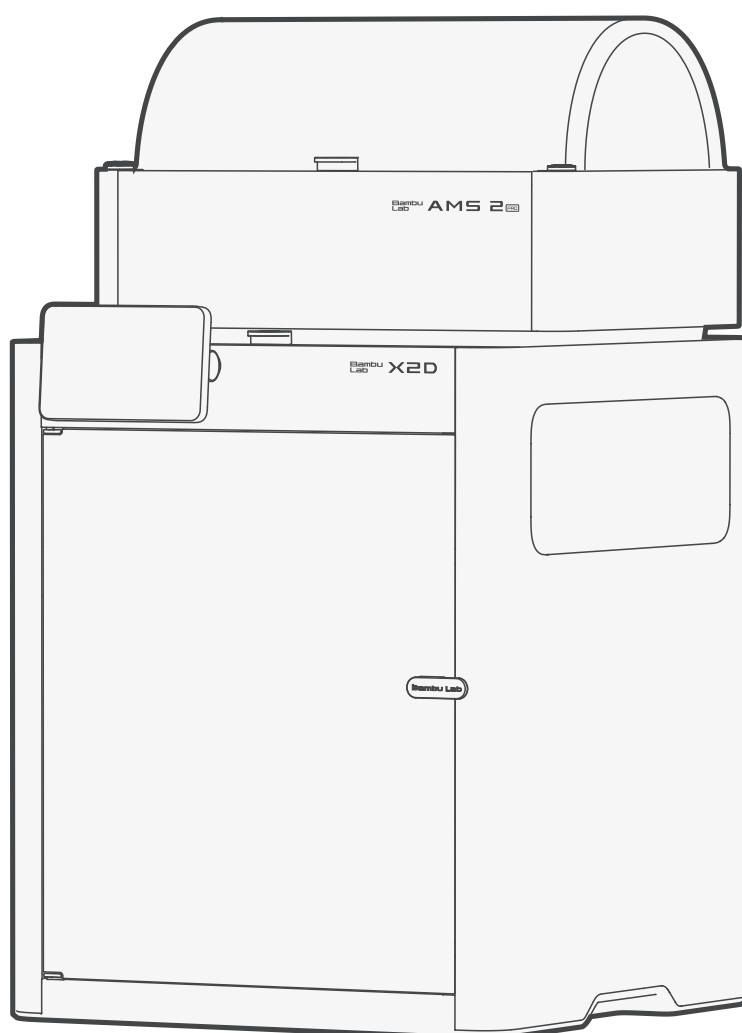


Bambu Lab X2D

3D Printing User Manual

Version 1.0 2026.05



Copyright Notice

This manual and its contents are intended solely to guide users in operating and using this product. The intellectual property rights belong to Shenzhen Bambu Lab Technology Co., Ltd. (hereinafter "Bambu Lab"). Without written permission from Bambu Lab, no part of this manual may be copied, distributed, modified, or provided to third parties in any form.

Manual Scope

This manual mainly introduces the X2D 3D printer. Some accessories or features mentioned in certain chapters are optional or upgrades and may not be included in your product package. Please refer to your specific model and configuration when studying the content and operating the printer.

Images shown in this manual are for reference only. The actual display and features may vary depending on the software or firmware version.

Version and Updates

After a firmware update, the printer touchscreen will display information about new features. You can click the link below or visit Bambu Lab Wiki and navigate to **X Series > X2D > Printer Features > X2D Firmware Release History** for details. If anything in this manual conflicts with the firmware release notes, the release notes take precedence.

wiki.bambulab.com/x2d/manual/x2d-firmware-release-history

This manual applies to firmware version: 01.01.00.00

Thank you for choosing the Bambu Lab X2D 3D Printer!

This manual provides essential information for using the 3D printing functions, including device setup, operation, and routine maintenance. To ensure safe, correct, and efficient use, read this manual carefully and make sure you understand it before use.

How to Use This Manual

👉 Use the table of contents and in-document links for quick navigation.

🔍 Search this PDF for keywords.

📖 Visit Bambu Lab Wiki (wiki.bambulab.com) and search for keywords within the chapter for more detailed steps and videos.

Quick Start

1. Go through the [Read Before Use](#).
2. Start your [first print](#).
3. [Access 3D model resources](#).
4. [Adjust slicing parameters](#).
5. Review [Print Quality Issues and Solutions](#) and [Printer Issues and Solutions](#).

Additional Resources

- **Unboxing and installation:** See the unboxing guide (wiki.bambulab.com/general/unboxing-guide) for printer unboxing and installation instructions.
- **Customized Courses:** Visit Bambu Lab Academy (bambulab.com/support/academy) for structured courses on the printer and software.

Feedback

If you have any questions or suggestions about this user manual, use the following link or scan the QR code to send feedback.



bambulab.com/support/documentation/feedback

Symbol Guide

NOTE

Supplementary explanations for the main content.

TIPS

Suggestions to optimize operations, improve efficiency, or enhance portability, helping you use the printer more effectively.

CAUTION

Operations that may affect print quality or printer performance. Proceed carefully to avoid potential issues.

DANGER

Potential hazards. Ignoring this may cause equipment damage or personal injury. Always follow the related instructions.

Technical Support

If you encounter issues during use, check this manual first. You can also visit Bambu Lab Wiki and search for troubleshooting steps, or use Bambu AI (support.bambulab.com) for maintenance tips, diagnostics, and solutions.

If your issue is not covered or the troubleshooting steps do not resolve it, submit a service ticket or contact online technical support via the Service & Support website (bambulab.com/support) for professional assistance.

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Read Before Use

To ensure safe operation and optimal performance of the printer, carefully review the following precautions before use:

Basic Safety and Electrical Requirements

- Verify that the printer's operating voltage matches the specified requirements to avoid damage or safety hazards. Check the label next to the power socket for specific voltage requirements.
- The printer operates at high temperatures and speeds. Do not allow children or unauthorized personnel to operate the printer to prevent burns, pinching, or other accidents.
- Do not touch the toolhead, heatbed, or motion parts during printing to prevent burns or mechanical injuries.

Operation and Maintenance Recommendations

- To ensure proper functioning of the printer's internal precision mechanisms, regular maintenance is recommended (see [Regular Care and Maintenance](#)).
- To prevent nozzle clogging and achieve better print quality, print TPU filament with the main hotend.
- When printing with the auxiliary hotend, select the supported filament types to avoid issues such as clogging (see [Printing Conditions](#)).
- The printer automatically switches between hotends during printing. Do not manually force switching to avoid damaging the device.
- For the best printing results, we recommend using Bambu Lab filaments. These filaments have undergone rigorous compatibility, safety, and stability testing based on the product's characteristics.
- Unless otherwise specified, always unplug the power cord before any operation, maintenance, or modification to prevent electric shock or equipment damage.
- Unless otherwise specified, allow the printer to fully cool down before any operation, maintenance, or modification.

Safety Instructions for AMS 2 Pro

- **To prevent filament feeding jams, do not load flexible materials such as TPU with a hardness of 95A or lower, or moisture-exposed PVA and BVOH into the AMS 2 Pro.**
- The AMS 2 Pro supports filament spool widths from 50 mm to 68 mm and diameters from 197 mm to 202 mm. Plastic spools are recommended.
- Connect the printer and a single AMS 2 Pro using the Bambu Bus cable 6-pin to use the AMS 2 Pro drying function. To dry filaments in multiple AMS 2 Pro units at the same time, purchase official Bambu Lab power adapters to supply power to the other AMS 2 Pro units.
- During filament drying, the AMS 2 Pro expels moisture through external air circulation. Ensure the air intake and air vent are not blocked by other objects for the best drying performance.
- For other AMS models, see the included quick start guides for usage instructions.

Chapter 1 Introduction

1.1 Product Overview

The X2D is an intelligent 3D printer based on Fused Deposition Modeling (FDM) technology. This model features an innovative dual-extruder system with two separately designed extruders: the auxiliary extruder provides strong thrust to support long-distance filament feeding, while reducing the toolhead load and improving motion performance. It maintains a compact size while ensuring ample print area. The dual hotend design significantly enhances material change efficiency and reduces filament waste.

The X2D also offers the following features to provide a smarter printing experience, making your creativity more efficient and diverse.

- **Smooth user experience:** The 5-inch touchscreen and second-generation UI provide smoother interaction, while the quick-release hotend design makes routine maintenance and replacement easier.
- **Stable support for engineering materials:** With a nozzle temperature of up to 300 °C, a heatbed temperature of up to 120 °C, and an adaptive airflow system that actively heats the chamber up to 65 °C, the printer reliably supports a wide range of printing needs, from basic to engineering-grade filaments.
- **Intelligent detection and comprehensive calibration:** The self-developed extruder motor works with the filament buffer to provide dual filament-tangle detection, while multiple cameras and sensors enable a wide range of smart detection and calibration features.

When used with the Automatic Material System (AMS), it further enhances printing intelligence and ease of use:

- **AMS 2 Pro:** supports RFID filament sync, automatic multi-color/multi-material changing, and smart drying. Enhances multi-material printing and filament management for a smarter, more convenient, and improved printing experience.
- **AMS HT:** specialized for high-temperature filaments, the AMS HT supports RFID filament sync, automatic multi-color/multi-material changing, and smart drying, meeting the demands of engineering-grade and professional printing.

NOTE

Unless otherwise specified, AMS refers to AMS 2 Pro, AMS HT, and other AMS devices.

Optional upgrade accessories can be used to further improve printing automation and reduce manual operations:

- **Filament track switch:** supports any mapping between AMS and the two hotends, allowing flexible delivery of filament from AMS to any target hotend, avoiding manual intervention in filament-saving mode.

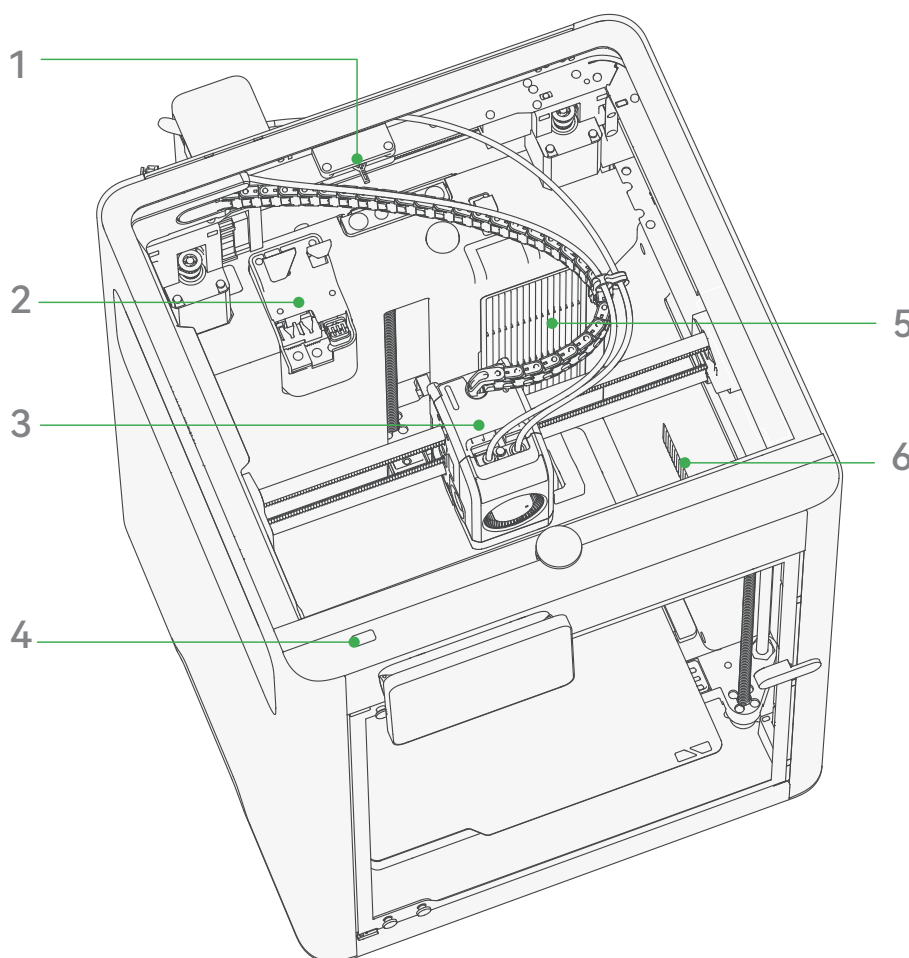
- **TPU feed assist module:** allows filament to be fed directly through the module's inlet while the printer remains enclosed, simplifying TPU print preparation and loading while reducing feeding resistance regardless of spool placement.

 NOTE

Upgrade accessories are not included in the printer package and should be purchased separately as needed.

