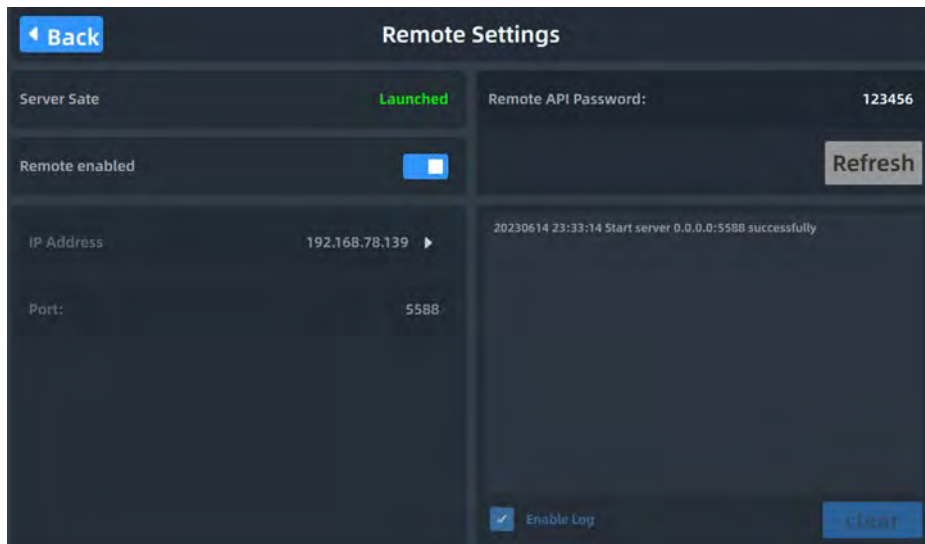
Figure. 4. 36 Remote Print settings

4.7 Other Interfaces

4.7.1 Warning

Press the Warning message on the status bar at the top of the touch screen, and follow the steps to dismiss the warnings.
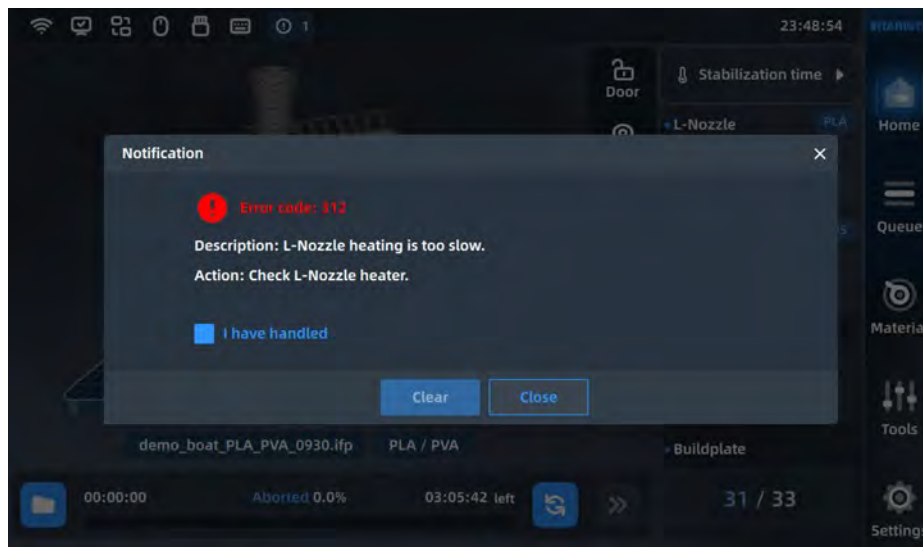
Figure. 4. 37 Warning tips

We can also check the previous warning messages in a day , three days, or a week time frame.
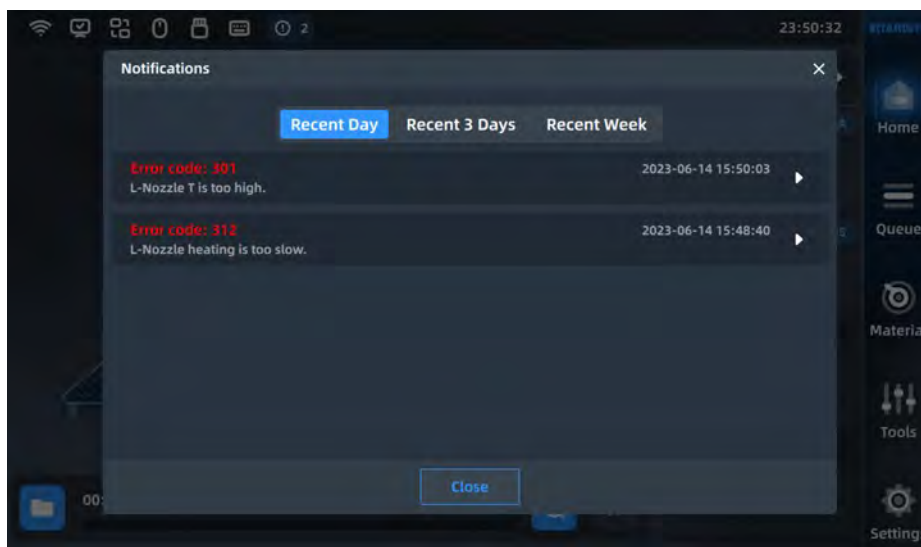
Figure. 4. 38 Warning statistics

4.7.2 Resume Print

We can resume printing if we get some error messages during printing. Just follow the steps.
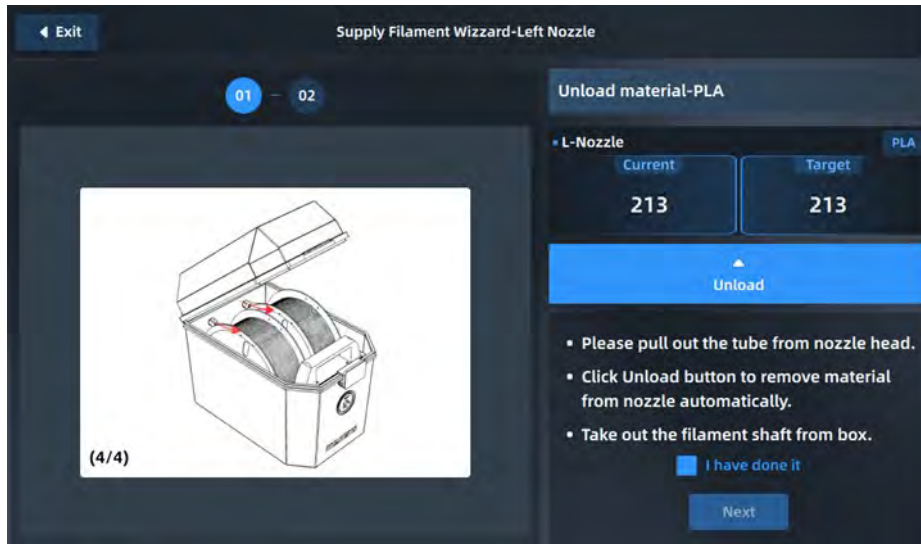
Figure. 4. 39 Resume Print

4.7.3 Developer Mode

Enter the developer mode by pressing the command - Expert mode under the system interface.

Figure. 4. 40 Developer Mode

5 Operating the printer

This section describes the basic steps to operate FUNMAT PRO 310.

5.1 Basic user operations

5.1.1 Turn on the printer power

To power on the printer:

1. the power socket is located on the lower right side of the machine, take out the power connection cable, the two ends of the cable are connected to the AC power supply plug (the printer power supply has 110V and 220V two models) and the printer power socket;

2. after inserting the power plug, toggle the power switch next to the printer power jack so that the power switch is in the on (I) position;
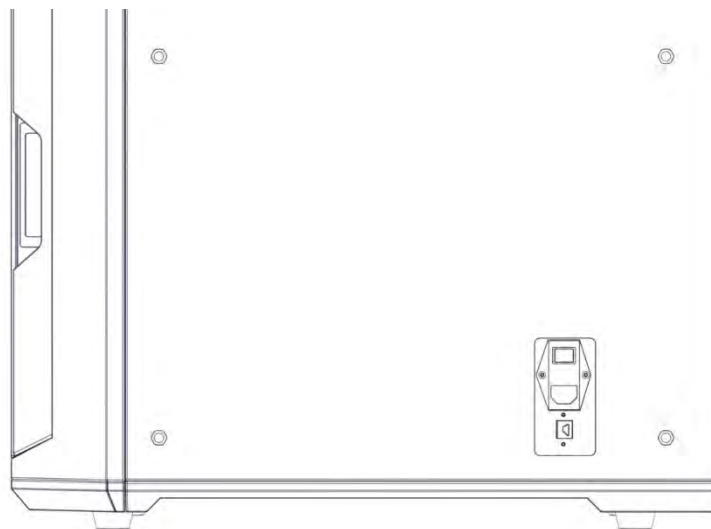
Figure 5. 1 Printer Power Interface and Switch

3. Then turn on the front of the printer screen on the right side of the front start-stop switch, at this time the front start-stop switch lights up, while operating the screen into the start-up interface, the printer began to start. Later enter the screen saver interface, click anywhere on the screen that exit the screen saver interface, and then display the following interface, boot up is complete.
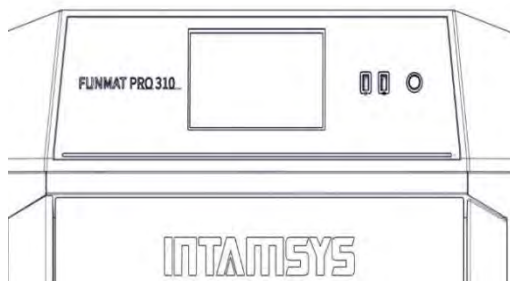
Figure 5. 2 Start/stop switch and power-on interface

5.1.2 Power off the printer

To power off the printer:

Press the power button located on the front of the printer (the same button as power on). Note that this action turns off this printer only. To completely disconnect power from the printer, the main power switch must be turned to the OFF (O) position.

If the printer is not used for a long time, disconnect the AC power supply from the power supply cable! If the printer is not used for a long period of time, disconnect the AC power supply side of the power supply cable.

5.2 Materials, INTAMBox and nozzles

The printer comes with an external INTAMBox sealed and dry consumables bin, which can hold up to two 1Kg rolls of material. The left bin supplies the left printhead for printing, mainly for model materials, and the right bin supplies the right printhead for printing, mainly for support materials. Note: Make sure that there are no prints or other debris on the print platform when loading and unloading material. This is because the XYZ will be zeroed when this operation is performed. Printed parts or other debris on the print platform can collide with the printhead or X-beam.

5.2.1 Loading material

The information within this section will guide you through the process of loading material into the nozzle. When completing the required steps, be sure to refer to the operating prompt information displayed on the touch screen.

The material box is placed on the right side of the printer, as shown in the figure, one end of the guide tube in the random accessory of the material box is inserted into the quick connector, and the other

end is inserted into the quick connector located on the right side of the printer, the material tube should be inserted to the bottom for smooth material feeding.
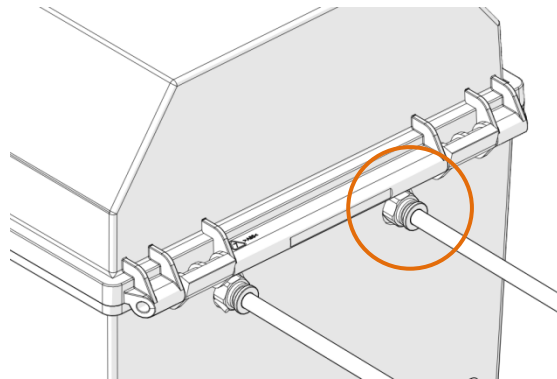
Figure 5.3 Schematic diagram of the installation of the guide tube

1. Toggle the catch, open the upper cover of the consumables box, place the dryer cassette in the front slot of the box, place the wire onto the rollers of the consumables box as shown, then thread the wire through the quick connector at the rear end until the material protrudes from the printer guide tube, and when manual loading is complete, close the upper cover and close the catch.
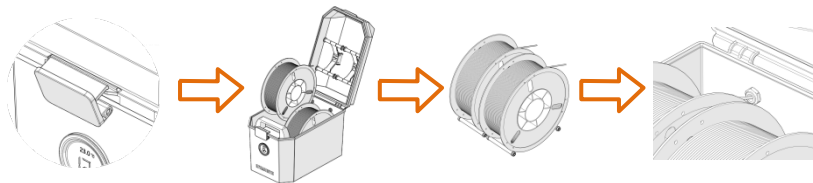
5.4 Diagram of loading wire

2. In the screen operation interface, select the Material button, this will display a screen similar to the one shown below. Click on L (Left Printhead)/R (Right Printhead) to select the printhead that will be loaded with the material, with the highlighted icon representing the activated printhead;
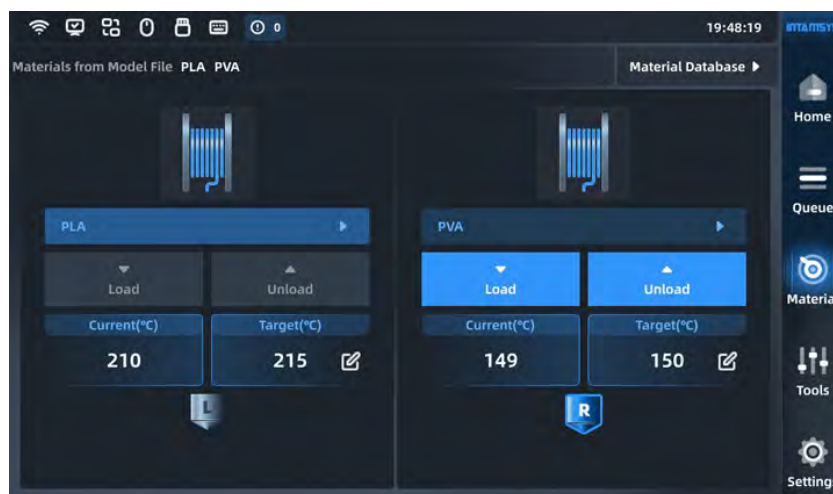
Figure 5. 5 Material interface