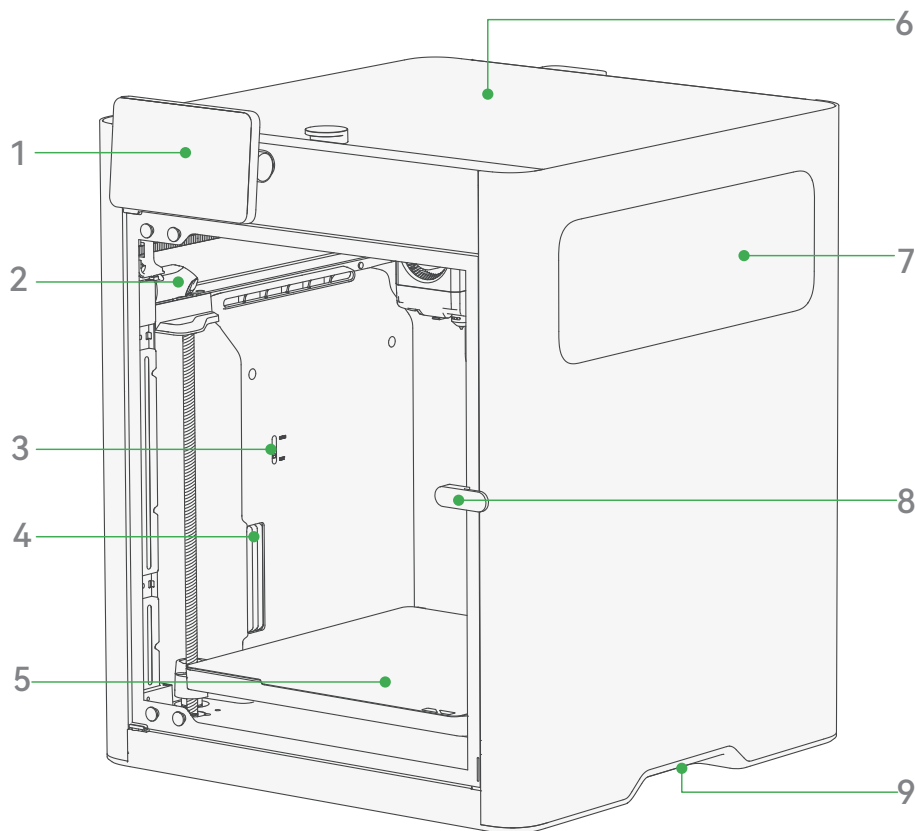
1.2 Printer Component Introduction

1.2.1 Printer



1. **Filament cutter stopper:** Inserts into the toolhead to activate the left and right filament cutters to cut the filaments.
2. **Purge wiper:** Comprises the purge wiper part and nozzle wiping pad. It cleans and collects excess extruded filament to keep the print surface clean and smooth.
3. **Toolhead:** Contains the main extruder. It precisely extrudes and heats filament, depositing melted filament layer by layer on the build plate.
4. **USB port:** Insert a USB drive to print model files offline and store recordings and timelapse files.

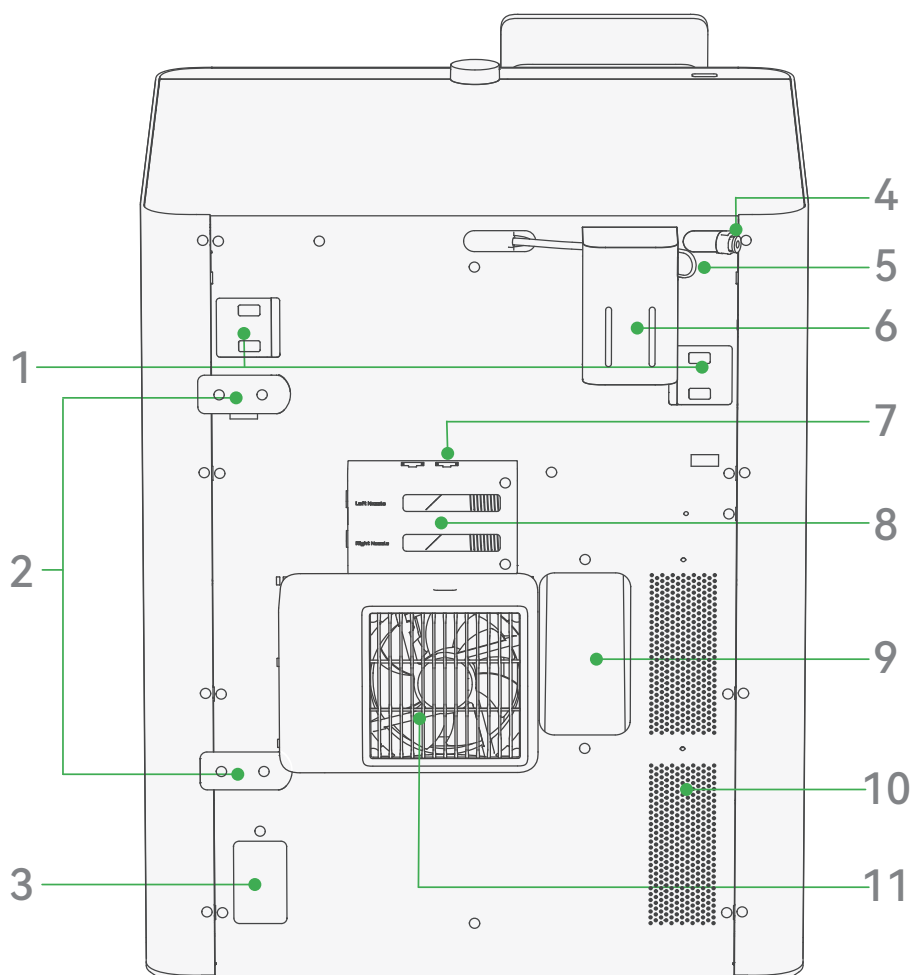
5. **Air filter:** Air inside the chamber passes through an activated carbon filter before being vented, helping reduce particle and odor emissions.
6. **Adaptive airflow switching unit:** In strong cooling mode, it draws in external cool air to lower the printing environment temperature. In heating mode, it works with the air filter to form an internal air circulation.



1. **Touchscreen:** Displays printing parameters and controls the printer.
2. **Live view camera*:** Monitors print progress in real time and is used for timelapse recording and AI vision detection.
3. **Circulation mode indicator:** Automatically switches based on the air management mode without manual adjustment.
4. **Chamber heater unit:** In heating mode, it raises and maintains the chamber temperature. In strong cooling mode, it draws external cool air to lower the printing environment temperature.
5. **Heatbed:** Heats the print surface to ensure stable adhesion of printed layers to the build plate, preventing warping or detachment.
6. **Top glass cover:** Allows observation of print progress during printing. It provides good sealing and safety and can also be used to place AMS.
7. **Side window:** Allows observation of print progress from both left and right sides during printing.
8. **Front door:** Keeps the printer enclosed and helps maintain chamber temperature during high-temperature printing. It also allows observation of print progress.
9. **External air intake (lift handle):** In strong cooling mode, it draws in external air through the intake to lower the chamber temperature. Use this position to lift the printer for safe handling.

i TIPS

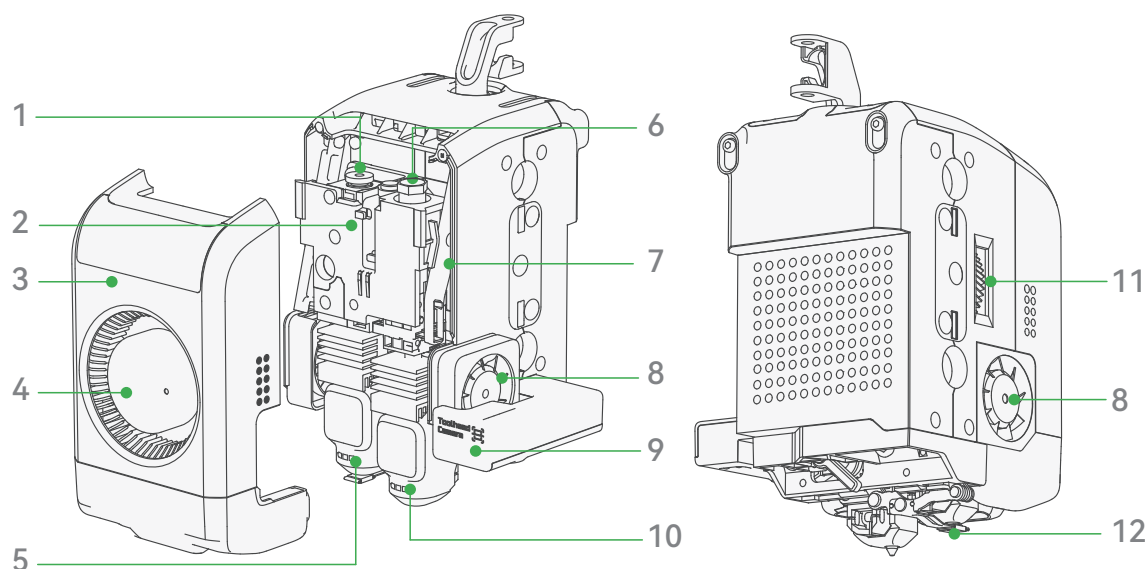
- For privacy protection needs, you can visit MakerWorld (makerworld.com) and search for "X2D privacy cover" under the Bambu Lab official account. Print and install the live view camera cover.
- After the privacy cover is installed, camera-related functions (such as photo, video, and visual detection) will be unavailable.



1. **Belt tensioner:** Adjusts and monitors belt tension. It sends data to the system to ensure printing accuracy and motion stability.
2. **Spool holder base:** Secures the spool holder to allow placement of an external spool.
3. **Power socket and switch:** Connect the printer to an AC outlet using the included power cord. Turn on the switch to power the printer.
4. **Main extruder PTFE tube bracket:** Filament enters the printer through this port and moves to the toolhead's main hotend.
5. **Auxiliary extruder PTFE tube bracket:** Filament enters the auxiliary extruder through this port and is then pushed to the toolhead's auxiliary hotend.
6. **Auxiliary extruder:** Independently extrudes filament for the auxiliary hotend, pushing filament from the filament buffer to the toolhead.
7. **Bambu Bus port 6-pin:** Connect AMS devices and external exhaust fans to the printer using the included Bambu Bus cable 6-pin to ensure proper communication.

8. **Filament buffer:** Reduces tension fluctuations during filament load to ensure smooth feeding.
 - The top includes two Bambu Bus ports 6-pin for data transmission to the AMS and external exhaust fan.
 - The left side has two filament inlets to connect the AMS and the external spool for filament feeding. The upper inlet transports filament to the main hotend, the lower inlet to the auxiliary hotend.
9. **Purge chute:** Connects to the printer's internal purge wiper, allowing waste material created during printing to be discharged from the chamber.
10. **Ventilation holes:** Assist in expelling hot air from the chamber during strong cooling mode.
11. **Exhaust fan:** Installed on the printer's back panel, it contains a filter that cleans the internal hot air before exhausting it from the chamber.

1.2.2 Toolhead



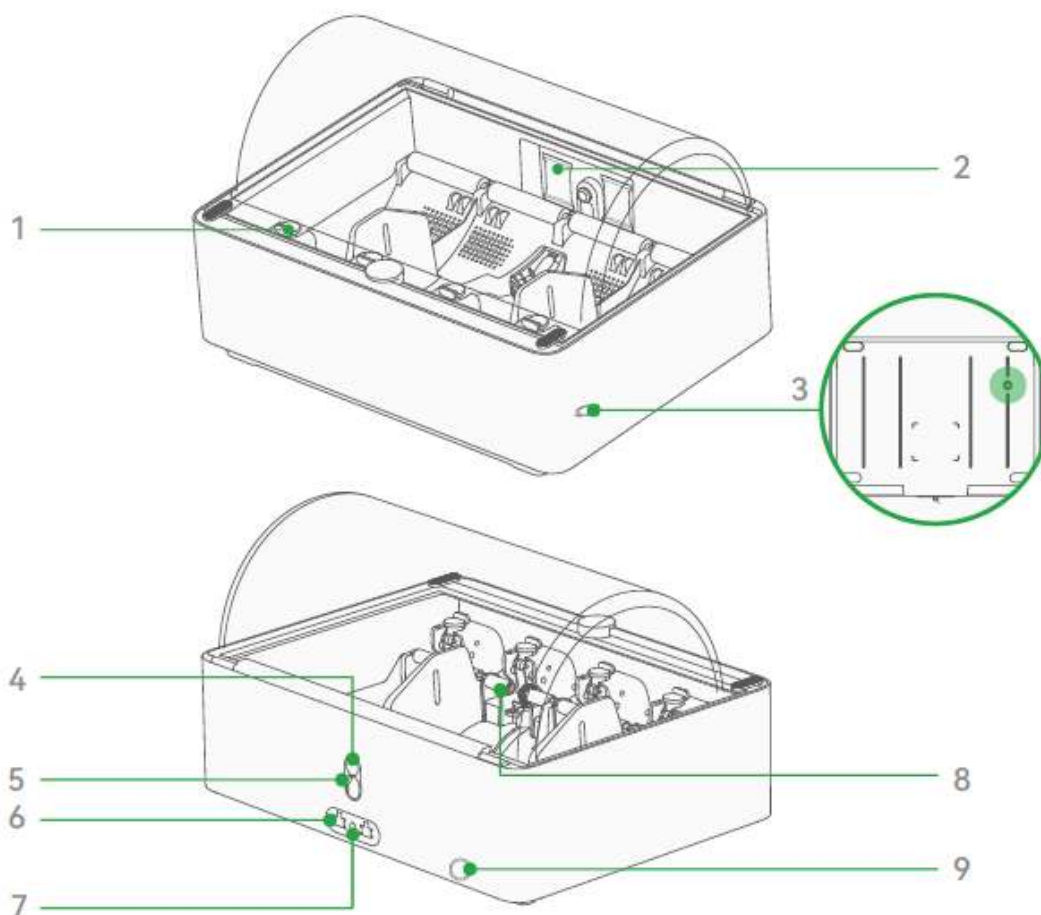
1. **Main hotend toolhead filament inlet:** The filament enters the main extruder and main hotend through this inlet.
2. **Main extruder:** Grips and pushes filament into the main hotend. Precisely controls filament extrusion and retraction length.
3. **Toolhead front cover:** Protects the front of the toolhead to prevent dust or debris entry.
4. **Part cooling fan:** Directs cooling airflow near the hotend nozzle to quickly cool the printed layers.
5. **Main hotend:** Heats and melts the filament, then extrudes it through the nozzle.
6. **Auxiliary hotend toolhead filament inlet:** Filament enters the auxiliary extruder through this inlet and is then pushed to the auxiliary hotend.
7. **Filament cutter lever:** During the unloading process, it drives the left/right filament cutter to cut the filament for the corresponding hotend.
8. **Cooling fan for hotend:** Stabilizes hotend temperature to prevent clogging caused by over-heating.