3. Press the Material Name List button and it will display INTAMSYS materials as well as custom materials. The most recent and frequently used materials are listed at the top and we can scroll down to select the available materials. Custom materials can be configured in the material database.
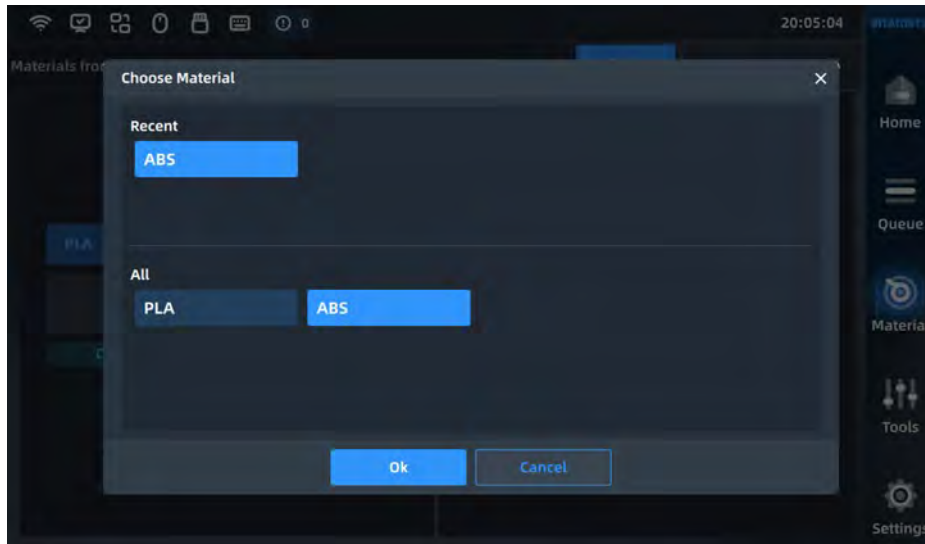
Figure 5. 6 Material (material library) interface

4. Specifically, if the material on the printer does not match the material settings in the G-code print file, it will alert the user to apply the material. Press "Apply" and the material will be automatically applied to the left and right nozzles.
Note: We need to unload/load the corresponding material manually.
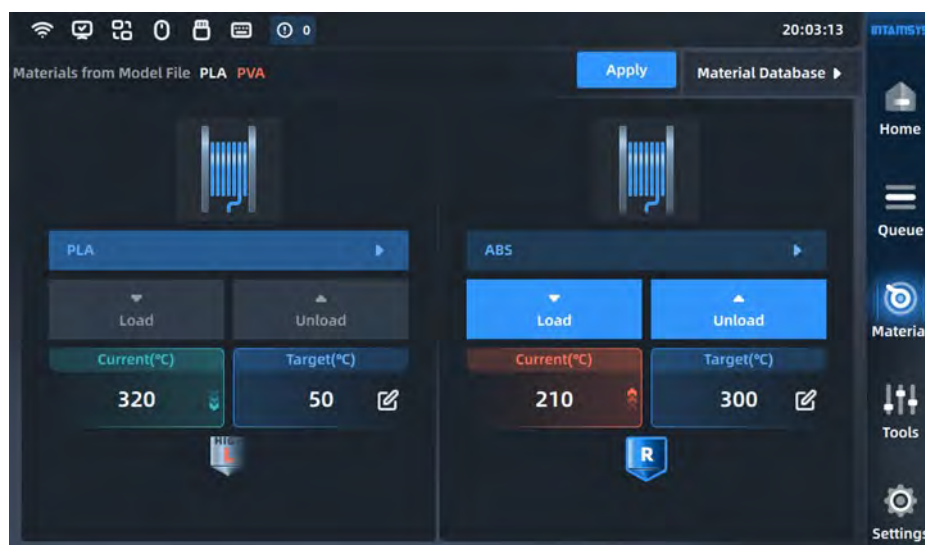
Figure 5. 7 Nozzle temperature setting interface

5. After selecting the material, press the load button, you can load the material step by step according to the pop-up wizard content.

- It will automatically heat the nozzle to the target temperature, and we can prepare the material and follow the instructions on the right.

- The user can stop the feed button or other blank area to exit the loading process.

- The user can close the prompt window and it will collapse the prompt button so that we can view it later

- Press the target temperature and we can edit it manually.
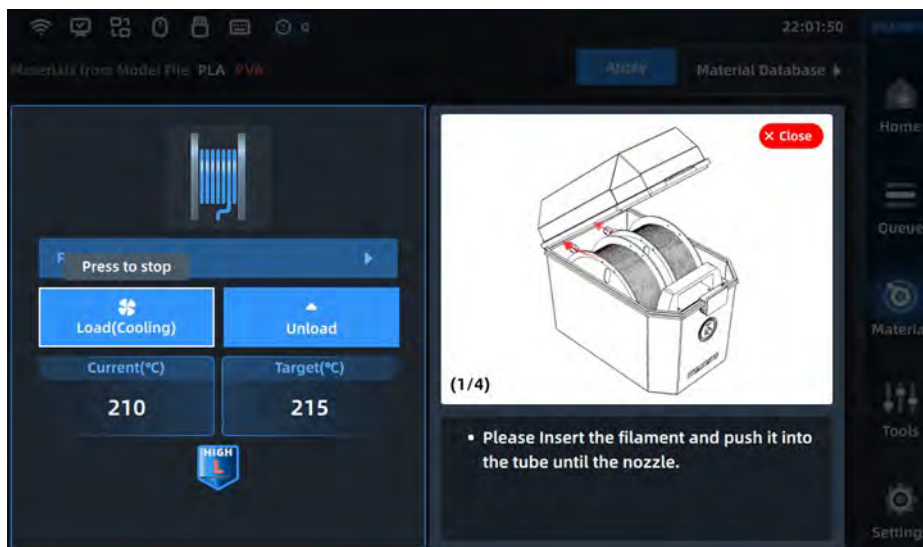
(1/4)

- Please Insert the filament and push it into the tube until the nozzle.

(2/4)

- Press the quick disconnect and drag out the tube.

(3/4)

- Please Insert the filament and push it towards the nozzle.
- Ensure the filament touch the gears.

(4/4)

Repress To Stop

Loading

- Observe the melted filament extruding out the nozzle contiually.
- Insert the tube back into quick disconnect and press the Loading button to stop extruding.

Figure 5. 8 Material loading guide screen

5.2.2 Material unloading

Pressing the unload button allows you to follow the wizard prompts to unload the material step by step, similar to the loading process.
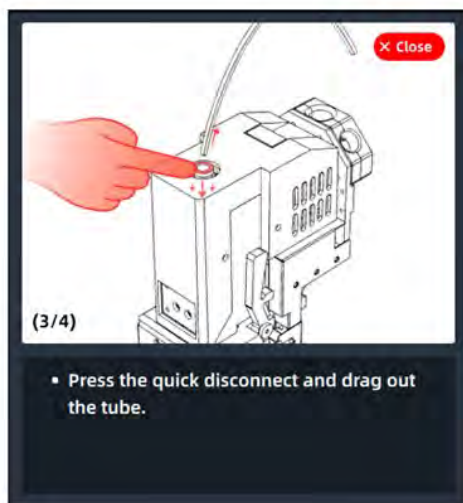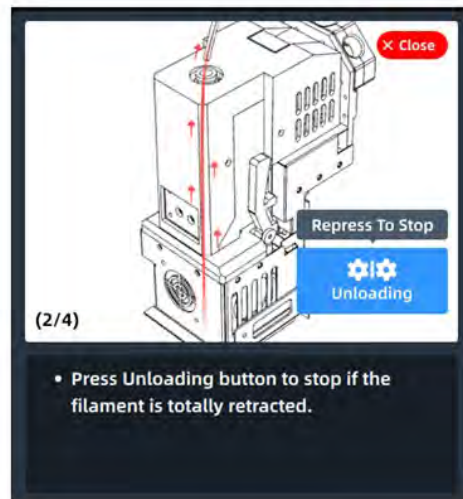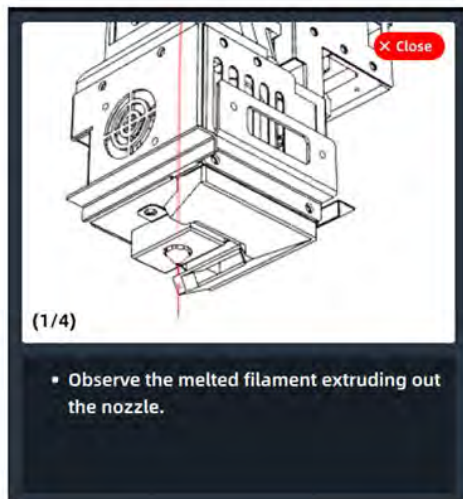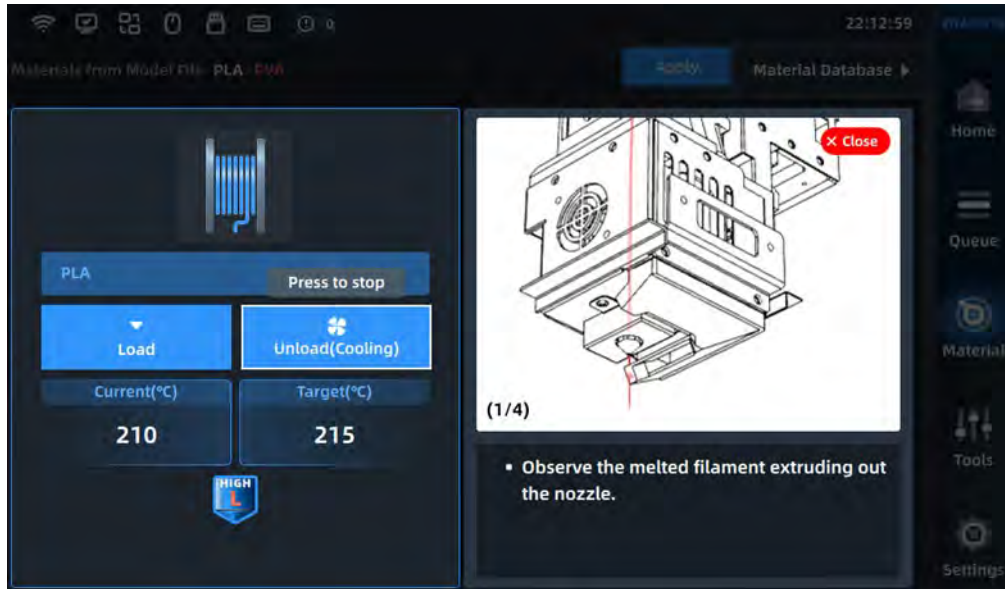
Figure 5. 9 Material unloading guidance screen

5.2.3 Editing materials

5.2.3.1 Modifying the parameters of the material
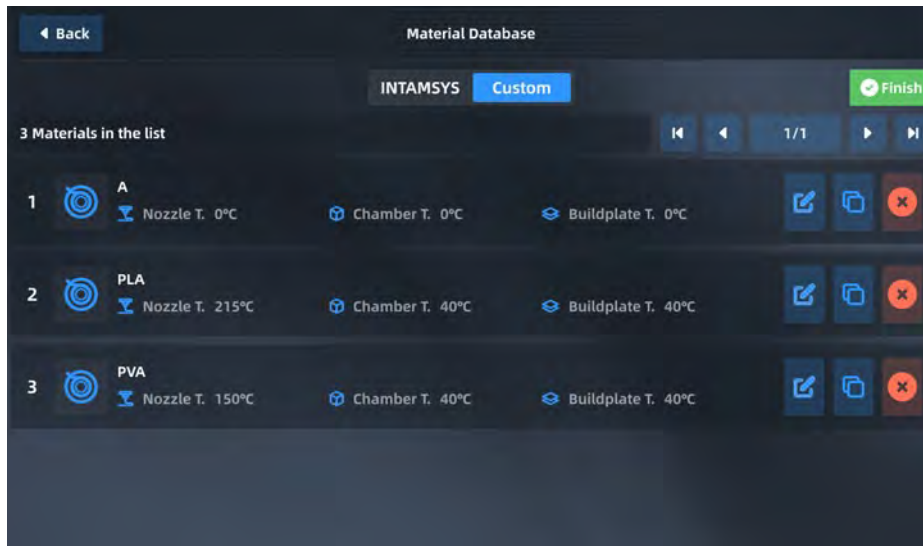
Figure 5. 10 Material editing interface

Click the "Material" button, and then select the Edit Material button in the lower right corner to enter the Edit Material screen. You can

to edit the following process parameters for the material:

Press the material database in the upper right corner of the material screen, we can enter the material database and view the material property details.

In the custom tab, we can import/export, create and edit material data.

Nozzle Temperature (Nozzle T) (°C): The nozzle temperature at which the material is loaded.

Platform temperature (Buildplate T) (°C): preheating and holding the print platform temperature.

Chamber temperature (Chamber T) (°C): the chamber temperature for preheating and holding.

Unload temperature (Unload T) (°C): the nozzle temperature at which the material is unloaded.

Preheat Time (min): The time for the platform and chamber to warm up before printing.

Density (g/cm3): The density of a material.

Maintain Time (h): The time to keep the platform and chambers warm after printing is complete.

Platform insulation temperature (Maintain Buildplate T) (°C): the insulation temperature of the platform after printing is completed.

Chamber Holding Temperature (Maintain Chamber T) (℃): The holding temperature of the chamber after printing is completed.

Note: The material process parameters here are used only for the printer's own operations other than formal printing. The own operations include loading material, unloading material, leveling, XY offset calibration, Z offset calibration, preheating, holding, etc. The printer will execute the loaded G-code command file during formal printing and will not execute the preset parameters within the printer.

The steps to modify the parameters of the material are as follows:

1. Click on the material line that needs to be modified, and the material line is highlighted at this time.

2. Click each input box separately, the input keyboard will pop up, you can modify the material name and each parameter separately.

3. When you are finished, click Change, and then click the Save icon.

5.2.3.2 New, insert, delete, restore material

The following operations can be performed for each material:

New: Create and reload material information

Remove: Delete the currently selected material

Modify (Change): modify the content of the current edit area to the currently selected material

The operation steps are as follows:

1. Click on the material row that will be copied, and the material row is highlighted.

2. Click "New", "Remove" and "Change" to create, delete and modify respectively.

3. When the operation is finished, click the Save icon.

5.3 Replace the nozzle or replace the material

5.3.1 Replace the nozzle

There are two types of print nozzles: silver nozzles made of CuCrZr, which can print all materials except those containing fibers (PEEK-CF, PEEK-GF, PA-CF, etc.); and black nozzles made of hardened steel, which mainly print materials containing fibers (PEEK-CF, PEEK-GF, PA-CF, etc.).

Please do not use one nozzle to print high and low temperature materials at the same time, otherwise it will be easily clogged. It is highly recommended that one nozzle be used for one material only.
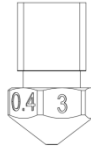
Figure 5.11 Nozzle shape structure

To replace the nozzle, proceed as follows:

1. Click the "Material" button to enter the material interface.

2. Click the "Set Temp(°C)" button to set the temperature and wait for the nozzle to heat up.

3. When the temperature reaches the set value and the material in the nozzle has melted, use a 7mm socket wrench to remove the nozzle.

4. Remove the high temperature nozzle in the sleeve with tweezers and replace it with a new one with replacement nozzle and install it to the nozzle.

5. After replacing the nozzle, re-leveling, XY offset calibration, and Z offset calibration are recommended.

5.3.2 Pre-print changeover

If you need to change the type of material before printing, in addition to changing the material in the Material screen, you must also selectively change the print nozzle. Different materials should be printed with different nozzles, and if you want to share a nozzle with different materials, the temperature of the nozzles must be very close to each other, with a recommended temperature difference of no more than 50°C.

Note: Do not print low melting point materials with nozzles that have printed high melting point materials, for example, using nozzles that have printed PEEK to print PLA will cause the printhead to clog and print failure.

If the material type is the same before and after or the material printing nozzle temperature is close, there is no need to replace the nozzle. The steps are as follows:

1. Unload the old material. Refer to 5.2.2 for detailed steps;

2. Select the new material to be loaded and execute the loading operation. Refer to 5.2.1 for detailed steps;

If the before and after material types do not match or if the material print nozzle temperature differs significantly, additional nozzle replacement steps are required, and accordingly, leveling, Z offset calibration and XY offset calibration operations are required. The steps are as follows:

1. Unload the old material. Refer to 5.2.2 for detailed steps;

2. Replace the nozzle. Refer to 5.3.1 for detailed steps;

3. Select the new material to be loaded and execute the loading operation. Refer to 5.2.1 for detailed steps;

4. Perform the leveling, Z offset calibration and XY offset calibration steps.

5.3.3 Suspension of material change

If the printer is printing, the user needs to perform a change operation for the material. The operation is as follows:

1. click on the screen "Print" (print) interface pause button, to be completely suspended printer nozzle movement;

2. Unload the old material.

3. Load new materials.

4. After loading, click the Start button on the Print screen to continue printing.

5.3.4 Out of material alarm follow-up material

The printer is equipped with a lack of material alarm function, when the material runs out, the printer pauses work, while the screen will pop up the alarm code to prompt the user to replace the material. Click the Supply filament button on the screen and then follow the instructions on the screen to replace the material, the refill operation is as follows:

1. Unload the old material.

2. Load new materials.

3. After loading, click the Start button on the Print screen to continue printing.
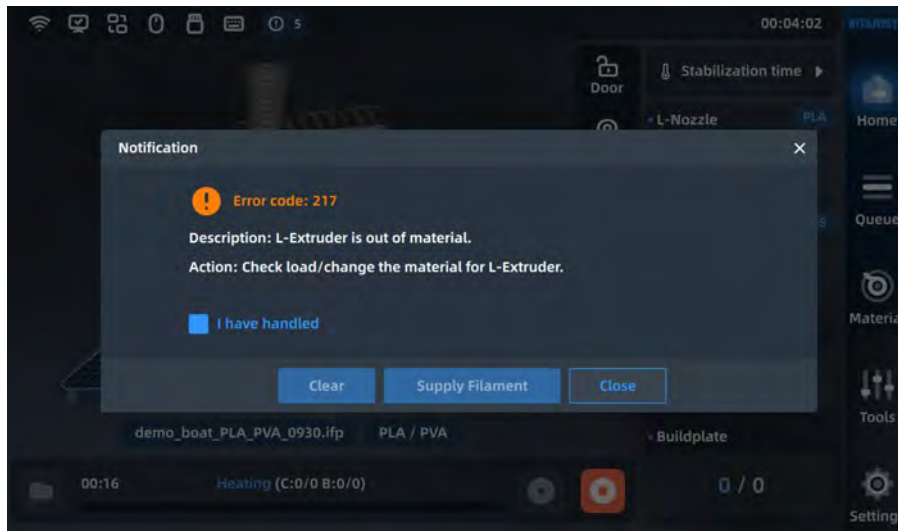
Figure 5.12 Out of material alarm interface

5.4 Basic Print Molding Operations

5.4.1 Preparing the printer

To prepare the printer for molding:

1. Turn on the printer's power (see 5.1.1 for details);

2. remove any material that may remain on the nozzle with a nozzle brush;

3. clean the print base, and the magnetic platform substrate of possible residual material or impurities;

4. placing the print base plate on the platform substrate along the left and right side guide slots of the magnetic suction platform substrate;

Note： that the magnetic suction platform substrate suction force is large, when placed should hold the handle of the printing platform with both hands, first print the base plate tilt, the back side first contact the magnetic suction substrate, and then rely on the magnetic suction force slowly laid on the platform to avoid pinching hands;
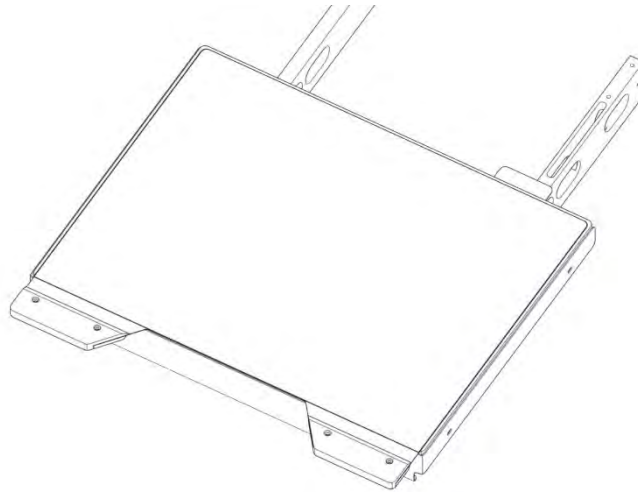
Figure 5. 13 Installing the print platform glass

5. Load the material according to the print job requirements. Refer to 5.2.1 for detailed steps;

6. Perform the leveling, Z offset calibration and XY offset calibration steps. This step may be skipped if leveling and calibration have already been performed;

7. When ready, the printer can officially perform the printing task.

5.4.2 Importing print files to the printer

1. import the STL model file into the slicing software INTAMSUITE, and generate the G-code (generate ifp format file operation interface can be model preview) file after slicing;

2. The G-code file generated by slicing can be placed in two optional locations:

(1) U-disk (U-disk). Inserted into the USB socket on the right side of the printer operation panel after copying via U-disk for reading by the printer;
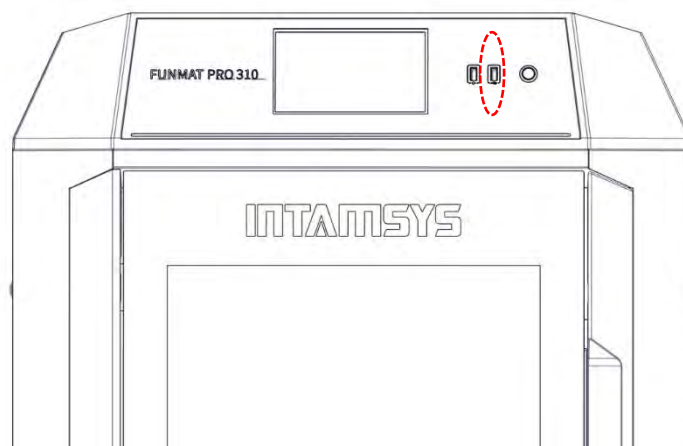
Figure 5.14 Copy via USB flash drive

(2) Ftp (network). Enter the IP address of the printer in the address bar of the window folder on the computer side, and transfer the G-code file to the printer via the network for the printer to read.
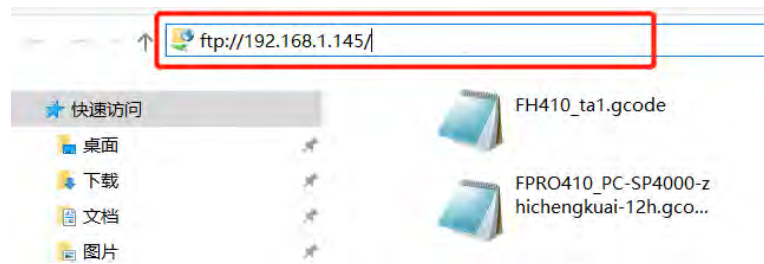
Figure 5.15 Ftp transfer PC interface

5.4.3 Loading print files

1. First select the location of the print file. Select the location where the file will be stored, such as U-disk (USB drive) or File Transfer Protocol (Ftp), from the drop-down bar in the upper right corner of the screen;

2. click on the open file icon in the bottom left corner of the screen, a list of printed files will pop up;
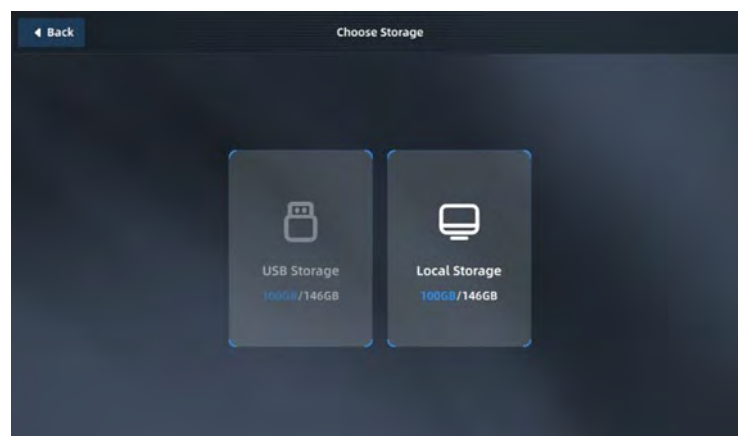
Figure 5.16 Open file button location

3. Select the required print file, and then click the Open "Print" button to load the print file. You can also select "Add to Queue" to add the print file to the print queue. If you use the U-disk (U-disk) import method, after loading the print file, you can pull the U-disk out of the socket, which does not affect the printing.

Figure 5.17 Print document interface

5.4.4 Printing and molding process

5.4.4.1 Main process of printing and molding

Click the Start button on the screen to start printing. The printing and forming process is divided into three steps: "Preheat - Print - Keep Warm".

1. Preheat. Before printing begins, the printing platform and chamber are first preheated. Preheat temperature and preheat time for the printer on the left printhead material platform temperature, chamber temperature and preheat time (need to confirm the material interface material settings and Gcode is consistent). Turn on the preheat timer when the platform temperature and chamber temperature are close to the target values;

2. Printing. When the warm-up time is over, the printer starts to read the G-code file and performs the official printing.

3. Keep warm. After printing, the nozzle cools down, the printing platform and the chamber remains hot. Insulation temperature and time based on the left nozzle material platform insulation temperature, chamber insulation temperature and insulation time.

5.4.4.2 Preheating time and holding time modification

Printing the molding process, the preheating time and holding time can be modified.

1. Click the "Preheat" button on the right side of the main interface, which will display the interface of preheat time and keep warm time modification;

2. Turn on or off by checking or unchecking Preheat and Maintaining.

3. Modify the time by operating "-"/"+" or dragging the scroll bar, and finally press the Confirm button to save the changes.

Note: **Preheat and keep warm need to be set before printing starts, the setting will not take effect during printing; only if the chamber has been kept warm for a long time can the preheat be turned off or the preheat time be reduced, otherwise the next print will be affected.**
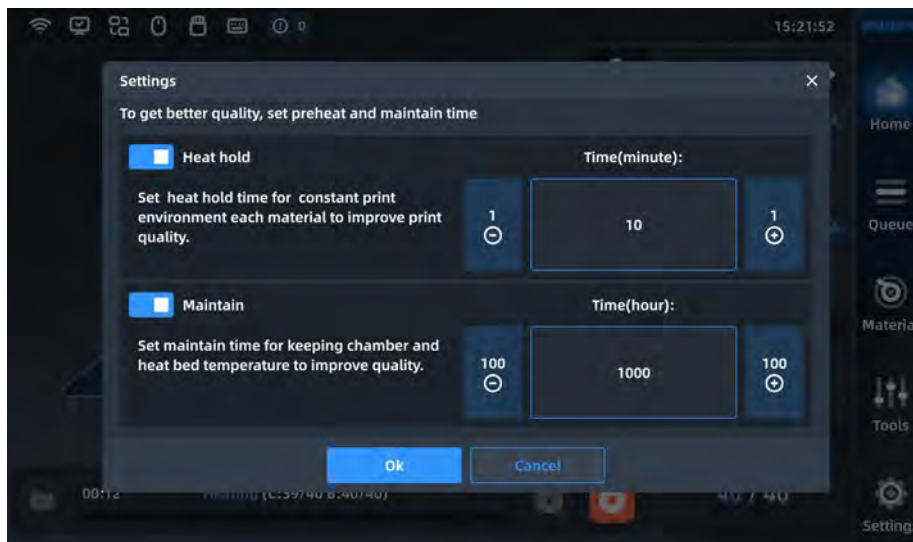
Figure 5.18 Preheating and holding time interface

5.4.5 Print forming parameters settings

During printing, the following process parameters of the printer can be adjusted in the Tools/Tune interface: Left Nozzle Temperature (L-nozzle), Right Nozzle Temperature (R-nozzle), Platform Temperature (Buildplate T), Chamber Temperature (Chamber T), Print Speed, Material Flow, Left Fan Speed (L-Fan Speed), Right Fan Speed (R-Fan Speed)