9. **Toolhead camera:** Used for motion accuracy calibration, high-precision nozzle offset calibration, and build plate identification code recognition.
10. **Auxiliary hotend:** Heats and melts filament, then extrudes it through the nozzle. It moves up and down with the nozzle switching lever to switch between the two hotends.
11. **Main extruder gear:** Made of hardened steel, including drive and driven wheels. Precisely pushes the filament under the drive of the extruder motor.
12. **Flow blocker:** A black flap located below the nozzle that prevents molten filament inside the idle nozzle from dripping onto the model or build plate.

NOTE

- The printer comes with standard 0.4 mm hardened steel hotends and is compatible with high flow and tungsten carbide hotends.
- For other hotend versions or specifications, please purchase the corresponding parts separately.

1.3 AMS 2 Pro Component Introduction



1. **Filament inlet:** Insert the filament end into this inlet, and the system will automatically detect and start loading the filament.
2. **Desiccant:** Keeps the internal AMS chamber dry.
3. **Air intake:** Introduces external dry air.

4. **PTFE tube release button:** Press this button on the back of the AMS to release and remove the PTFE tube.
5. **Filament outlet:** Connects the AMS to the printer's filament inlet.
6. **Bambu Bus port 6-pin:** Used to connect the AMS to the printer or other AMS units.
7. **Power connector:** Plug the power adapter into this port to supply power for the drying function.
8. **Active support shaft:** Actively supports and drives the rotation of the filament spool.
9. **Air vent:** Expels moisture inside the AMS.

1.4 Printer and AMS Status

1.4.1 AMS 2 Pro Status Indicator



The AMS indicator shows the current operating status: white light indicates normal operation, while red light indicates an error or fault.

Normal Status Blink Patterns	Meaning
Four slots with white lights flashing in sequence	AMS is initializing after power-on, and the white light turns solid when initialization is completed.
Four slots with solid white lights	After AMS initialization, or when the screen is woken and all 4 slots have filament inserted (only slots with filament light up when the screen is woken).
Solid white light stays on	This slot is performing preloading, reading, or printing operations (including loading and unloading).
White light off	1. No loading, reading, or printing operations within 15 minutes after the screen turns off. 2. 10 seconds after preloading or reading is finished. 3. No operation within 20 minutes after initialization.

Four slots breathing white Normal drying status.

Error Status Blinking Patterns Meaning

Four slots flashing red - double flash	The printer cannot detect AMS due to a communication error.
Red light breathing	No filament is detected after the printing starts. Operation resumes normally once the filament is inserted.
Red light solid	Filament may be broken inside the AMS internal hub.
Red light single flash	Generally indicates load failure. Please check whether the filament inlet is functioning properly.
Red light double flash	Failed to load or unload filament.
Four slots breathing red	1. An abnormality occurred during the drying process. 2. When idle, the drying module NTC disconnects, or abnormal air duct temperature is detected. Check whether all components are securely connected.

1.4.2 HMS Messages

HMS (Health Management System) is the built-in fault diagnosis and status monitoring system for Bambu Lab printers and AMS (Automatic Material System).

When a device experiences hardware failure, print failure, or needs maintenance, HMS provides notifications on the printer screen or in software such as Bambu Handy and Bambu Studio, and offers recommended solutions.

You can tap   at the bottom right of the homepage or  at the left menu to access the message page and view details. Use any of the following methods to diagnose and fix issues:

If an HMS message appears, use any of the following methods to locate and fix the fault:

- Scan the QR code with your phone to directly access the diagnostic and troubleshooting page.
- Visit Bambu Lab Wiki and search the HMS code to view detailed causes and troubleshooting steps for the fault.

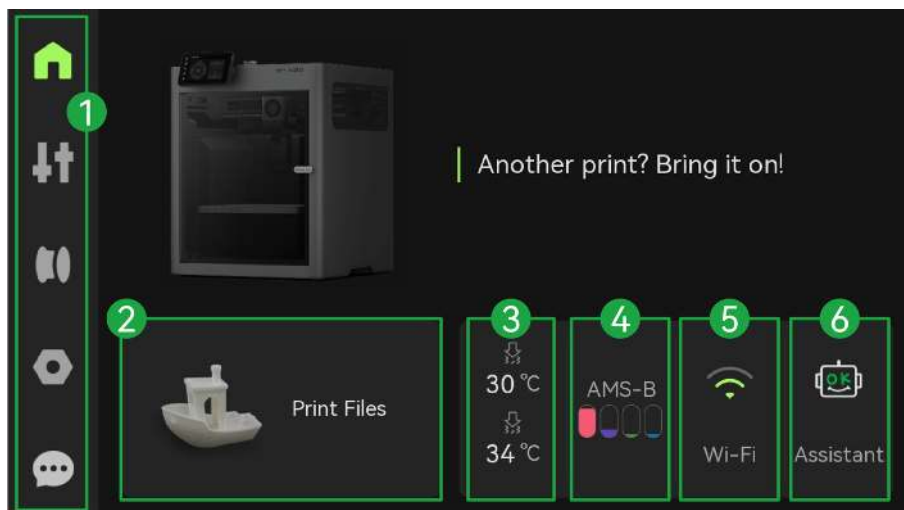
TIPS

The printer can assess its cleanliness based on task type and print duration, and provide maintenance reminders. After receiving the printer, update the firmware to the latest version to enable this feature.

1.5 Screen Icons

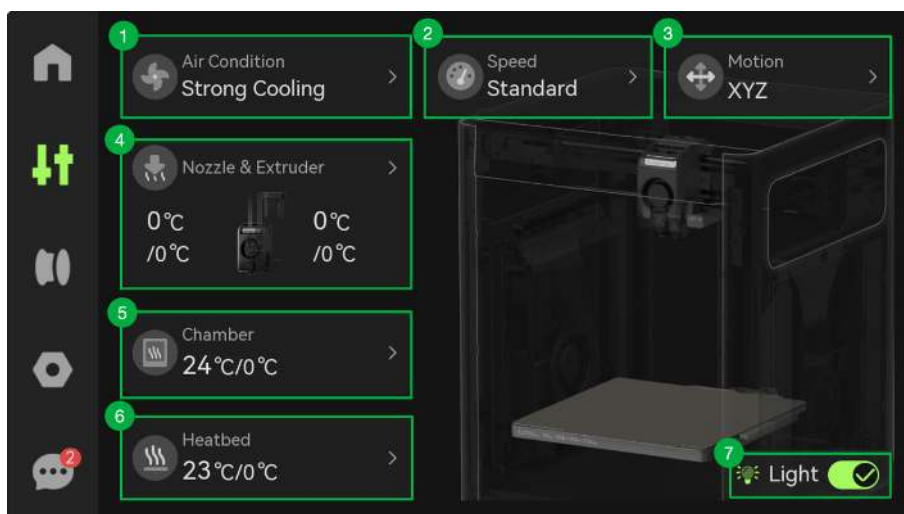
The main menu bar is on the left side of the printer screen. Tap the icons to jump to the , , , , or  pages to configure and operate the printer. See [Common Screen Controls](#) for detailed feature descriptions and operation instructions.

Homepage



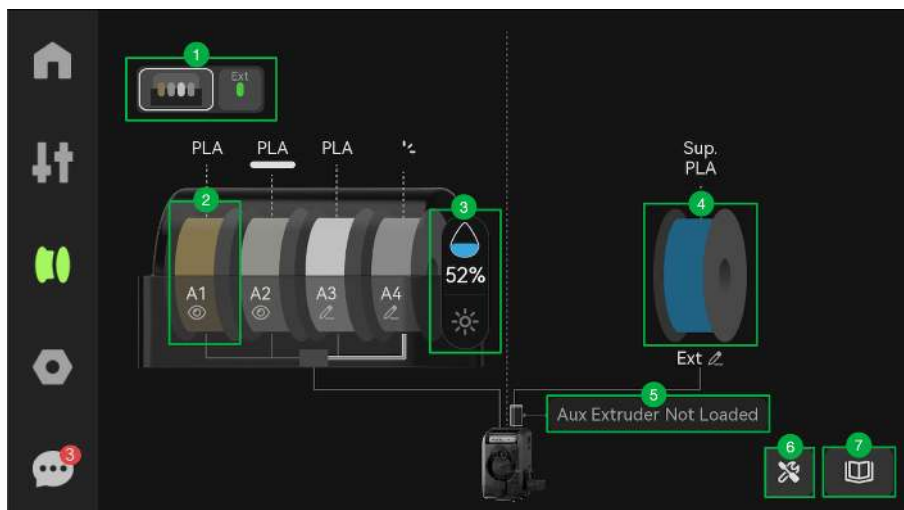
1. Select internal models or USB stored models.
2. Quick access to nozzle and extruder adjustments.
3. Quick access to the AMS filament page.
4. Quick access to network settings.
5. Quick access to the message page to check HMS (Health Management System) errors.

Control



1. View and manually set the air management mode and fan speed.
2. Set print speed mode.
3. Control the motion of the toolhead and heatbed along the X, Y, and Z axes.
4. Set the nozzle type and temperature. Control the extruder to extrude or retract filament.
5. View and set chamber temperature.
6. View and set heatbed temperature.
7. Control the LED light inside the chamber.

Filament

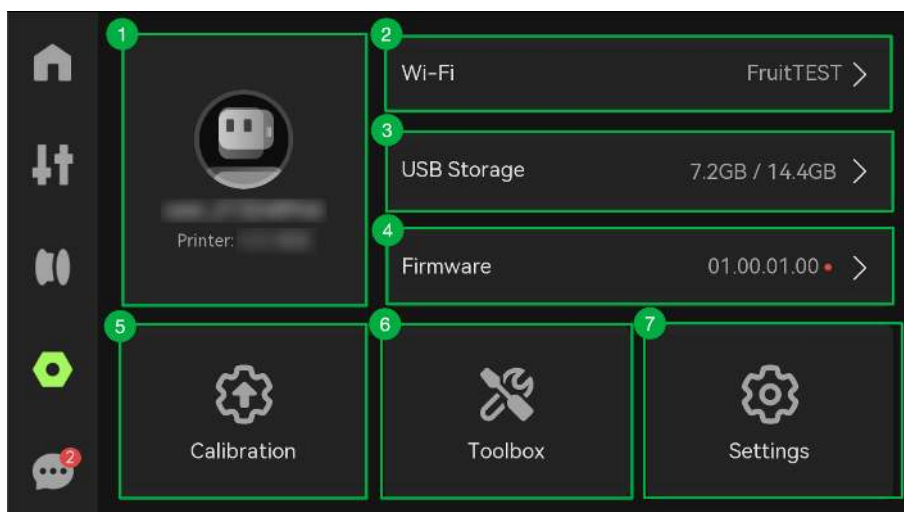


1. Switch between AMS and external spool information.
2. Tap any AMS spool icon to edit filament, load or unload filament, and re-read filament RFID.
3. View humidity and temperature inside the AMS, and perform drying.
4. Tap the external spool icon to edit filament and load or unload filament.
5. Indicates the loading status of the auxiliary extruder.
6. Enable auto refill, AMS setup, and drying functions.
7. View filament loading guide.

NOTE

Some features shown in the illustration are available only when AMS is connected. For X2D without AMS, only the external spool icon is displayed.