The parameter adjustment steps are as follows:

1. click on the icon of the parameter to be modified so that it is highlighted;

2. modify the parameter values by clicking on the "-"/"+" on the right side or rotating the knob below, with the specific values displayed in the box;

3. Click the Apply button to complete the setting of this parameter.
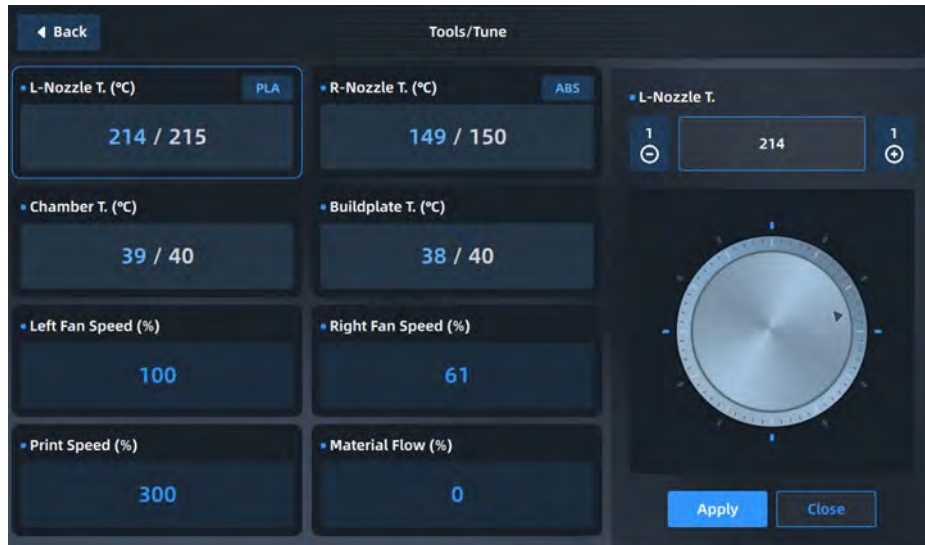
Figure 5.19 Adjustment interface

5.4.6 Forming alarm

If the printer detects a fault that could affect printing, it gives a warning in the display. Depending on the severity of the warning, the alarm status button will change to yellow, orange, or red.

Pressing the Alarm Status button will open a dialog box that indicates the cause of the alarm. The body of the dialog box will contain information related to the cause of the alarm.

In some cases, an alarm will prevent you from starting to print and will need to be corrected before the printer can perform printing. While the printer is performing a print job, various warnings may be displayed, some of which will pause and abort printing. Depending on the severity of the warning, you may or may not be able to resume molding.

See Chapter 8 for a list of fault alarms and how to handle them.

5.4.7 Pause Printing

During printing, the Pause button within the Print screen will be selectable. The printer can be paused automatically, or it can be paused manually using this button.

5.4.7.1 Automatic pause

1. the automatic pause command occurs when an orange alarm is detected (see 8.1 for a detailed list of orange alarms);

2. when the path in the cache is completed, the Z-axis platform is lowered slightly, the nozzle will move to the zero position and the nozzle stops heating, while an alarm dialog box pops up indicating the reason for the suspended state;

3. you need to correct this alarm and then tap the Clear button to clear the alarm;

4. To resume printing, press the Start button within the Print screen. The Resume command will be sent to the printer instructing it to resume printing.

5.4.7.2 Manual pause

1. manual pause occurs when the pause button is pressed;

2. when the path in the cache is completed, the Z-axis platform is lowered slightly, the nozzle will move to zero position and the nozzle stops heating;

3. To resume printing, press the Start button within the Print screen. The Resume command will be sent to the printer instructing it to resume printing.

5.4.8 Termination of molding

After a print job is started, the Terminate button within the Print page will be in the selectable state. The printer can be automatically terminated, or it can be manually terminated using this button at:

5.4.8.1 Automatic termination

Automatic termination occurs when a red alarm condition appears (see 8.1 for a detailed list of red alarms). When the printer receives an abort indication, the nozzle, stage and chamber heating will be turned off and the XY axis will be zeroed.

5.4.8.2 Manual termination

A manual pause occurs when the Terminate button is pressed. When the printer receives an abort indication, a dialog box is displayed for confirming or canceling the abort. Pressing confirm will terminate. When the printer receives an abort indication, the nozzle, stage, and chamber heating are turned off and the XY axis is zeroed.

5.4.9 After the molding is completed

When molding is complete, the print head is zeroed and stopped and the print progress on the screen will show 100%, indicating that the print molding is complete. The printer's platform and chambers may be insulated according to presets.

To remove a print from the printer:

1. Unlock the door and open the front door of the chamber. If you want to end the insulation, just uncheck the Maintaining button, then the front door and top cover are unlocked; if you still want to keep warm, click the door lock button on the screen status bar to unlock the front door and top cover;

2. Click on the Axis (axis of motion) interface, click on the "Z↓_" button to bring the platform down to the bottom, at which point the platform drops to the bottom of the chamber to facilitate the removal of the printing platform glass plate;

3. Put on gloves and remove the flexible print base;

4. Bend the flexible printing base plate up and down with both hands, and the playing parts will be detached from the base plate.

5. Remove the support material from the printout.

5.5 Changing the printer default settings
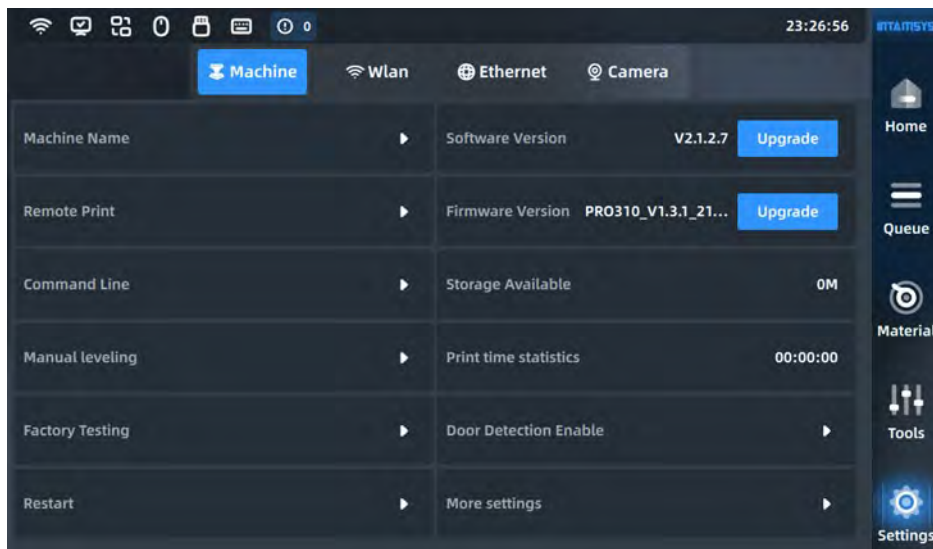
Figure 5.20 Printer system parameter settings

5.5.1 Wi-Fi connection

Wi-Fi auto reconnect, which automatically reconnects the last Wi-Fi connection after a system reboot. Click the switch on the right side of Wi-Fi auto reconnect in the System Settings screen to turn it on/off, blue is on. The WLAN interface allows you to set the wireless network connection on and off, and other settings related to the wireless network.
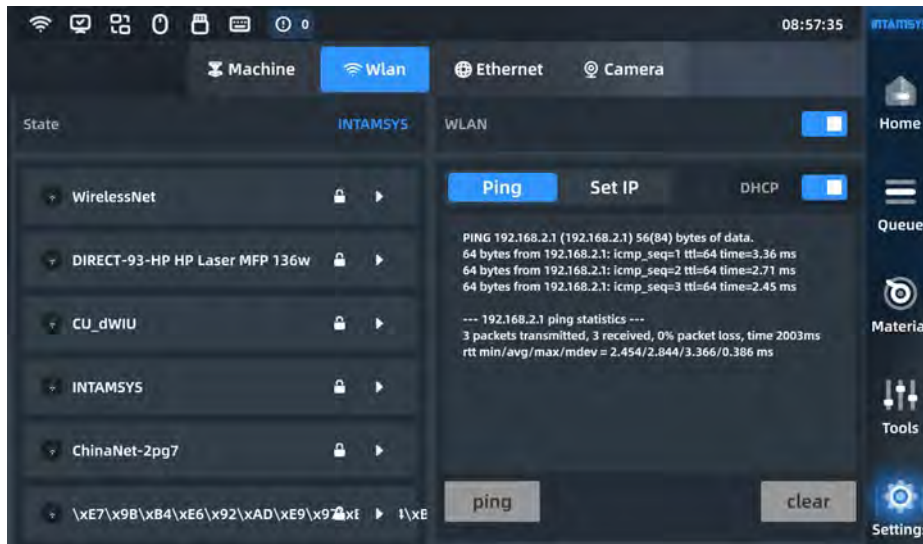
Figure 5.21 WLAN settings

5.5.2 Modifying the system's date and time

The system time of the printer will not update itself according to the time zone of the location and needs to be modified by the user. Click Date & Time in More Setings (interface) to bring up the date and time modification box, after the modification is completed, exit the modification box to take effect.
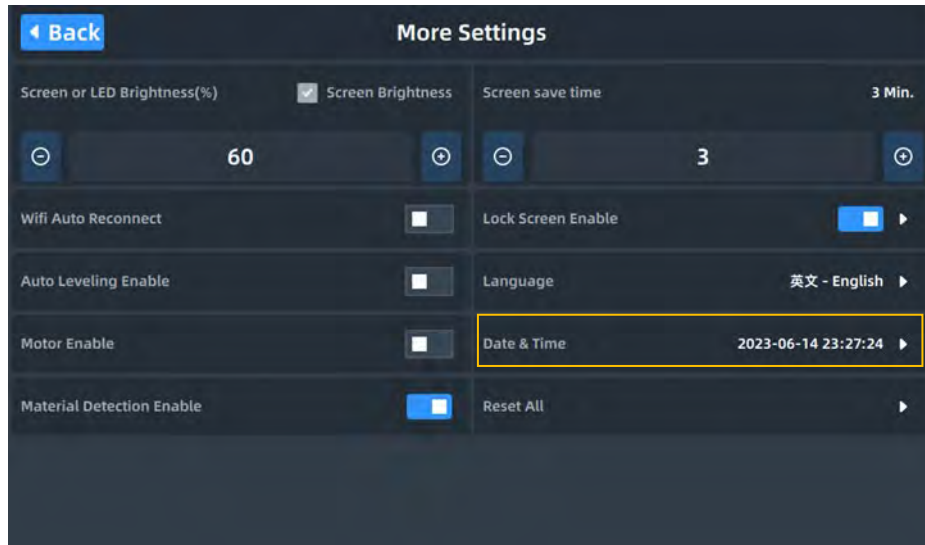
Figure 5.22 Date and time settings

5.5.3 Turn on/off the allow network remote access function

Enable Remote after start: Sets remote access to be allowed automatically after the device reboots. Click the switch on the right side of Enable Remote after start in the Settings screen to turn it on/off, and the blue color is on. Click the drop-down menu on the right to enter the Remote settings screen to set remote printing.
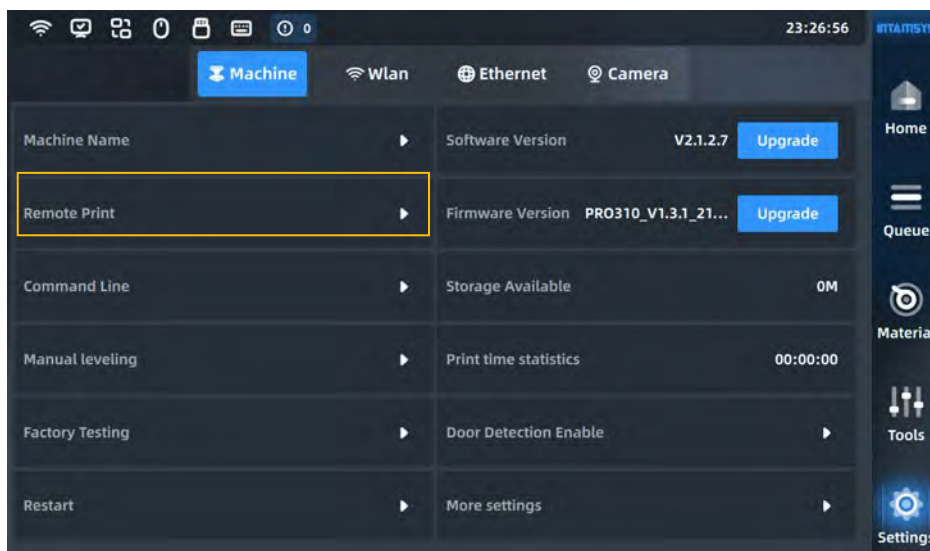
Figure 5.23 Remote Print On
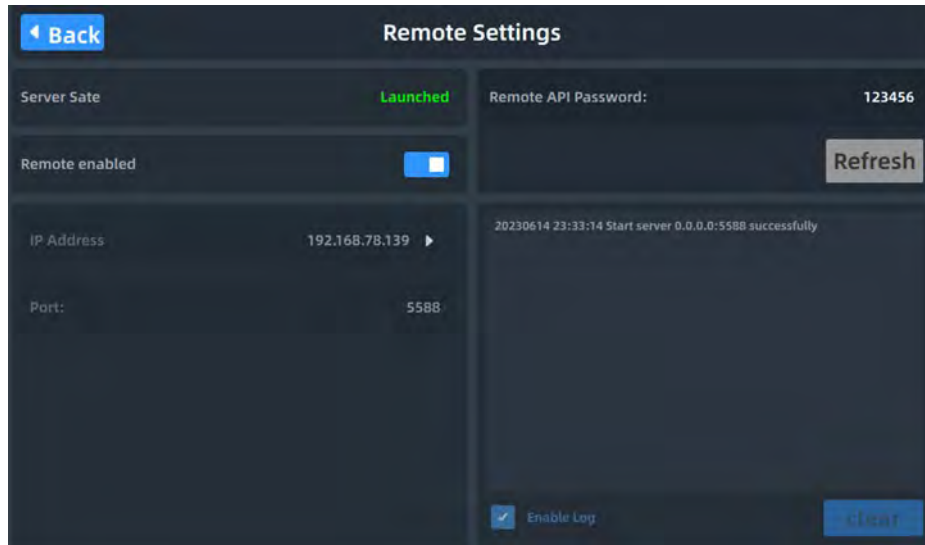
Figure 5.24 Remote Print Setup

5.5.6 Front door and top cover locking

The printer is installed with front door solenoid lock and top door solenoid lock, the front door and top door should be closed during the device heating and printing process, the printer will be locked automatically after the door is closed, the user can click the Door lock icon on the main interface to turn on or off the door lock. It can also be turned on/off by the switch on the right side of Door lock enabled (front door and top cover locked) under Settings interface, showing blue for on.

Figure 5.25 Door lock switch
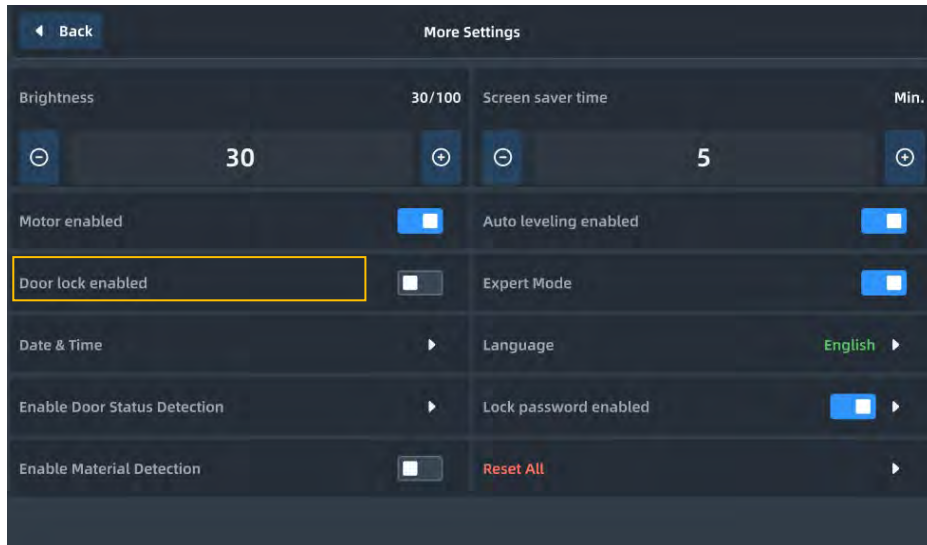
Figure 5.26 Door lock button location interface

For user protection, the front door and top cover are locked when the printer starts printing or when the chamber starts heating, and cannot be opened when locked. If you need to forcibly unlock them during this process, click the door lock button to unlock the front door and top cover.

Note: **Do not put your hands inside the chamber after forced unlocking to prevent burns or pinching.**

5.5.7 Motor start

Motor enabled (motor start) refers to the turning on/off of motors for X-axis, Y-axis, Z-axis, extrusion motors and auxiliary wire feed.

Click More Setings under the System Settings screen, then click the switch to the right of Motor enabled to turn it on/off, showing blue for start.

Start means all motors are energized, close means all motors are energized are closed. After closing, you can use your hand to push each motor to rotate freely, which is convenient for equipment maintenance.
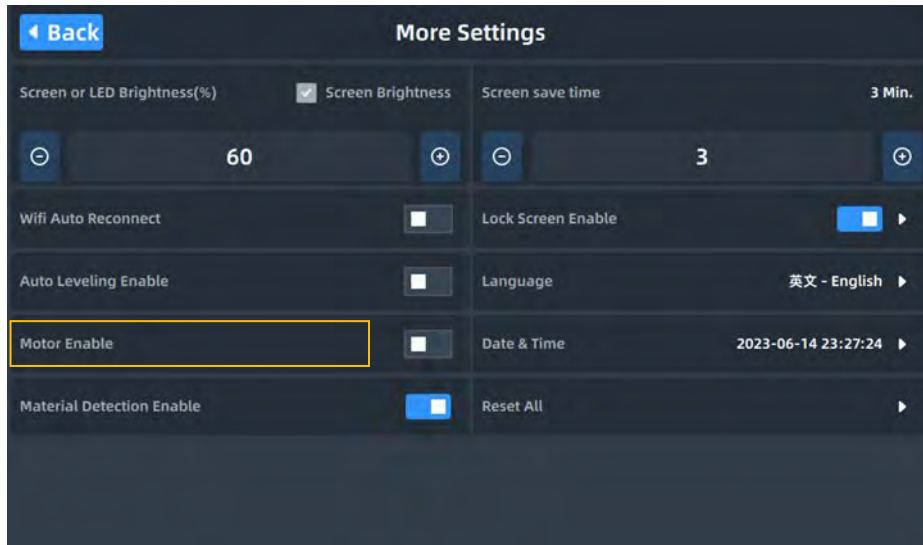
Figure 5.27 Motor control interface

5.6 Printer Status
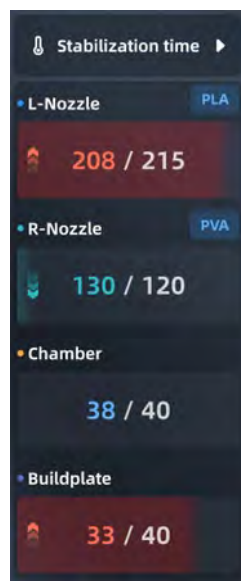
Figure 5.28 Printer Status

5.6.1 Temperature status

The temperature and humidity status of the printer can be viewed in real time on the Print screen.

L-Nozzle: target and real time temperature of the left nozzle;

R- Nozzle: target and real time temperature of the right nozzle;

Heatbed: target and real-time temperatures of the platform;

Chamber: target and real-time temperature of the chamber;

5.6.2 Software Versions

Software and firmware versions can be viewed through the Settings screen.

SW version: screen version;

FW version: the firmware version.
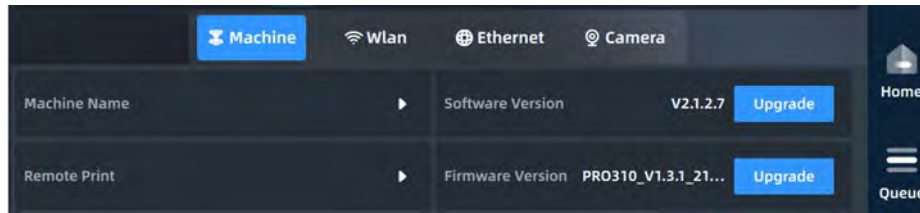
Figure 5.27 Screen and firmware version number

6 Leveling and calibration

This section describes the leveling and calibration methods for operating the FUNMAT PRO 310.

In the Tools screen, click the Calibration button to enter the Auto Leveling and XYZ offset calibration screen. The three steps from top to bottom are Leveling, L&R-Nozzle Z offset and Nozzles XY offset.
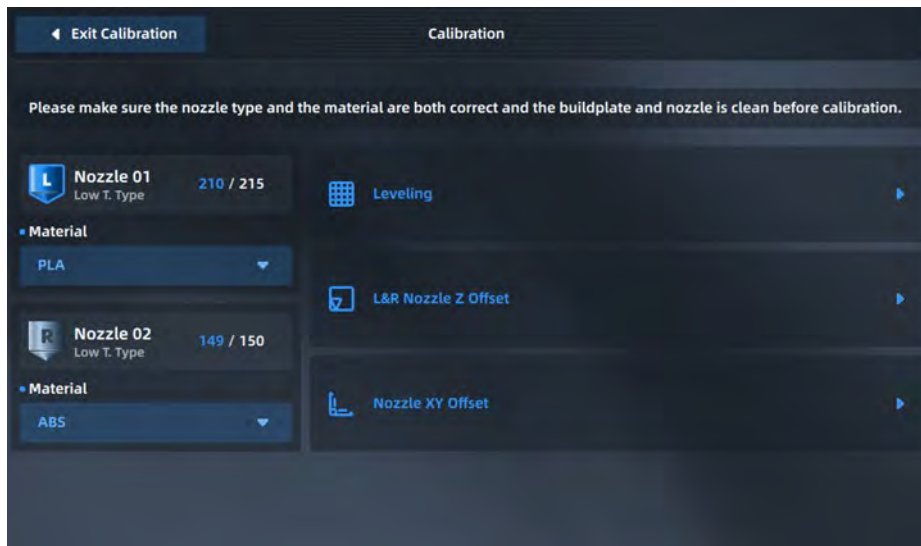
Figure 6. 1 Leveling and XYZ offset calibration steps

Any one or more of these steps can be performed selectively, and the three steps from top to bottom must be performed in sequence when using the printer for the first time. After the different operations, the following table will guide the user on how to selectively perform one or more of these steps.

Table 6.1 Conditions to be Implemented for Manual Leveling and XYZ Offset Calibration

Conditions of use	Step 1: Leveling	Step two: Z Offset Calibration	Step three: XY Offset Calibration
After replacing the left nozzle	●	●	●
After replacing the right nozzle	-	●	●
Replace the print head assembly with a new one	●	●	●
After replacing the print backplane with a new one	●	●	-
Leveling error	●	-	-
Z-offset calibration error	-	●	-
XY Offset Calibration Failure	-	-	●

6.1 Leveling

FUNMAT PRO 310 printer has 100-point and 16-point auto leveling function, the printer is factory calibrated for leveling, users can do auto leveling first when they get the printer, in case of auto leveling failure, users will be guided to do manual leveling. Users can also enter manual leveling through the Settings interface.

6.1.1 Automatic leveling

Automatic leveling, mainly with the help of the sensor installed on the left printhead, measuring the position of 100 points on the platform (or 16 points), the printer itself determines the relative position of the print base plate and XY movement plane, and the Z-axis rise or fall in the printing process real-time compensation. Even if the print base plate has a certain tilt angle is also possible to achieve printing by compensation. As with manual leveling, automatic leveling is achieved only through the left printhead. Within the Tools screen, click the Calibration button, and then click the Leveling button to enter automatic leveling.
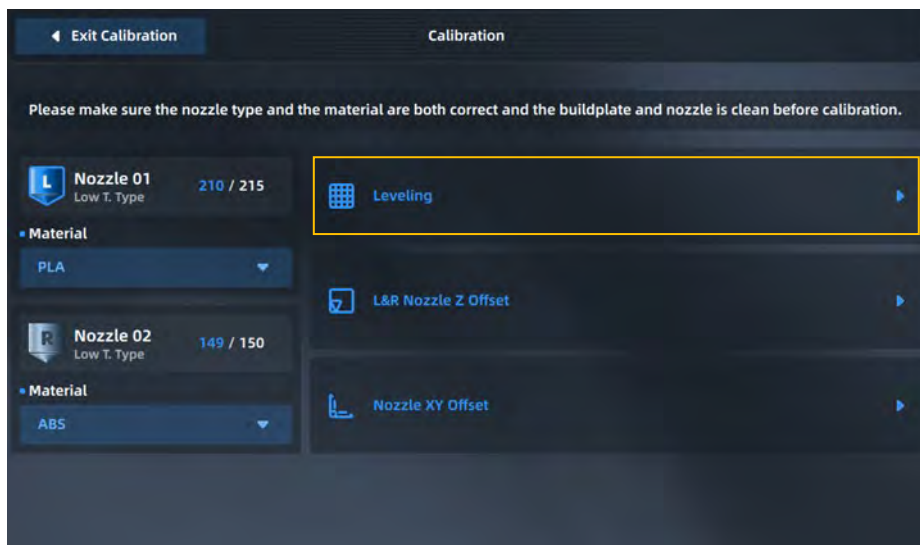
Figure 6. 2 Automatic leveling

1. Click the Leveling icon, a prompt box will pop up, prompting to clean the print platform and chamber to prevent interference with the leveling operation. If it has been cleaned, click the "OK" button to officially enter the automatic leveling operation;

2. First, the leveling sensor trigger test is performed. If the leveling sensor fails, a pop-up window will be prompted, and then the automatic leveling procedure will be terminated. After the leveling sensor test, the nozzle will move to the center of the front side of the platform to start the benchmark point test, the

benchmark point test is completed after the start of the 100-point leveling test. The difference between each test point and the reference point will be displayed on the interface, and when the difference between the maximum and minimum values of all points is greater than 0.5mm, the leveling failure will be prompted, and manual leveling is recommended first.

Figure 6. 3 Automatic leveling

Caution:

- When installing the print base plate before leveling, the print base plate should be properly attached to the platform along the guide slots on both sides of the platform substrate;
- Residual material on the tip of the nozzle to be cleaned before leveling;
- The printing platform needs to be cleaned before leveling and no foreign objects should be left behind;
- The chamber needs to be cleaned before leveling to avoid collision with foreign objects when the platform is lowered;

6.1.2 Manual leveling

Manual leveling, mainly with the help of the plug ruler (thickness 0.2mm) to measure the 4 points on the platform, while the knob located below the printing platform by hand to achieve the same distance between the tip of the nozzle and the platform glass at each of the 4 points, so that the entire XY movement plane and the platform glass parallel. Manual leveling is achieved by the left nozzle only.