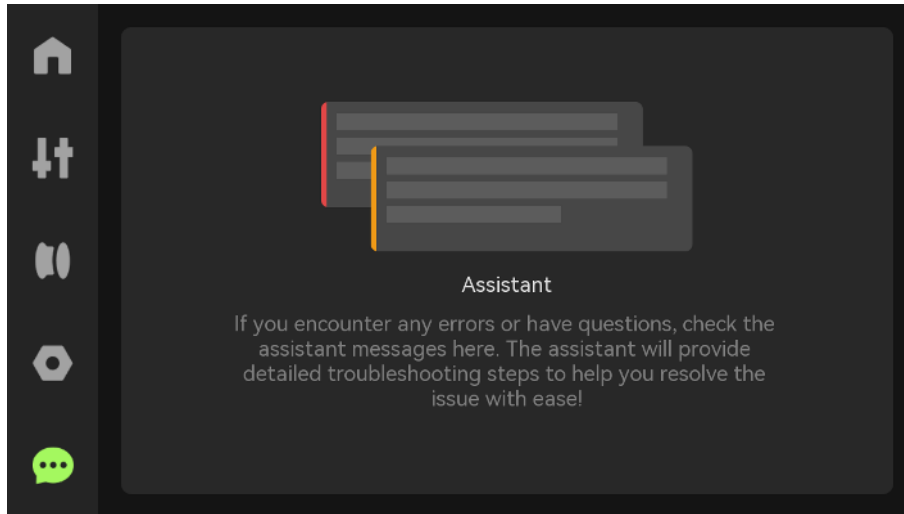
Settings



1. Log in and view account.
2. Configure printer network.
3. Configure USB storage.
4. View and update firmware.
5. Start print calibration.

6. Use functions such as printer maintenance and filament drying.
7. Other basic settings.

Message



When the printer requires maintenance or encounters a fault, related prompt messages will be displayed here (see [HMS messages](#)).

Chapter 2 First Print

Before the first print, you need to ensure the printer is properly placed, installed, and auto-calibrated. This chapter guides you through these preparations to ensure the printer starts its first print in optimal condition.

2.1 Preparation Before Printing

2.1.1 Printer Placement

Keep the workspace clean and tidy to ensure print quality and equipment safety. Place the printer on a level, sturdy platform.

CAUTION

The printer is equipped with anti-vibration feet that reduce unwanted vibration at specific resonance frequencies during printing. Make sure the platform is stable and non-slip to prevent the printer from shifting or falling during operation.

2.1.2 Initial Installation

Please follow the steps below to install the printer:

Step 1. **Remove packaging materials.** Follow the Quick Start Guide to remove the outer box, foam, moisture-proof bag, and internal fixtures, ensuring no packaging materials are left on or inside the printer.

Step 2. **Check the printer and accessories**

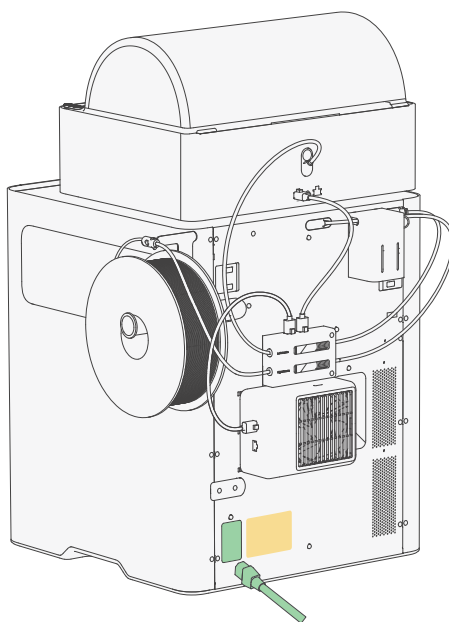
- Confirm that all included accessories are present.
- Ensure the printer's standard **textured PEI plate** is correctly installed on the heatbed.

CAUTION

- Do not touch the build plate surface with your hands. Oils can reduce adhesion, causing model collapse or spaghetti issues.
- If the build plate surface has oil residue or dust, clean it with warm water and detergent. Dry completely before attaching it to the heatbed.

Step 3. **Install accessories**

Ensure the touchscreen, auxiliary extruder, external exhaust fan bundle, external spool, and AMS 2 Pro (if any) are properly installed. If not, you can follow the steps in the video below.



Scan the QR code or click the link (wiki.bambulab.com/general/unboxing-guide) to watch the unboxing video and jump to the relevant time segment as needed.



i TIPS

- Included accessories may vary by product variant. Please refer to the actual items received.
- To connect multiple AMS units, refer to [Connecting Multiple AMS Units](#) for instructions.

Step 4. **Check power-on status**

- Ensure the power cord is properly connected.
- Confirm that the **power switch** on the back of the printer is turned on and the indicator light is lit.
- The touchscreen should light up normally and display the initial setup interface.

2.1.3 Initial Calibration

⚠ CAUTION

Calibration and print jobs should be performed only after the printer has been properly positioned. Moving the device after calibration may affect measurement accuracy.

On first startup, the printer will automatically enter the initialization process. Follow the on-screen instructions to complete the steps:

Step 1. **Language, region, and network settings**

Select the appropriate language and time zone, then choose an available Wi-Fi network, with the option to skip network selection if it is not required.

Step 2. Account login

Open Bambu Handy and scan the QR code displayed on the touchscreen to bind the printer (see [Install Bambu Handy](#)). You can skip this step if it is not required.

Step 3. Automatic calibration

The printer will automatically perform a series of operations, including motor noise cancellation, vibration compensation, auto bed leveling, and nozzle offset calibration.

Step 4. Remove the foam under the heatbed

The heatbed rises after the calibration. Remove the remaining foam from the bottom area.

Step 5. Calibration completes

The touchscreen displays "Calibration completed", and you can start your first print.

2.2 Load Filament

NOTE

This method applies to the X2D AMS Combo. If using other AMS devices (such as AMS or AMS HT), the operation is the same as for AMS 2 Pro.

2.2.1 Load Filament via AMS 2 Pro

Step 1. Place the spool into any AMS 2 Pro slot. Gently push the feeder tab and insert the filament. The AMS 2 Pro will detect the filament and load it automatically.



Step 2. After confirming the spool rotates smoothly, close the AMS 2 Pro cover and secure the locking tab.

Step 3. On the printer screen homepage, navigate from the assistant to the AMS Setup page.

Step 4. Select **Auto Mode > Detect**. The printer will automatically detect which extruder the AMS 2 Pro is connected to.

i TIPS

- If the AMS 2 Pro is connected to the upper inlet of the filament buffer, it is assigned to the left main hotend. If it is connected to the lower inlet, it is assigned to the right auxiliary hotend.
- We recommend connecting AMS devices to the main hotend to fully leverage its filament compatibility.
- If there is no filament for automatic setup, select **Manual Mode** and assign the connected AMS 2 Pro to the **left** or **right (auxiliary)**.

2.2.2 Load Filament via External Spool

- Step 1. After confirming the filament type and color, place the spool on the spool holder according to the filament winding direction.
- Step 2. On the printer screen, tap  > **external spool** > **edit**, select the filament type and color, then tap confirm.
- Step 3. Insert the filament into the PTFE tube and push forward until it stops. The line between the toolhead and spool on the printer screen will show the filament color, indicating the extruder has detected filament entry.



- Step 4. On the screen, tap **external spool (Ext)** > **Load**, then wait for the nozzle to heat up.
- Step 5. Follow the on-screen prompts to check if the filament extrudes smoothly from the nozzle. Then select the corresponding option on the touchscreen.

i TIPS

- Manually push the filament again during loading to ensure it remains inside the extruder.
- If no filament extrusion is observed, select "Not extruded yet, retry" as prompted on the printer screen, then keep pushing the filament until it extrudes properly.

2.3 Start Printing

⚠ CAUTION

The printer's built-in models and the models stored on USB are all pre-sliced files, and the filament-to-nozzle mapping cannot be changed. If the filament is grouped to the unintended hotend, adjust the spool placement to ensure it is loaded to the correct hotend.

i TIPS

Before printing, it is recommended to connect a USB drive to the printer's USB port. This allows you to import sliced files and start prints directly from the screen, and can also be used to store recordings, print history, and print cache. See [Connect a USB Drive](#) for more usage tips.

The printer includes pre-sliced files for common models such as the scraper handle, ready to print from the screen. You can also start prints from a mobile device using Bambu Handy or from a computer using Bambu Studio. See [Printing from Multiple Devices](#).

Step 1. On the touchscreen, tap  > **Print Files** and select the model you want to print.

i TIPS

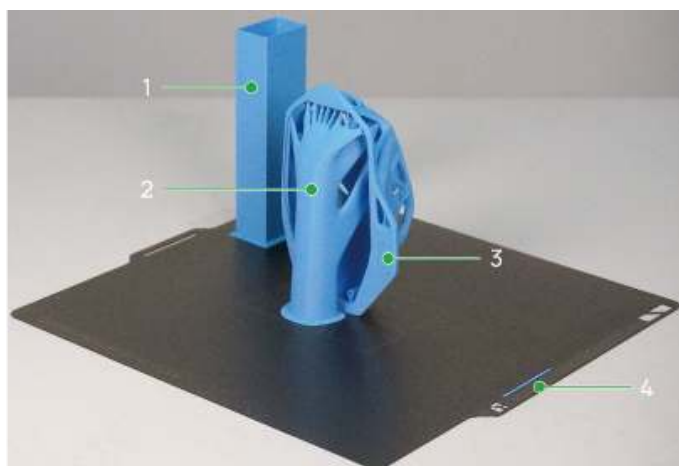
In advanced options, you can manually set bed leveling and flow calibration modes. The default auto mode is recommended.

Step 2. Select the filament for both hotends, then tap **Print**.

2.4 Remove the Model

Step 1. **Wait for the heatbed and model to cool down**

After printing is complete, wait for the heatbed to cool to room temperature before removing the build plate, model, and other print structures. This prevents model deformation, build plate damage, or hand burns.



1. Prime tower
2. Support
3. Model body
4. Prime line

TIPS

On the printer screen, go to the  page to check the real-time temperatures of the nozzle, chamber, and heatbed.

Step 2. Remove the model

Pinch the edge of the build plate and lift up, then take out the detached model. If the model adheres firmly to the build plate, gently flex it to release the model or use a scraper to assist removal.

**Step 3. Clean the build plate**

Remove the prime tower and scrape off the prime line. Place the build plate back, ensuring it aligns with the heatbed's stopper.

**Step 4. Model post-processing (if necessary)**

For models with support structures, remove the supports promptly after printing. Use your hands or needle-nose pliers to break them off from the model body.

 NOTE

For appearance finishing of prints, visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "work after printing" to find tutorials.

2.5 Unload Filament

2.5.1 Unload Filament from AMS 2 Pro

After the print job completes, the filament will automatically retract into the AMS 2 Pro.

If you need to unload filament after stopping or canceling a print job, go to  on the printer screen, select the corresponding filament icon, and tap **Unload** to return the filament to AMS 2 Pro.

 NOTE

This method applies to the X2D AMS Combo. If using other AMS devices (such as AMS or AMS HT), the operation is the same as for AMS 2 Pro.

2.5.2 Unload Filament from External Spool

- Step 1. On the printer screen, go to the  page, select external spool, then tap Unload.
- Step 2. When the filament exits the extruder, follow the printer prompts to rewind the filament, then insert the filament end into the spool's hole to secure it.
- Step 3. On the screen, tap **Finished, continue** to complete Unload.

2.6 Waste Disposal

Waste refers to the excess filament extruded to clear residual filament inside the nozzle at the beginning or during multi-color, multi-material printing, to ensure print quality. This waste is expelled through the purge chute at the back of the printer.

We recommend following the steps below to collect and dispose of the waste:

- Use a container to catch the waste during printing and clear it regularly.
- Before printing, make sure there is no waste left inside the purge chute and the outlet is unobstructed.
- Avoid installing covers or pipes on the back of the printer that might block the purge chute to prevent clogging or print failure.
- Dispose of waste in accordance with the regulations of your country or region.

2.7 Connect Multiple AMS Units

Each hotend of the printer can connect up to 4 AMS/AMS 2 Pro units and 8 AMS HT units. With a dual hotend setup, you can print with up to 25 colors. Connecting 1 or 2 AMS devices requires no extra accessories. For 3 or more AMS devices, please purchase a [Bambu 4-in-1 PTFE adapter](#).