1. Click on the Manual Leveling icon, a prompt box will pop up, prompting the user to prepare the stopper (thickness 0.2mm) and socket wrench, and clean the printing platform and chamber to prevent

interference with the leveling operation. If the cleaning is completed, click the "I have done it" button to enter the manual leveling operation;
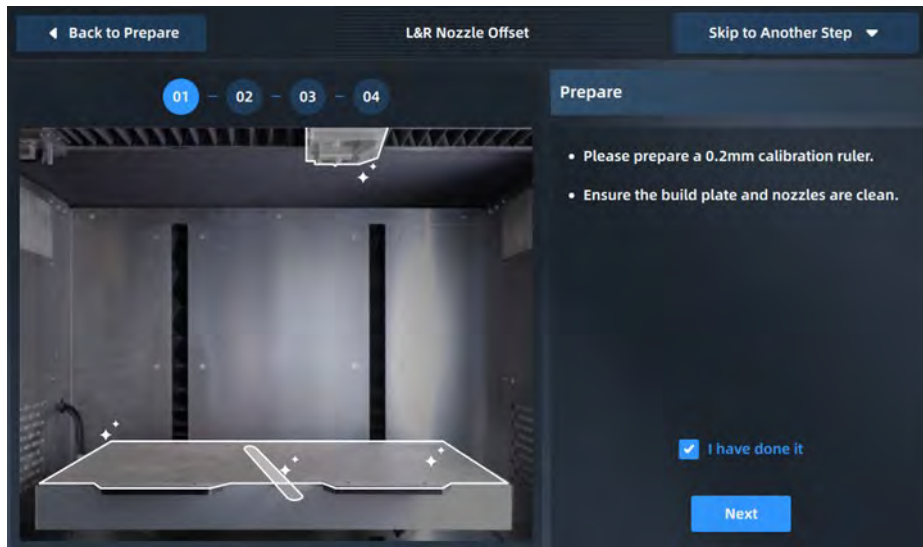
Figure 6.4 Manual leveling

2. according to the prompts on the screen, respectively, rotate the knob under the printing platform by hand, while measuring the distance between the nozzle and the glass plate of the platform with a stopper (thickness 0.2mm), pump the stopper back and forth, adjust until the stopper just passes, and then click the Next (next) button;

3. After adjusting each of the 4 points on the platform for the first time, the screen will display the Redo2-5 (repeat steps 2-5) button, click this button to repeat the leveling once more;

4. When the second manual leveling is finished, the Finish button will pop up on the screen. Clicking this button will lower the platform to the bottom of the Z-axis and then back again to end the manual leveling.
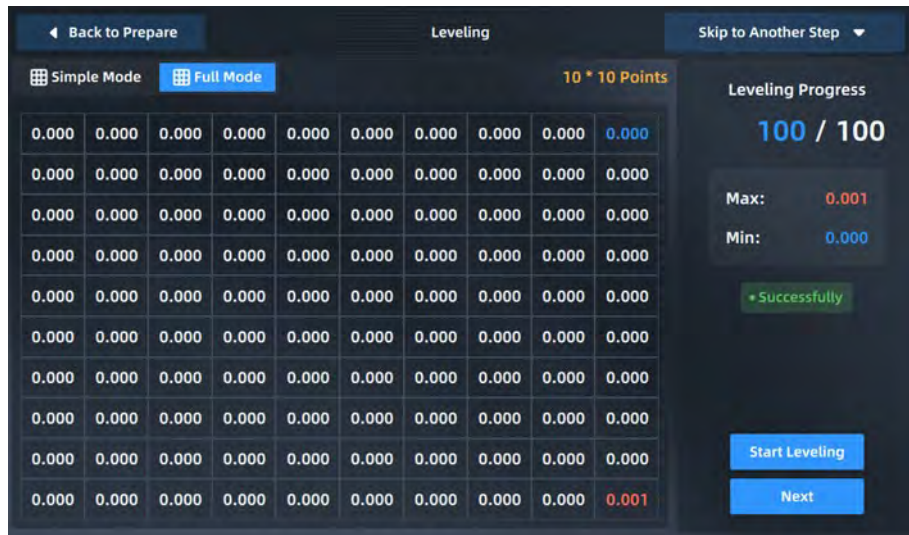
Caution:

· When installing the print base plate before leveling, the print base plate should be properly attached to the platform along the guide slots on both sides of the platform substrate;

· Residual material on the tip of the nozzle to be cleaned before leveling;

· The printing platform needs to be cleaned before leveling and no foreign objects should be left behind;

· The chamber needs to be cleaned before leveling to avoid collision with foreign objects when the platform is lowered;

6.1.3 Z-offset calibration

1. Click on the L&R-Nozzle Z offset icon to enter the Z offset calibration operation, which will first prompt the user to prepare a stopper (0.2mm thickness) and clean the print platform. If it is cleaned, click "I have done it" to officially enter the Z offset calibration operation at;
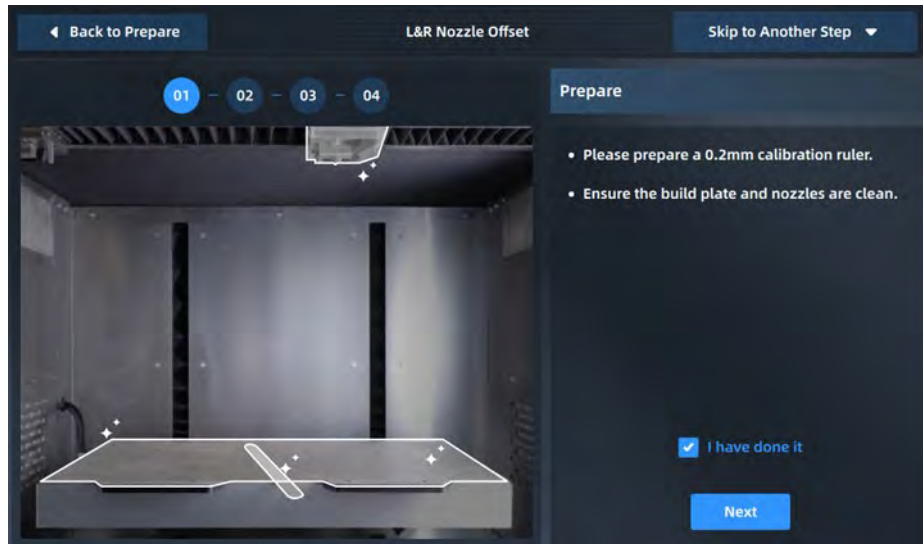
Figure 6.5 Z-directional offset calibration

2. the left and right nozzles will be automatically set to warm up according to the selected material, and the nozzle temperature will automatically jump to the next operation when it reaches the target temperature;
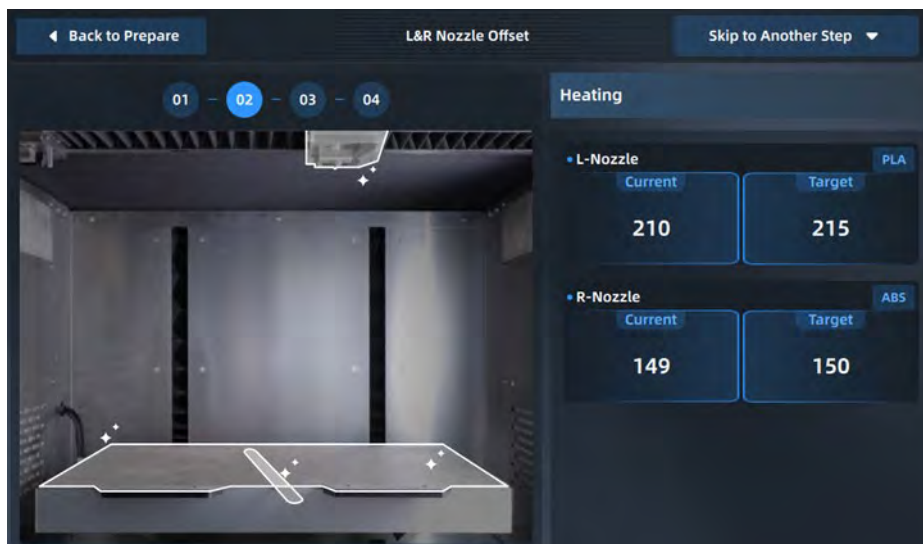
Figure 6.6 Z-directional offset calibration interface

3. First of all, the left nozzle calibration, according to the instructions on the screen, the stopper between the nozzle and the glass platform, through the "Z ↑ 0.05" / "Z ↓ 0.05" button coarse adjustment, through the "Z ↑ 0.01 "Z↑0.01"/"Z↓0.01" button for fine adjustment, adjust until the stopper is just plugged into the stopper. Press the Next button when the adjustment is completed;
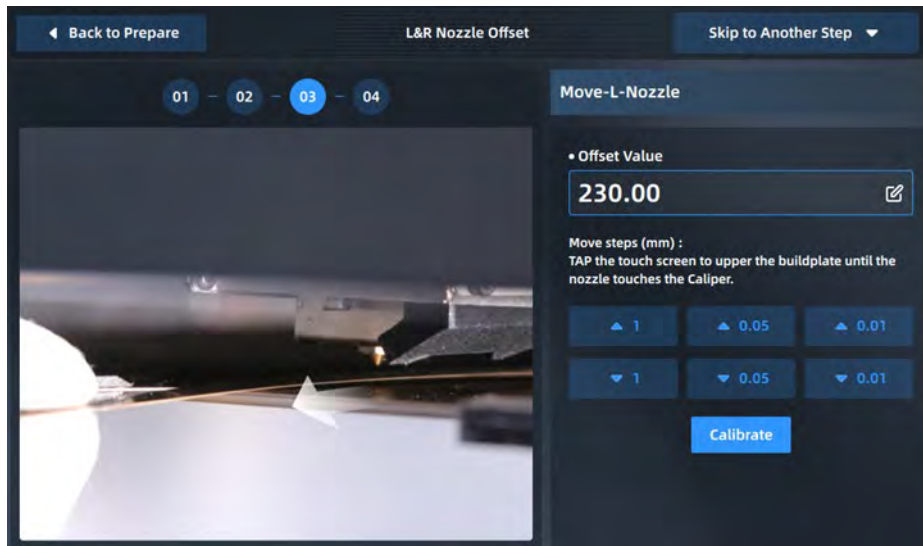
Figure 6.7 Z-directional offset calibration interface

4. Then the calibration of the right nozzle, the operation method and the calibration of the left nozzle the same. After the adjustment is complete, press the "Finish" button to end, the screen will pop-up window to display the height of the left and right nozzle offset value, click "OK" to end the Z-directional calibration.
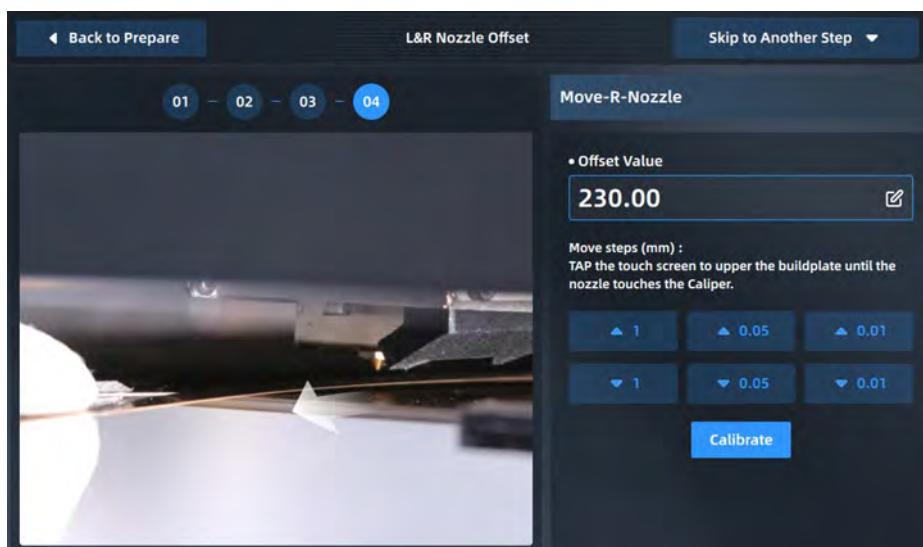
Figure 6.8 Z-directional offset calibration interface
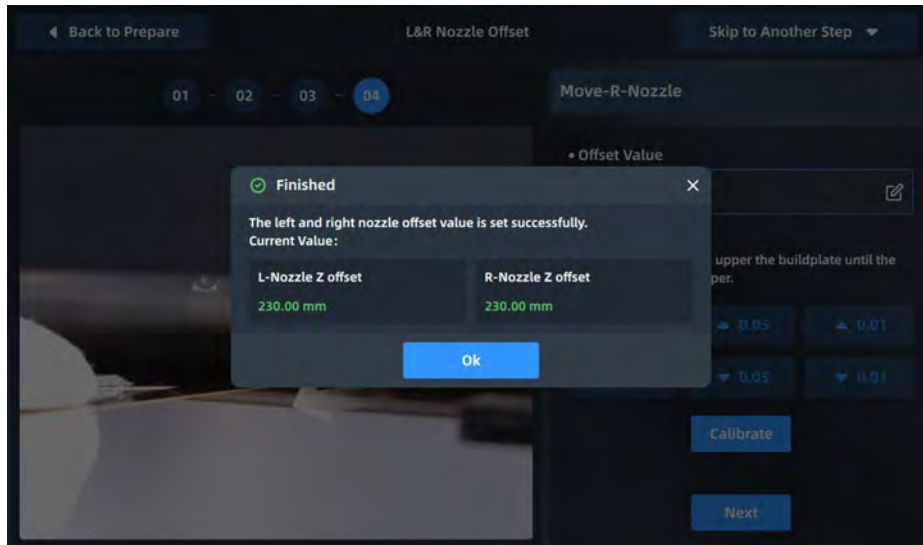
Figure 6.9 Z-directional offset calibration interface