NOTE

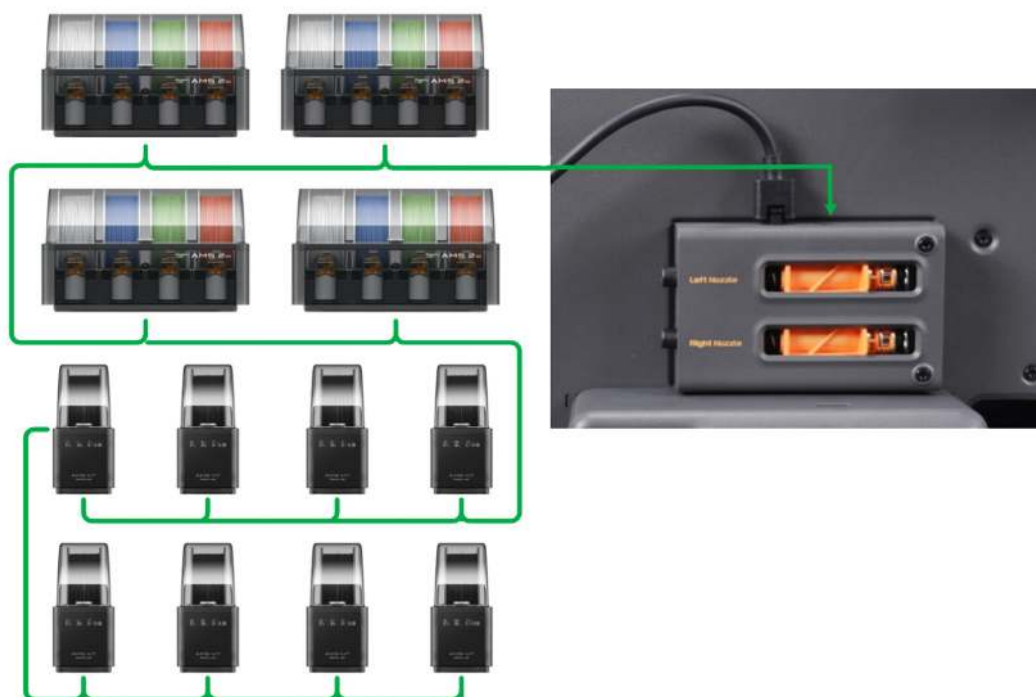
The X2D is compatible with the first-generation AMS and supports plug-and-play operation as well as multi-color printing, but it does not support AMS drying. Due to differences in the loading and buffer structures, the X2D is not compatible with AMS lite.

TIPS

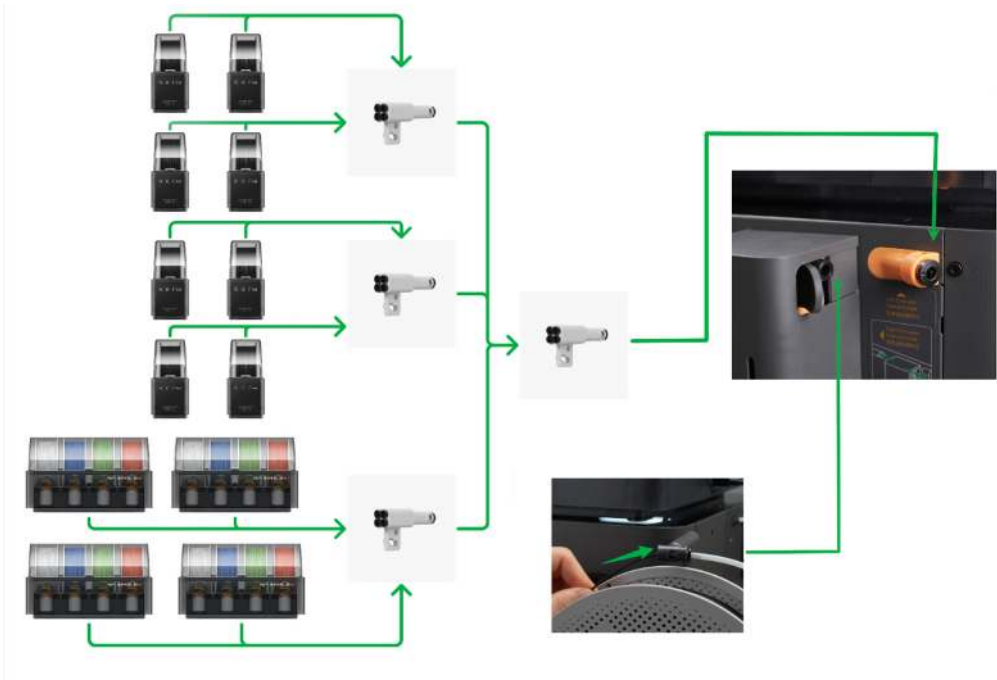
We recommend connecting AMS devices to the main hotend to fully leverage its filament compatibility.

Connection Steps:

Step 1: Use the **Bambu Bus cable 6-pin** to connect all AMS devices and the printer as shown in the diagram.



Step 2: Use the **PTFE tube** to connect AMS devices and the Bambu 4-in-1 PTFE adapter as shown in the diagram.



Chapter 3 Access 3D Model Resources

3.1 MakerWorld Model Community

MakerWorld (makerworld.com) is Bambu Lab's official 3D model-sharing platform, featuring a large collection of models uploaded by talented creators across a wide range of categories, from artistic designs to practical tools. Whether you are an artist seeking inspiration or an engineer solving real-world problems, you can find models that meet your needs here. It is also a place to exchange experience, share ideas, and learn from one another.

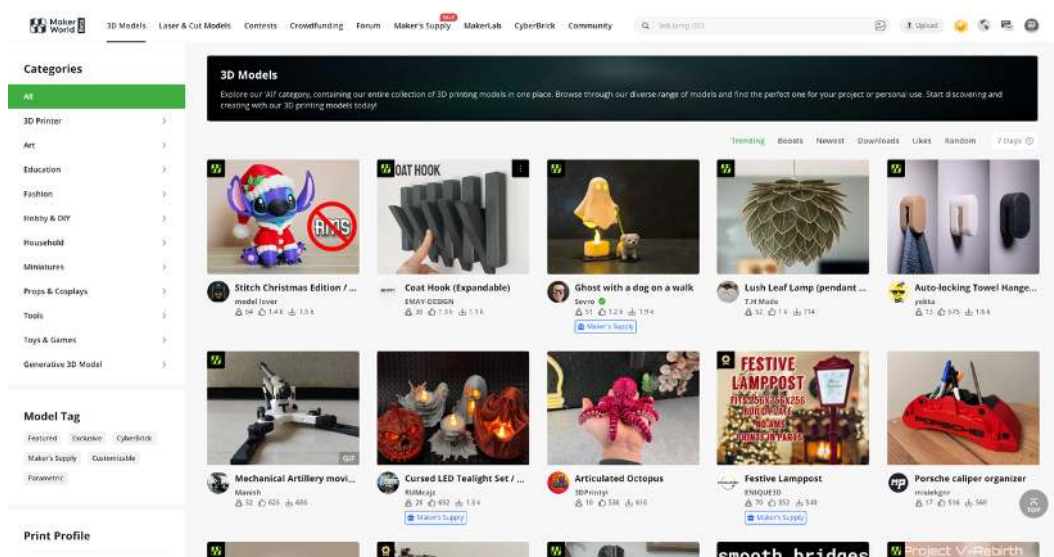
Through MakerWorld, you can:

- Browse curated models and popular community recommendations.
- Download model files in STL, CAD, or 3MF formats.
- Send models directly to Bambu Studio for slicing and printing.
- Upload and share your creative designs, and engage with the community.

MakerWorld is available on the web and directly integrated into Bambu Handy and Bambu Studio for seamless model browsing and printing.

NOTE

- 3MF files: Contain all print parameters and color information, enabling you to start printing directly in Bambu Studio.
- STL and CAD files: Contain only the model's geometry and do not include print settings or color information, so parameters must be adjusted in the slicer or printer software.



3.2 MakerLab Creative Tools

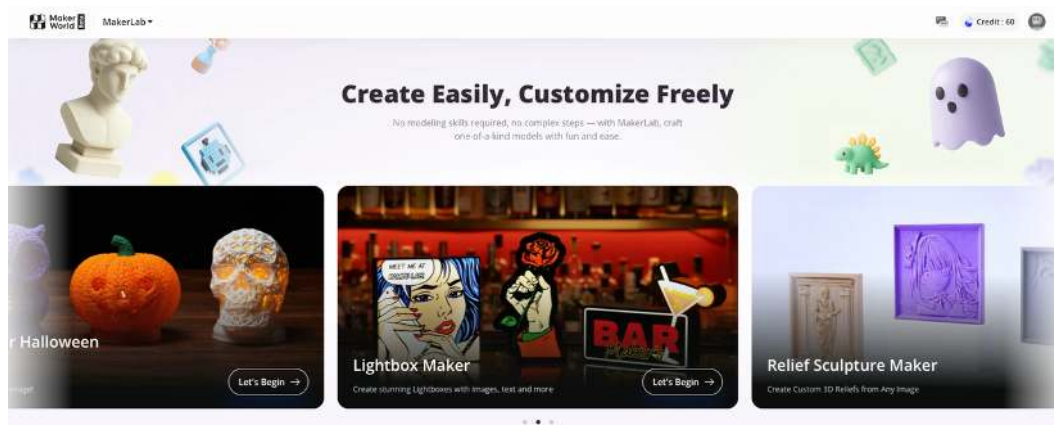
MakerLab offers a range of online creative tools to help turn your ideas into printable models. No modeling experience is needed to create personalized designs quickly.

Creative tools include generators for lightboxes, flexi toys, relief sculptures, and vases, as well as AI-powered and parametric modeling tools, all accessible via the web.

MakerLab is also integrated into both Bambu Studio and Bambu Handy, enabling seamless model generation and printing.

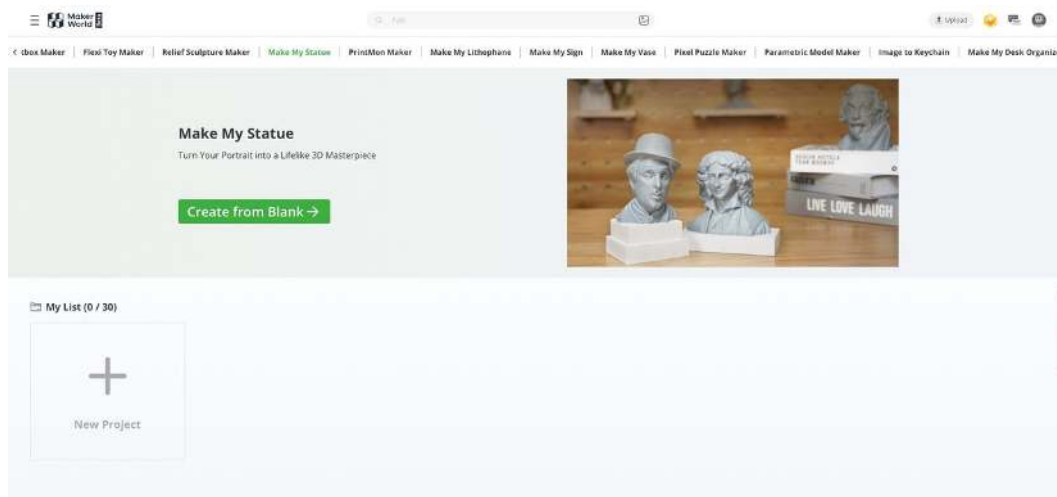
NOTE

Bambu Handy supports only some tools. To access all features, use a desktop browser or Bambu Studio.



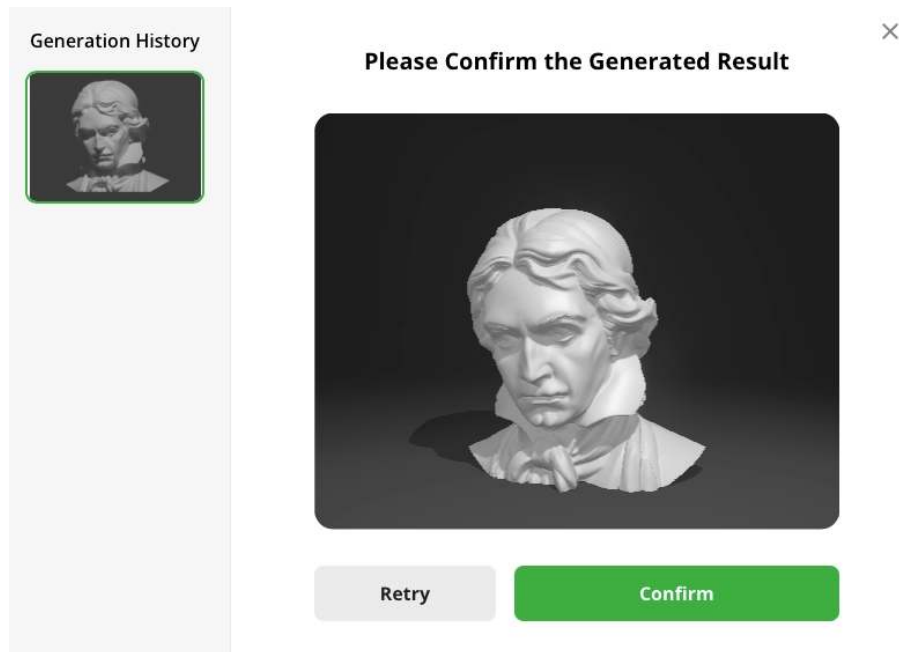
Each creative tool includes detailed instructions. The following uses the Statue Generator as an example to show the workflow on the web:

Step 1. At the top of the MakerWorld homepage, click **MakerLab** > **Make My Statue** > **New Project**.