6.1.4 XY Offset Calibration
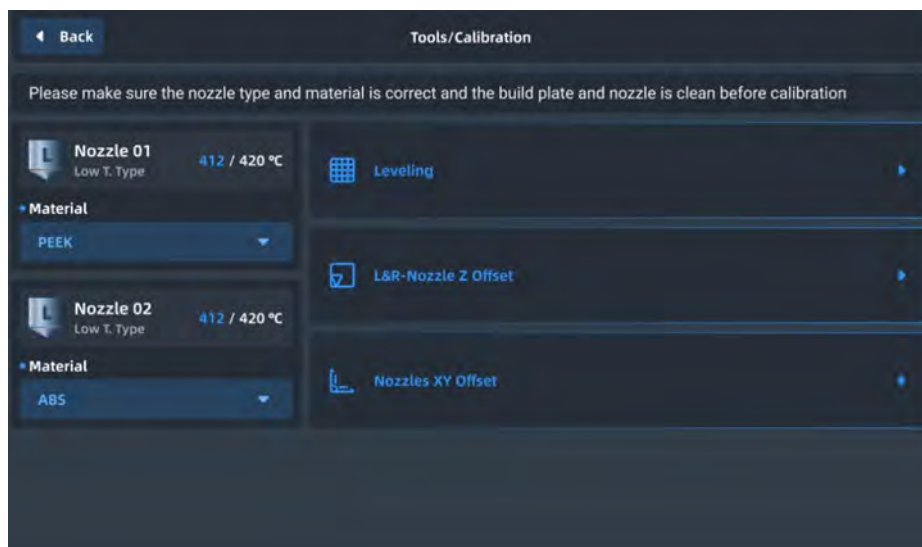
Figure 6.10 XY Offset Calibration

1. Click on the Nozzles XY offset icon, which prompts to confirm that the left and right printheads and platforms are clean and that the material has been loaded. Once confirmed, clicking the "I have done it" button will begin calibrating the model for printing. (If the XY offset values are known, there is no need to tap the Next button, just tap the Skip to adjust button and enter the X offset and Y offset values respectively);
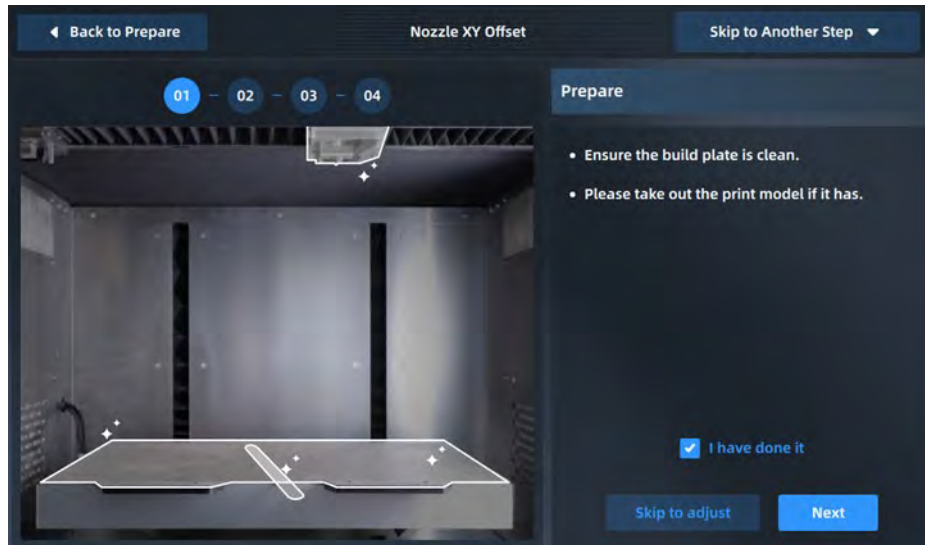
Figure 6.11 XY Offset Calibration

2. the left and right printheads and printing platform will automatically set the temperature rise according to the selected material, and automatically jump to the next operation after the temperature rises to the target temperature;
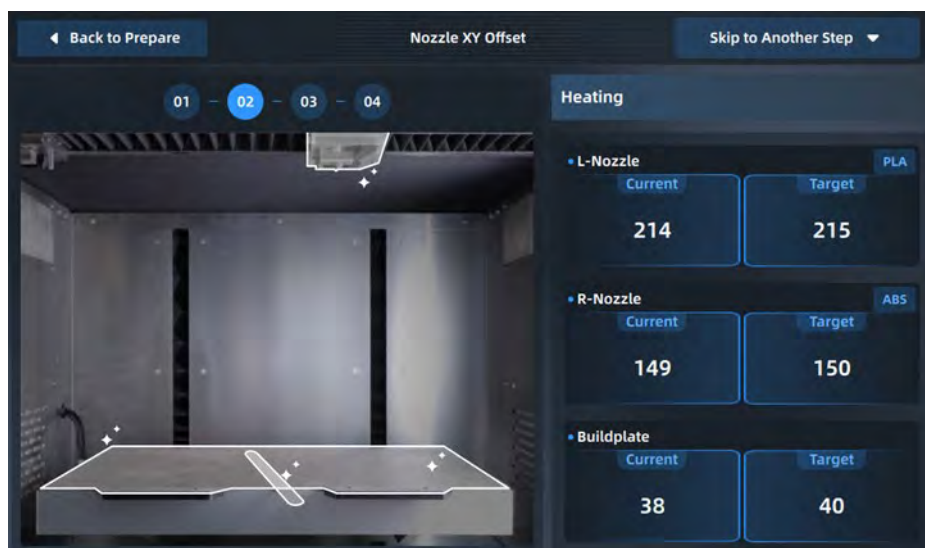
Figure 6.12 XY Offset Calibration

3. The printer will print the model scale with the left and right printheads respectively, and click the Next button when the printing is finished.
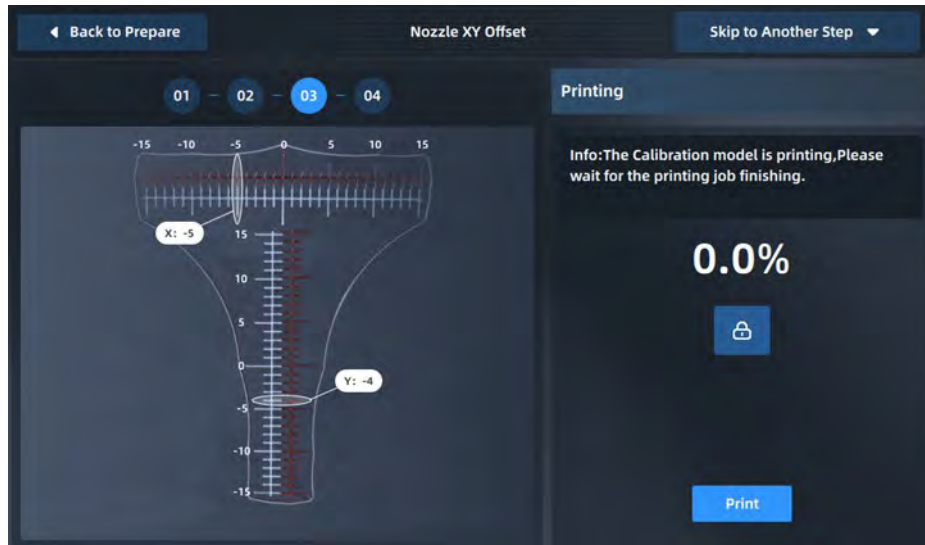
Figure 6.13 XY Offset Calibration

4. Read the scale to get the X offset value and Y offset value respectively, and click the "+"/"-" button to input the value.
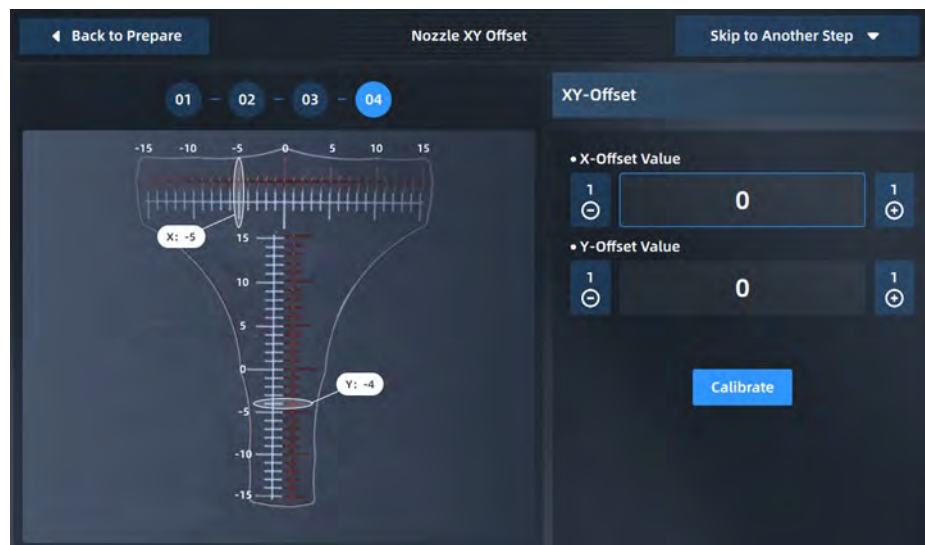
Figure 6.14 XY Offset Calibration Interface

The X offset value needs to be obtained by reading the horizontal direction scale as follows:

(1) Read the scale of the model printed by the right printhead, using the model printed by the left printhead as a reference;

(2) First, determine whether the right nozzle model centerline is located to the left or right of the left nozzle model centerline. If on the left, take the "-" value, if on the right, take the " + " value;

(3) Find the most aligned scale of the two models and count from the midline to this scale, with the value recorded as N;

(4) Enter the "N" value in the input box.

The Y offset value is obtained by reading the numerical direction scale as follows:

(1) Read the scale of the model printed by the right printhead, using the model printed by the left printhead as a reference;

(2) First, determine whether the center line of the right nozzle model is located above or below the center line of the left nozzle model. If in the lower side, take the "-" value, if in the upper side, take the " + " value;

(3) Find the most aligned scale of the two models and count from the midline to this scale, with the value recorded as N;

(4) Enter the "N" value in the input box.

For example, the following figure shows the scale printed by a certain XY offset calibration, after reading the X offset value should be "+6" and the Y offset value should be "-5".
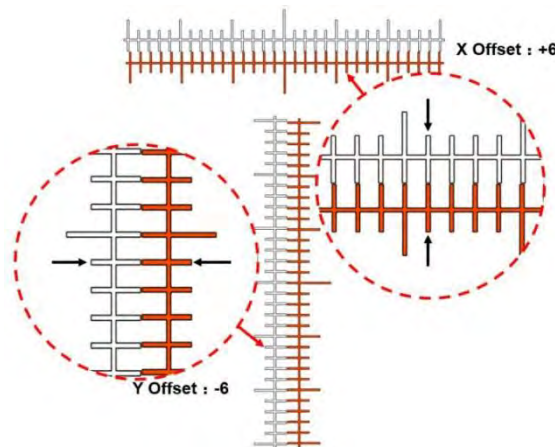
Figure 6.15 Reading method of XY offset calibration scale

Note: **The offset value of 1 represents one scale, and the actual deviation is 0.05mm.**

If, after reading the print scale, you find that the horizontal or vertical direction print scale range in the middle line are far apart and other scales are difficult to overlap, it means that the XY deviation has exceeded the measurable range of the scale (maximum scale range 15, i.e. 0.75mm). Take the following steps:

(1) First observe the position of the center line of the right nozzle model relative to the center line of the left nozzle model to determine the offset direction "-"/" ‖ ;

(2) Then set the offset value to the maximum value and click the "OK" button;

(3) Perform XY offset calibration again and print the test model until it reads the determined offset value.

7 Maintenance

Correct and frequent maintenance not only is beneficial to prolonging the machine's service life, but also greatly improves your printing success rate and printing effect each time. The maintenance tasks that the user is required to perform on Pro310 are described in this chapter.

7.1 Inspections before Each Print

Inspections before print can ensure the safety of the printing process, and improve the printing success rate.

7.1.1 Inspect the printing buildplate

Inspection platform and flexible printing board:

1. Ensure that the magnetic suction platform is free of foreign objects, there are no adsorbed debris on the magnet, and the screws for installing the magnet are not loose or protruding;
2. Check for foreign objects or damage on the surface of the flexible printing plate;
3. Properly attach the printing plate to the printing platform.

7.1.2 Empty the printing chamber

The heated chamber may melt the filament remained on the chamber's base plate, which may adhere to the base plate. The foreign matters in the chamber under the hot bed may occupy the moving space of Z axis. So before printing, please clear all matters and material residues in the printing chamber carefully.

7.1.3 Inspect nozzles

In order to avoid the impact of the residual material on the nozzle on the forming quality of the printed work, you should check whether the nozzle is clean before each printing. Otherwise, you need to heat the nozzle to the melting temperature of the residual material, and then clean the nozzle with a wooden handle copper wire brush.

If the material sticks to a higher position and enters the small cover shell of the nozzle attachment, it is necessary to remove the small cover shell near the nozzle, clean the nozzle, and then install the small cover shell back.
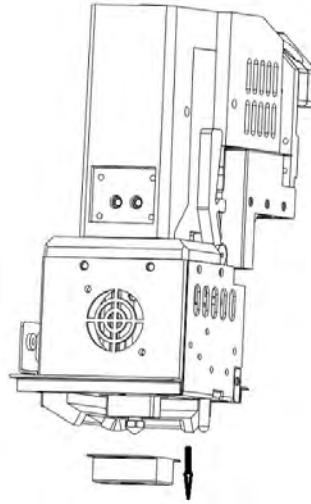
Figure 7.1 Clean the nozzle

7.2 Maintenance after Each Print

7.2.1 Clean the buildplate

After printing, the printing platform will be reduced to a certain distance, and then put on gloves to remove the printing base plate from the printer together with the print. Bend the flexible printing bottom plate with both hands to separate the print from the printing bottom plate, and then clean the printing bottom plate and put it back on the hot bed.

7.2.2 Clean the nozzle

After each printing, you should check whether some printing materials are glued to the outer surface of the nozzle. Wrapped by residual material for a long time will affect the service life of the nozzle. In order to better prepare for the next printing, please pay close attention to whether the surface of the nozzle is clean. If too many residual materials are glued, heat the nozzle until the material sets the temperature and then clean it with a wooden handle copper wire brush.

Note: **Move the printing bottom plate to the lowest position before cleaning the nozzle, and place scalds at high temperature during cleaning.**

7.2.3 Clean the chamber

In the process of printing, the nozzle brush will scrape some material fragments down to the chamber. So please carefully clean up the interior of chamber after each product is printed.

7.3 Periodic Maintenance

7.3.1 Cleansing of the feeding gear of extruder

After long-term use, more and more cut material chips accumulate in the groove of the feed gear, resulting in a decrease in the feed power of the extruder. It is recommended to remove the nozzle front housing every month, remove the front cover plate, remove the wire feeding gear shaft 2, check the groove accumulation of the two wire feeding gear shafts at a time, and carefully clean each tooth groove with tools such as a small copper wire brush or tweezers if necessary.