Step 2. Upload an image as prompted, click **Confirm**, and wait for the model to be generated.

Step 3. If satisfied with the generated model, click **Confirm** to download it. If not, click **Retry** to generate again.



Step 4. Open Bambu Studio, click **File > Import**, and select the model file. After importing the model, you can slice it and start printing.

Chapter 4 Printing from Multiple Devices

4.1 Start a Print from Bambu Handy

Bambu Handy is an all-in-one mobile app designed for Bambu Lab 3D printers. It lets you search for and print models with one tap, remotely monitor and manage print jobs, quickly reuse past projects, and adjust settings during printing.

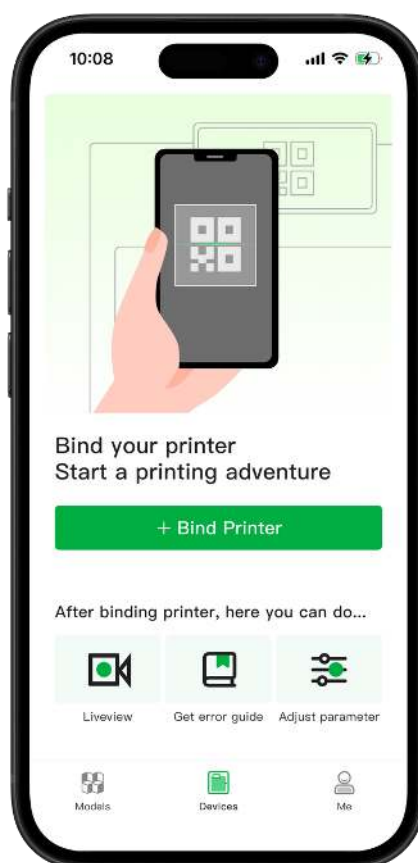
NOTE

To optimize user experience, some software interfaces may be updated. Please refer to the actual interface in use.

4.1.1 Install Bambu Handy

Before installing Bambu Handy, please ensure the following:

- The printer and your phone are connected to the network.
- The selected region for the printer matches the region of the Bambu Handy app version.



- Step 1. Visit bambulab.com/download or search for Bambu Handy in your mobile app store to download and install the app.
- Step 2. Open Bambu Handy, read and agree to the Privacy Policy and User Agreement, then enter the homepage.

Step 3. On the **Me** page, tap **Sign In / Sign Up**, enter your email address and verification code to complete registration.

NOTE

The registration method (phone number or email address) varies according to local laws and regulations. Please follow the actual display.

Step 4. On the printer touchscreen, tap **> Log in**, and a QR code will appear.

Step 5. On the Bambu Handy Devices page, tap **+ Bind Printer** (as shown below), then scan the QR code on the printer touchscreen.

Step 6. Review and accept the Terms and Conditions and Privacy Policy, then tap **Confirm to Bind**.

TIPS

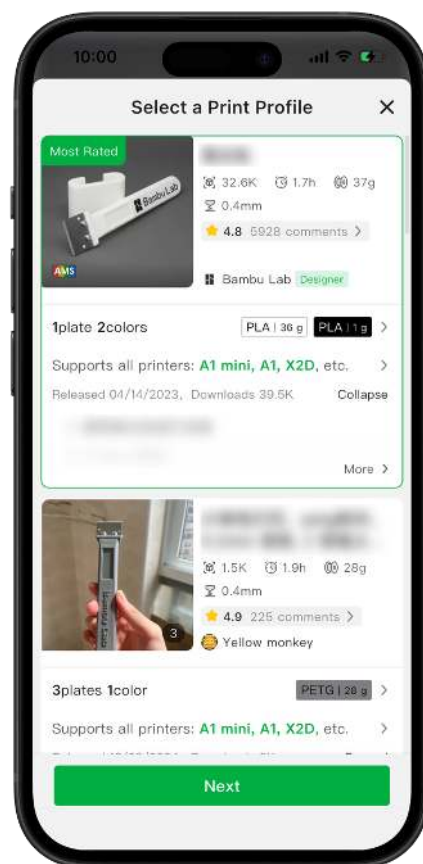
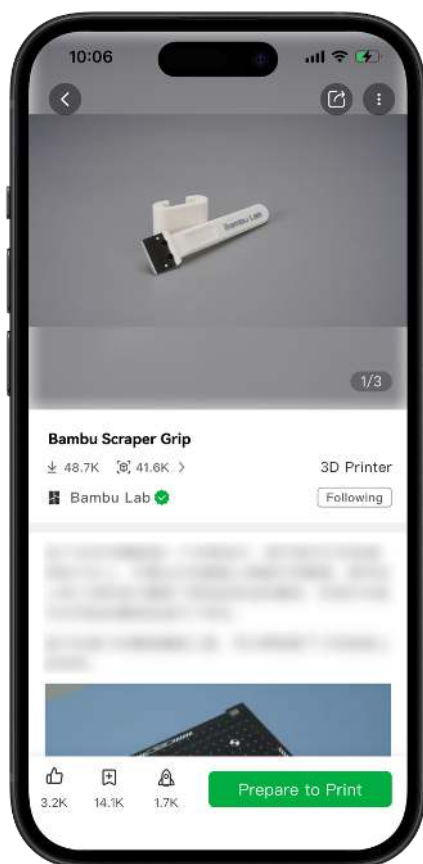
If the printer and your phone are on the same network, Bambu Handy will automatically find nearby devices. Tap **Pair Nearby Devices** and select the corresponding printer.

Step 7. Name the printer, then tap **Confirm**.

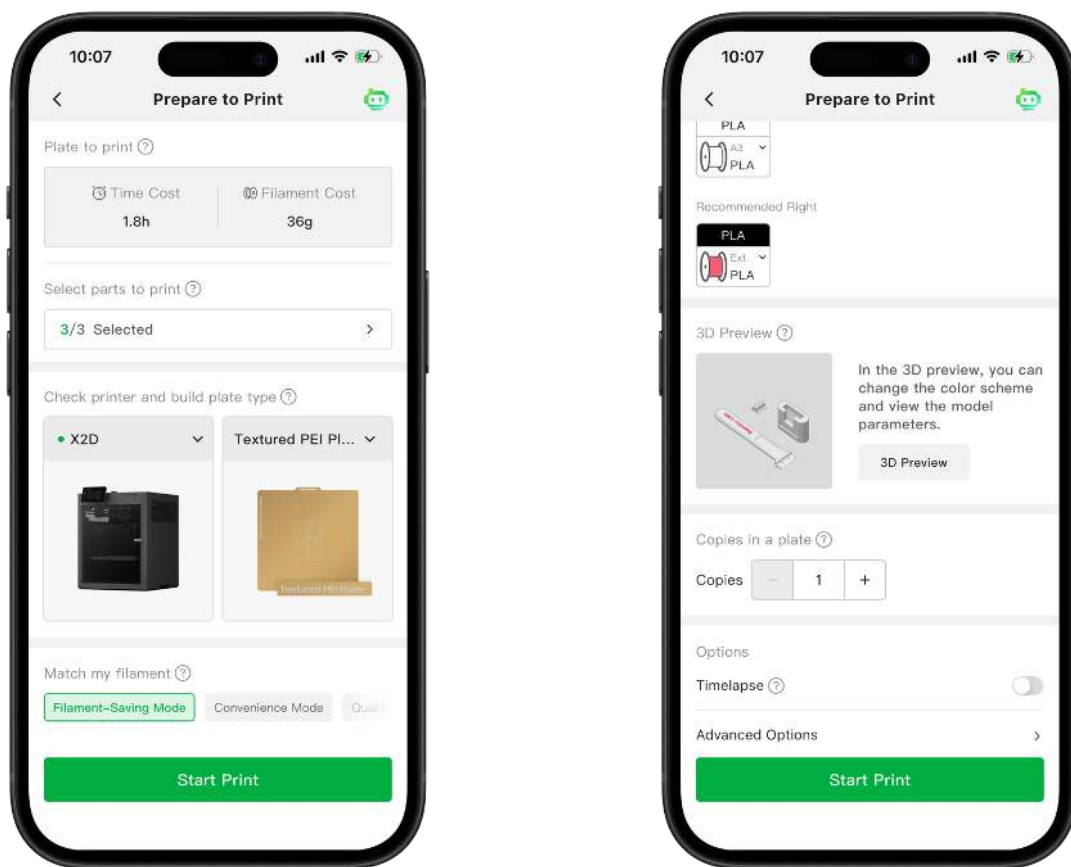
4.1.2 Start Printing in Bambu Handy

Step 1. On the **Models** page, select the model to print and click **Prepare to Print**.

Step 2. Select your printer model and print profile, then click **Next** to enter the Prepare page.



Step 3. Check the printer model, build plate type, filament grouping strategy, and select filaments for both hotends. Set the print copies and print options, then click **Start Print**.

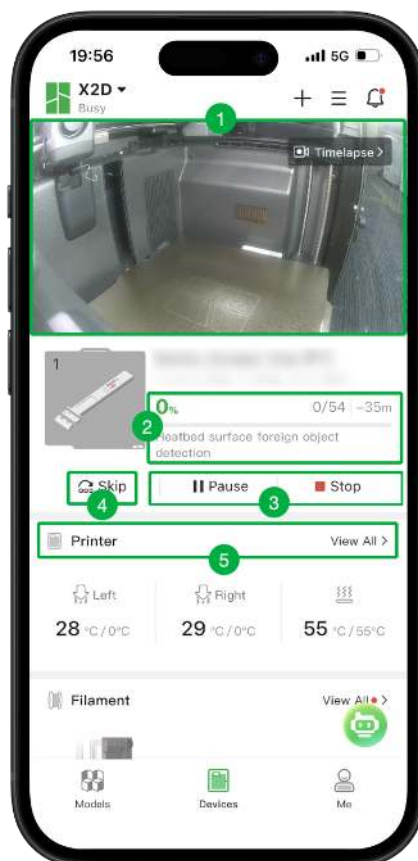


NOTE

Bambu Handy automatically assigns filaments based on the default filament-saving mode. To adjust this, see [Select Filament Grouping Mode](#).

Step 4. Monitor the print job or perform other operations (such as adjusting print speed) on the Devices page.

4.1.3 Devices Page Introduction



1. **Camera view:** Remotely view the live feed of the printer to monitor print status.
2. **Progress bar:** Displays the current print layer and estimated remaining time to track print progress.
3. **Task control:** Pause or stop the print in real-time.
4. **Parts skip:** Skip the current object and continue printing the remaining objects when one of the objects collapses or fails to print correctly.
5. **Printer settings:** Adjust print speed, heatbed temperature, light, and more (see [Common Screen Controls](#)).

4.2 Start a Print from Bambu Studio

Bambu Studio is Bambu Lab's official slicing software, designed specifically for Bambu Lab 3D printers. It features project-based workflow management, systematically optimized slicing algorithms, and a clean, user-friendly interface.

Before 3D printing, you need to slice the model in software to convert the 3D model into G-code instructions that the printer can recognize. This is a key step in turning your design into a finished print.

NOTE

To optimize user experience, some software interfaces may be updated. Please refer to the actual interface in use.

4.2.1 Install Bambu Studio

To smoothly install and run Bambu Studio, please ensure your computer meets the following requirements:

- Operating system: Windows 10, Mac OS X 10.15, Ubuntu 20.02, Fedora 36, or later.
- Processor: Intel® Core 2 or AMD Athlon® 64; 2 GHz or higher.
- Memory: Minimum 4 GB RAM; 8 GB RAM or higher recommended.
- Storage: At least 2 GB of available space.
- Graphics support: OpenGL 2.0 compatible.

Installation Steps

Step 1. Download Bambu Studio.

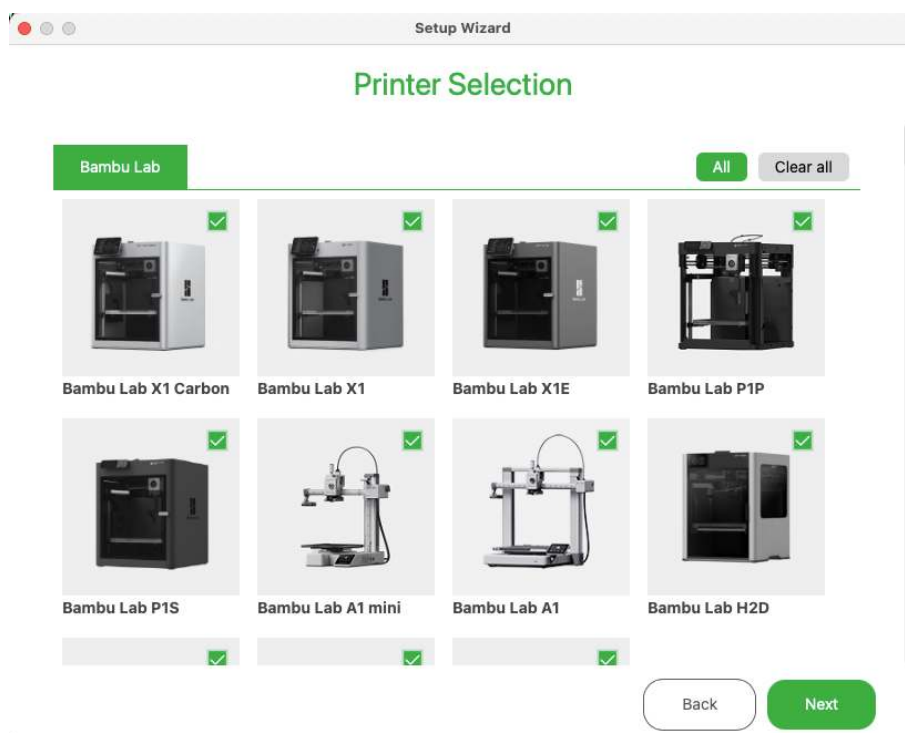
- Windows and MacOS versions: bambulab.com/download
- Linux version: github.com/bambulab/BambuStudio/releases

Step 2. Double-click the downloaded .exe file and follow the instructions to complete the installation and open the software.

Step 3. Select your region and click **Next**.

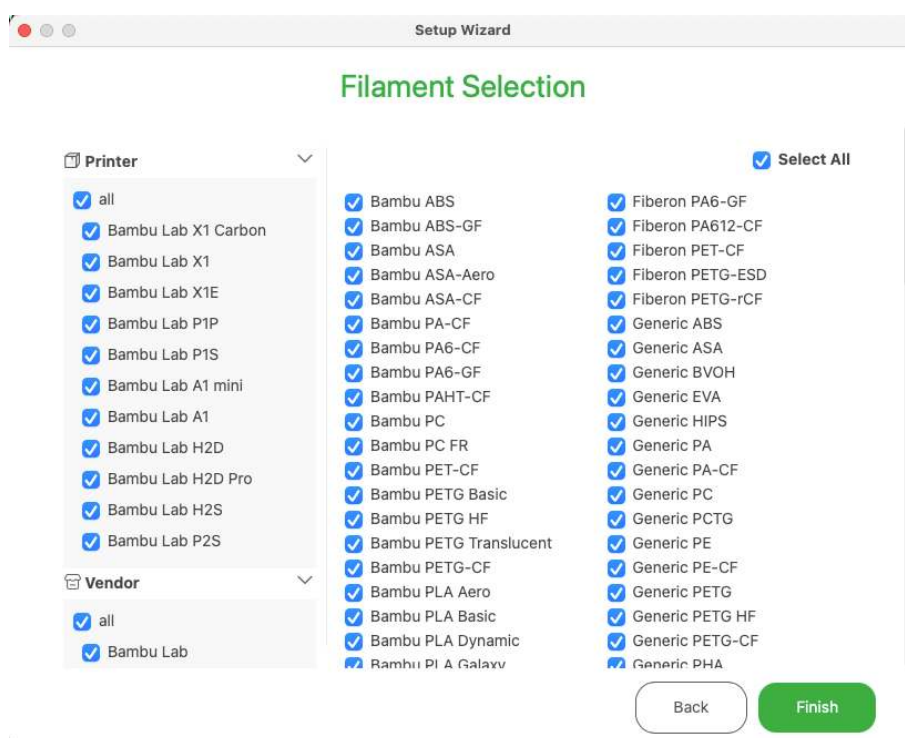
Step 4. Read and choose whether to join the Customer Experience Improvement Program.

Step 5. Select your printer model and nozzle size presets, then click **Next**. The chosen presets will be used for slicing to generate appropriate print paths.



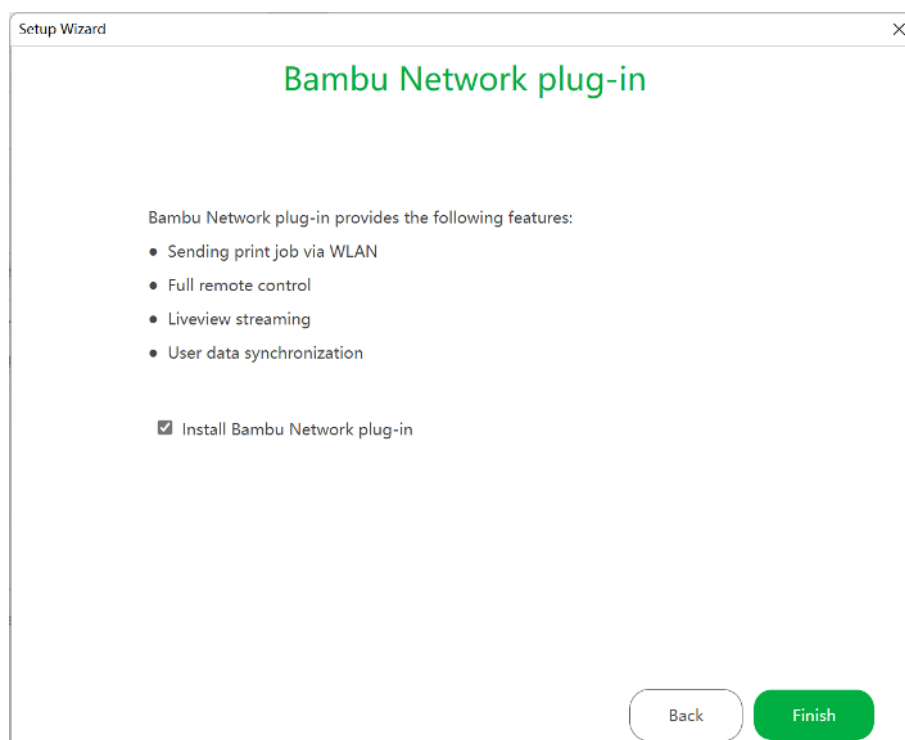
Step 6. Choose the filament preset, then click **Next**.

Filament presets include print temperature and other parameters. Once you select a filament, all printing parameters will be applied during slicing without manual adjustments.



Step 7. Check **Install Bambu Network Plug-in**, then click **Finish** to start the installation automatically.

This plug-in supports printing via local networks or the internet and provides remote control and user data synchronization features.



Step 8. After logging in, printer information will be automatically synchronized across all your devices.

4.2.2 Download and Import Model

MakerWorld hosts a wide variety of high-quality models uploaded by creators, including model files and complete print profiles. The creators have predefined the print parameters, allowing you to download and send the model to the printer with one click, requiring no complex setup.

MakerWorld Models

Step 1: Select the model you want to print on the MakerWorld website or within Bambu Studio's **online models**, then go to the model details page.

Step 2: Choose a print profile that matches your printer model and printing needs.

Step 3: If you use MakerWorld in a browser, click **Open in Bambu Studio**. If you use Bambu Studio, click **Download and open**.

Step 4: Bambu Studio will automatically download the model and open the Prepare interface.

Other Models

NOTE

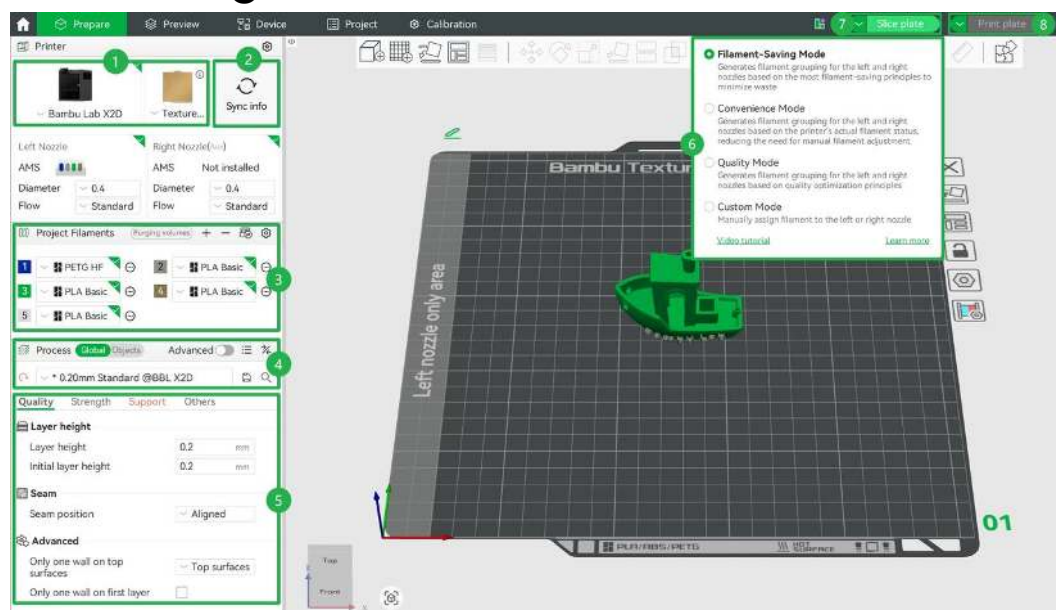
Bambu Studio supports the following file formats: .3mf, .stl, .stp, .step, .amf, and .obj.

Step 1. Import the model using your preferred method.

- In the top left corner, select **File > Import > Import File (3MF/STL/STEP/SVG/OBJ/AMF...)**.
- In the Prepare page, click  in the top toolbar, select the model file, then click Open.
- Drag and drop the model file directly onto the plate in the Prepare page.

Step 2. After successful import, the model will automatically load onto the plate, ready for pre-viewing, editing, or slicing.

4.2.3 Start Printing in Bambu Studio



Step 1. Select the correct printer and build plate.

Step 2. Click **Sync info** to automatically sync the current printer's nozzle information and AMS quantities.

 NOTE

Bambu Studio does not currently support mixed slicing with nozzles of different diameters.

Step 3. In the Project Filament list, click  to sync filament information from the AMS device.

Step 4. Click the selection box to choose the ideal process preset. For example, when printing with a 0.4 mm nozzle, a layer height of 0.20 mm is a common choice.

 NOTE

Process presets include appropriate default parameters suitable for most print tasks. You can adjust them based on your actual needs or desired results.

Step 5. Adjust slicing parameters.

Step 6. After completing all settings, select the filament grouping mode. For details, see [Select Filament Grouping Mode](#).

Step 7. Click the **Slice** button to slice the model and view color schemes, filament usage, print time, and other information.

Step 8. Send the print job. In the pop-up window, select the corresponding filament from AMS or external spool, then click Send.

 NOTE

- In the pop-up, you can choose to enable timelapse, auto bed leveling, nozzle offset calibration, and flow dynamics calibration.
- Timelapse is off by default, while other print calibrations are set to auto. To use high-precision nozzle offset calibration data, turn off the nozzle offset calibration [here](#).

4.3 Start a Print from Printer Screen

On the printer touchscreen, tap  > **Print File** > **Internal (or USB)**. Choose the model to print (see [Start Printing](#)).

Chapter 5 Slicing with Bambu Studio

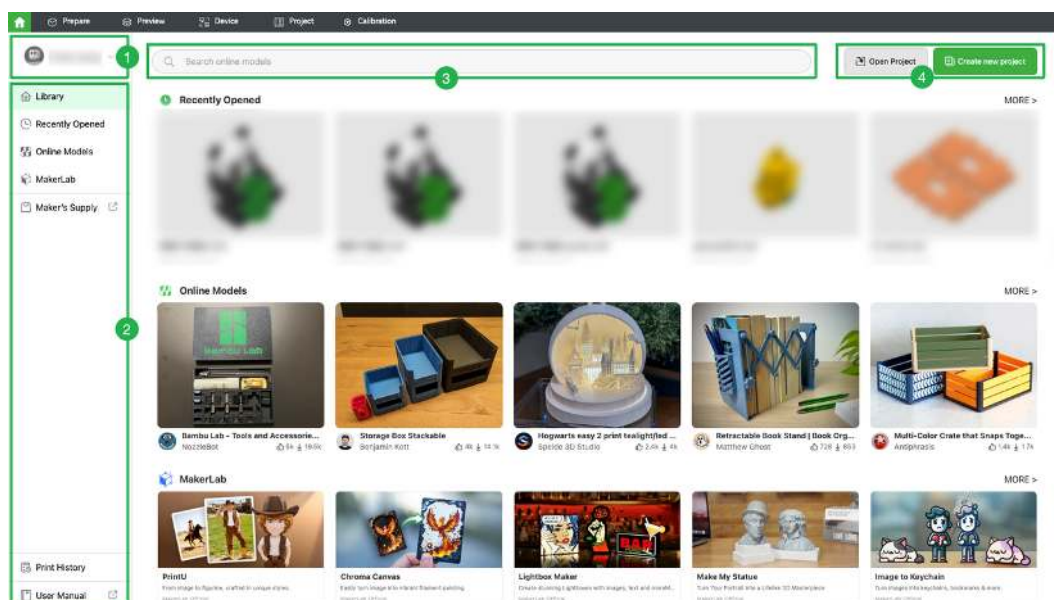
NOTE

- Some screenshots show other models for reference only and do not affect the actual workflow.
- To improve the user experience, some software interfaces may change. Refer to the actual interface.