604-1631-E06 前罩壳

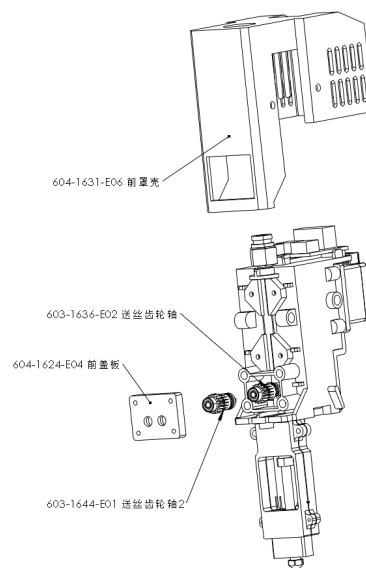603-1636-E02 送丝齿轮轴

604-1624-E04 前盖板

603-1644-E01 送丝齿轮轴2

Figure 7.2 Location of feed gear

7.3.2 Maintenance of moving parts

It is recommended to supplement perfluoropolyether grease or lithium soap-based grease every 6 months for X-axis and Y-axis motion guidance components (the left and right covers of the machine need to be removed when supplementing Y-axis grease).

1. Make sure that all relevant temperatures are set to "0" and disable the motor in the system settings (turn off Motor enabled);

2. Manually move the nozzle assembly to the center;

3. Use a cloth to clean the residual grease on the X/Y rail;

4. Apply perfluoropolyether grease on the X/Y guide rail with a soft brush. Note: Too much grease may have a negative impact on exercise.

5. Move the nozzle assembly back and forth on the X/Y axis several times to ensure that the grease is applied evenly.
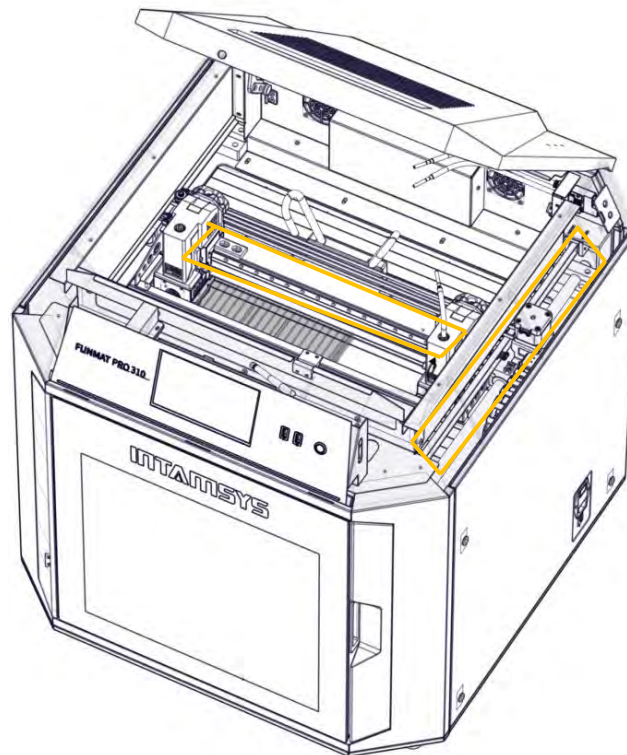
Figure 7.3 Lubrication Maintenance X/Y Axis Linear Guide

The moving parts of the Z-axis include linear bearings and ball screws. It is recommended to supplement perfluoropolyether grease or lithium soap-based grease every 6 months (the back cover of the machine needs to be removed).

1. Shut down the printer and unplug the main power cord.

2. Use a wrench to remove the 4 locking screws at the four corners of the back cover.

3. Apply perfluoropolyether grease or lithium soap-based grease to the linear guide rail and linear ball screw with a soft brush. Too much grease may have a negative impact on exercise.

4. Install the back cover back to the original and fix it, plug in the main power cord, then open the printer, and move the Z-axis up and down 10 times to evenly grease.
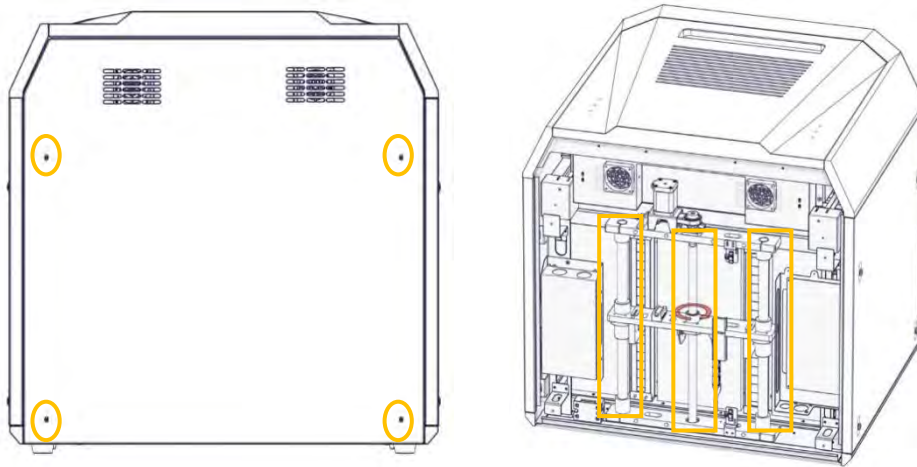
Figure 7.4 Lubrication and maintenance of Z-axis guide axis

Note: **Before replenishing grease everywhere, wipe the surface of the sports pair with a dust-free cloth with alcohol, and then apply the grease evenly on the surface.**

7.3.3 Maintenance of chamber filters

Air filters are installed at the air inlets on both sides of the printing chamber. Screw off the screws of the filter cover plate and remove the cover plate to see the filter. It is recommended to check or replace it every 6 months.

Figure 7.5 Clean the chamber filter

7.3.4 Maintenance and replacement of the guide pipe

The guide tube of the printer consists of two parts, one inside the printer and the other outside the printer. The external guide tube is connected from INTAMBox to the printer, and the internal guide tube is connected to the nozzle by the cutting detection mechanism.
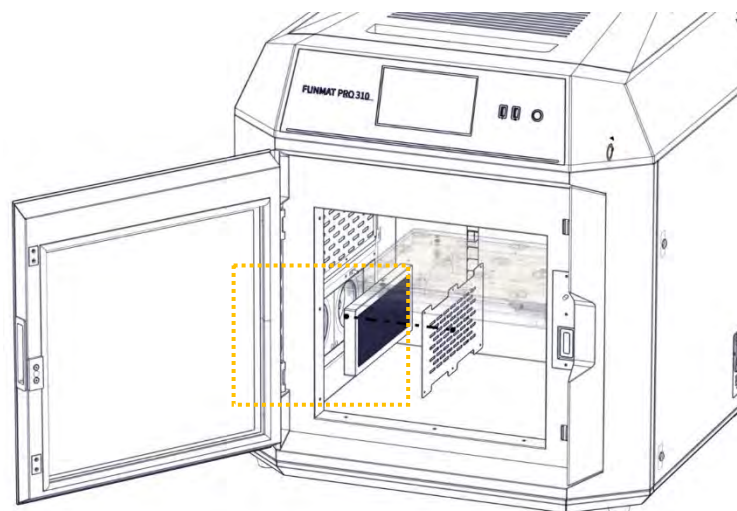
Especially the part located in the printing chamber, it is recommended to change its flexibility every 12 months because it works in a high-temperature environment to avoid possible aging.

1. Remove the consumables to ensure that all the consumables are put back in the material warehouse.

2. Close the printer and open the top cover, and start maintenance after the temperature of all parts drops to room temperature.

3. Move the extruder assembly to the center, press the black collar with one hand, and remove the catheter with the other hand.

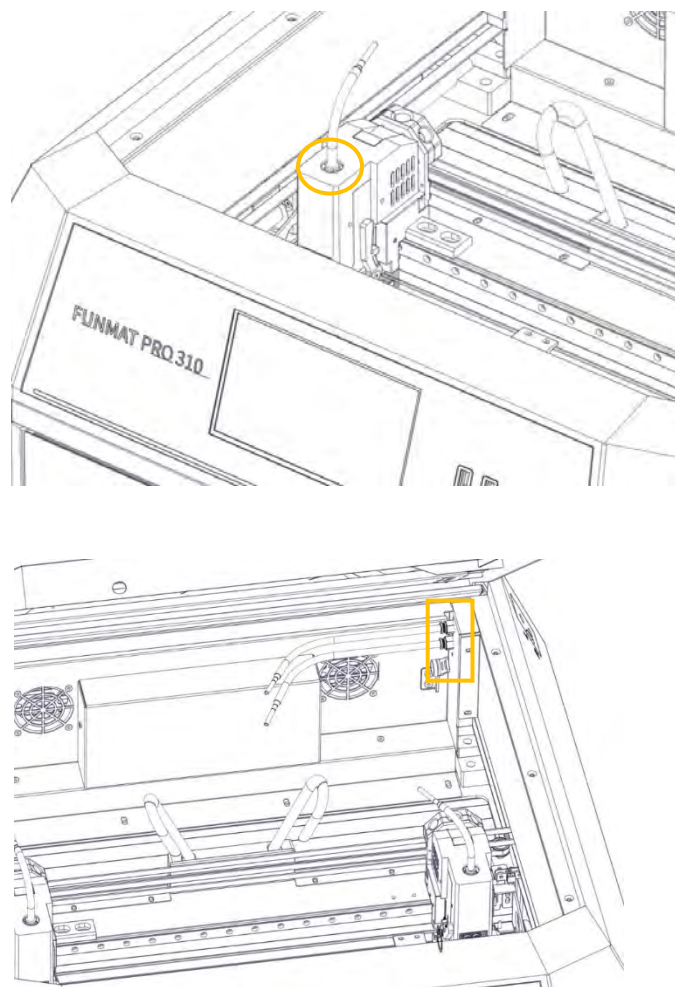4. Follow step 3 to remove the other end of the guide tube from the quick connector.

Figure 7.6 Disassembly of printer internal catheter

1. Follow the same steps to remove the external guide pipe.

2. Prepare new tubes of the same length, reinstall them and put them back in place.

Note: **Both ends of the guide tube must be fully in place to ensure smooth threading.**
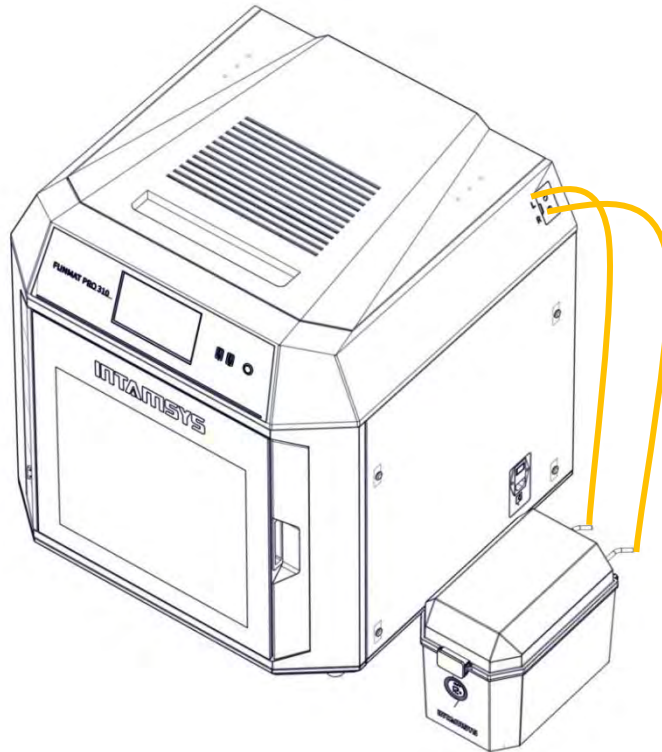

Figure 7. 7 Installation of new material pipes

7.4 Others

It is recommended that personnel with certain professional knowledge conduct a comprehensive inspection of your machine before the expiration of the one-year warranty period to check whether the fans, heaters, switching power supplies, fuses and other devices are still in normal condition. If you find any abnormalities, please contact our local agent. When performing these inspections, it may be necessary to remove the protective parts and put the devices that need to be inspected in an observable state, which is dangerous. Please pay attention to safety.

The latest version of machine firmware and screen software can be obtained from the following website:

https://www.intamsys.cn/

8 Fault Codes

Some modes of trouble likely to occur in the process of printing, and the troubleshooting measures required after the occurrence of each type of trouble are listed in this chapter.

Please contact with our customer support in your area for any problem that you meet when following this User Manual for operations.

Table 8.1 List of Fault Codes

Error Code	Error Name	Error Type	Maintenance Action
171	Serial com error	error	If you can continue to print, continue to print. If there is no response for a long time, please turn off and restart the machine.
210	Nozzle1 T does not change during heating	warning	Please check the installation position of the left nozzle sensor and heating rod.
211	Nozzle2 T does not change during heating	warning	Please check the installation position of the right nozzle sensor and heating rod.
212	Left nozzle heat is too slow	warning	Check L-Nozzle heater
213	Right nozzle heat is too slow	warning	Check R-Nozzle heater
217	Left nozzle is out of material	warning	Check load/change the material for L-Extruder
218	Right nozzle is out of material	warning	Check load/change the material for R-Extruder
221	Chamber front door is open	warning	Close the front door
222	Chamber top door is open	warning	Close the top door
235	Left leveling sensor is triggered	warning	Check if left nozzle leveling sensor position state, wire or connector
301	L Nozzle T too high	error	Check L-Nozzle sensor or heater
302	R Nozzle T too high	error	Check R-Nozzle sensor or heater
303	Buildplate T too high	error	Check buildplate sensor or heate
304	Chamber T too high	error	Check chamber sensor or heater
306	Left nozzle T Sensor wire is short circuit	error	Check L-Nozzle sensor wire
307	Right nozzle T Sensor wire is short circuit	error	Check R-Nozzle sensor wire
308	Buildplate T Sensor wire is broken	error	Check buildplate sensor wire
309	Chamber T Sensor wire is broken	error	Check chamber sensor wire
332	X limit switch is triggered	error	Check if layer shift happens or exceeding X range
333	Y limit switch is triggered	error	Check if layer shift happens or exceeding Y range
334	Z limit switch is triggered	error	Check if leveling is ok or exceeding Z range

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