5.1 Introduction to Bambu Studio Interface

5.1.1 Homepage

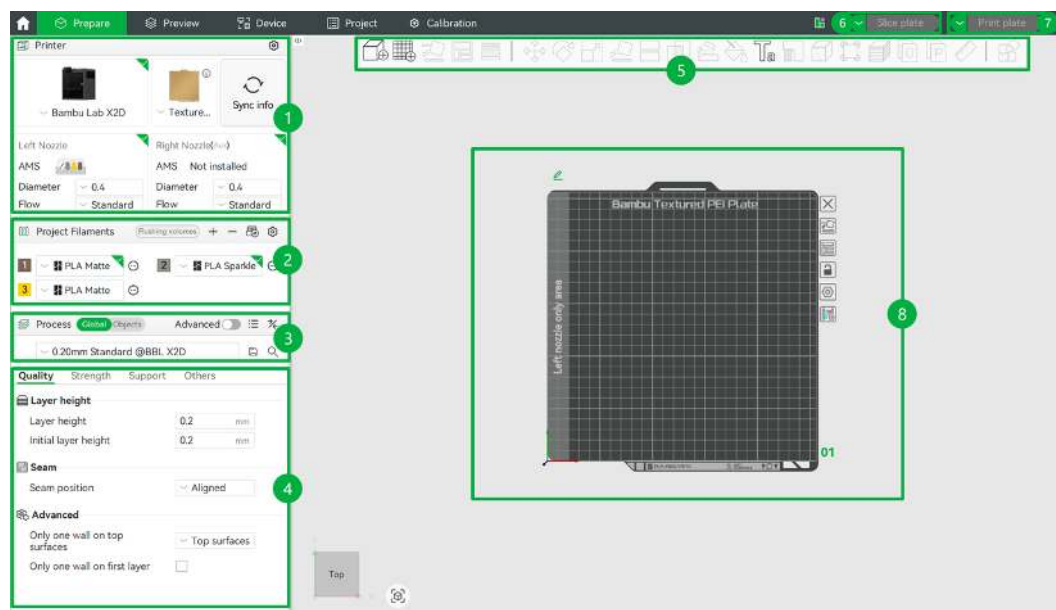
The homepage brings together model management, resource access, and learning guidance. It is the starting point when you open Bambu Studio.



1. **Account info:** View the current account or log out.
2. **Page navigation:** Quickly access recently opened files, online models on MakerWorld, MakerLab, Maker's Supply, print history, and tutorials.
3. **Search bar:** Enter keywords to search online models on MakerWorld.
4. **Project operations:** Open local projects or create new ones.

5.1.2 Prepare

The Prepare page is used to adjust models, select the printer and filament, set print parameters, slice models, and send print jobs.



1. **Printer settings:** After selecting a printer model, you can sync the build plate, nozzle, AMS, and filament information with one click. Bambu Studio automatically matches the slicing and print settings based on the selected configuration.
2. **Filament settings:** Displays the filament types and colors used in the current file. Click the + icon to manually add or remove filament. The system automatically loads preset parameters for the selected filament type.
3. **Process presets:** Provides preset parameter combinations for different quality levels, such as Standard and High Quality, which can be applied globally with one click.
4. **Print parameter details:** Models downloaded from MakerWorld usually include complete print parameters and require no additional setup. For special effects, you can adjust the parameters manually (see [Adjust Slicing Parameters](#)).
5. **Top toolbar:** After importing a model, select an object to edit and view it using the toolbar (see [Use the Top Toolbar](#)).
6. **Slice button:** Click to slice the current plate or all plates and view the slicing results (see [Pre-view](#)). Hover over the button to select the filament grouping mode.
7. **Print and export:** Start printing or export files. Click  to choose from the following options:
 - Print plate: Start printing the sliced file for the currently selected plate immediately.
 - Print all: Send sliced files for all plates to the printer and start printing the last plate immediately. After it finishes, you can select the next plate from **Print Files** to continue printing.
 - Export plate sliced file/all sliced file: Export the sliced files to your computer or a USB drive, then start offline printing from the printer screen via the USB drive.
 - Send/Send all: Send the sliced files to the printer's internal or external storage, such as a USB drive. You can then start the print job manually from the printer screen.

NOTE

This operation requires the Bambu Network Plugin to be installed, and Bambu Studio and the printer must be on the same network.

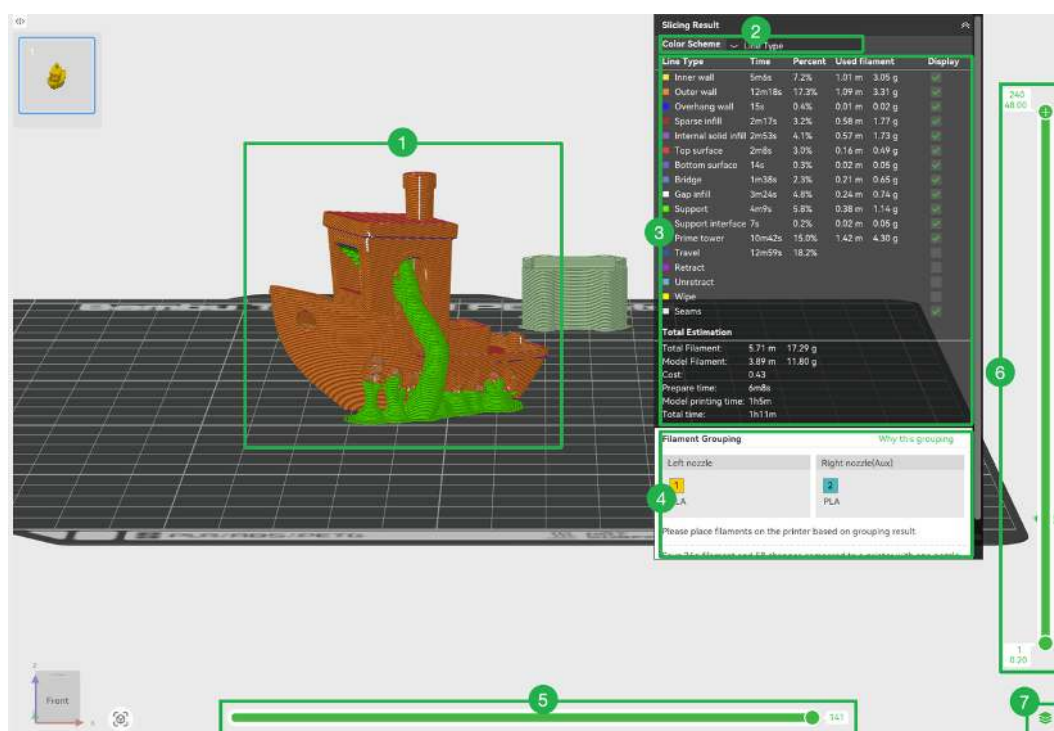
TIPS

The printer's internal storage is limited. If there are too many sliced files, insert a USB drive and send the sliced files to external storage.

8. **Print plate:** Place and edit models. A project can contain multiple plates.

5.1.3 Preview

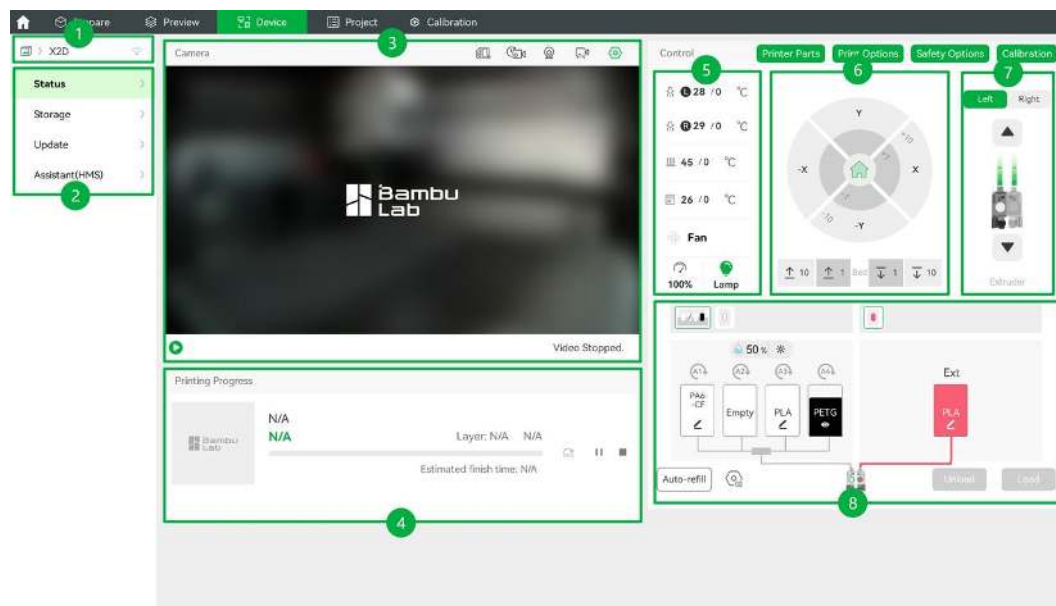
The **Preview** page is used to view slicing results and detailed information for each layer. You can also add custom operations to specific layers.



1. **Model preview:** Shows the sliced model. The model colors change automatically based on the selected color scheme. You can view the meaning of each color in the Slicing Result panel.
2. **Color scheme:** Select the type of slicing information to view, such as line type, filament, or print speed.
3. **Details:** Shows detailed information for the selected category, including what each color represents and the corresponding data.
4. **Filament grouping:** View the filament-to-nozzle mapping. If needed, click **Regroup filament** (see [Select Filament Grouping Mode](#)).
5. **Single-layer path:** Drag the progress bar to view the toolhead path on the selected layer.
6. **Layer details:** View the model's layer count, layer height, and print time. Drag the layer slider to check the slicing results layer by layer. Right-click **+** to add custom operations to a specific layer, such as custom G-code, pause, or filament change.
7. **Display mode:** Switch between viewing all layers and viewing a single layer.

5.1.4 Device

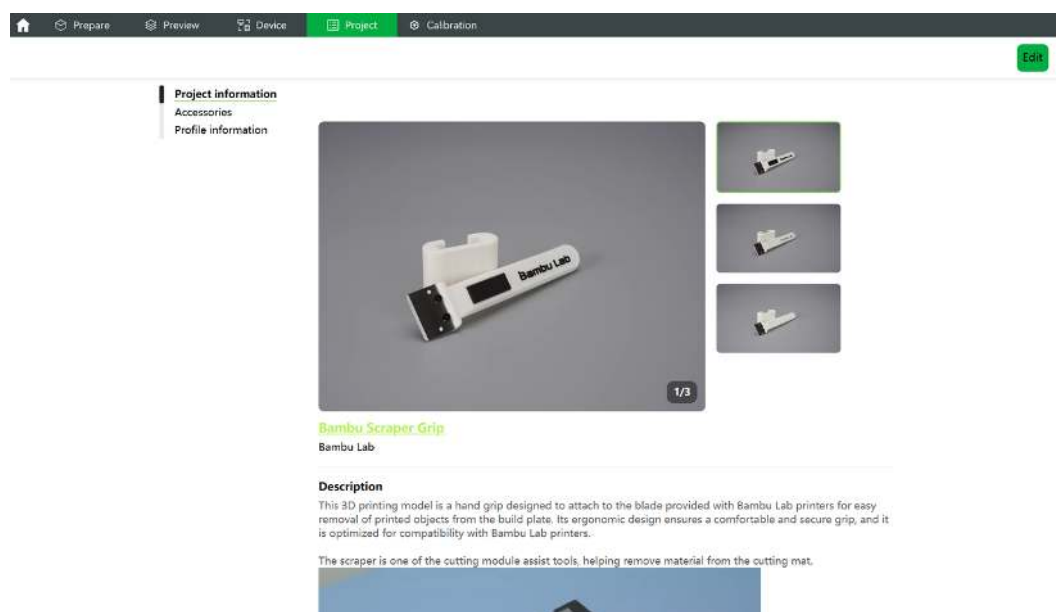
The device interface shows the status of the connected printer and its operation options. You can also perform the same operations on the printer Screen (see [Printer Screen Control](#)).



1. **Device info:** Shows the currently connected printer. Tap to switch devices.
2. **Device status and management:** View printer information, including device status, storage media, firmware updates, and the Health Management System (HMS). Supports real-time monitoring, device control, USB file viewing, and firmware updates.
3. **Live video:** Play or pause the live video and manage recording and livestream status.
4. **Current print job:** Displays information about the current print job, including the job thumbnail and print progress. You can skip objects, pause, start, or stop the job.
5. **Temperature control:** Adjust the air management system, and set temperatures for the nozzle, heatbed, and chamber. The number on the left is the current temperature, and the number on the right is the target temperature.
6. **Motion control:** Move the toolhead and heatbed when the printer is idle.
7. **Extruder control:** Shows the extruder feed status. A green dot indicates that the filament is loaded. Use the up and down arrows to manually extrude or retract 1 cm of filament.
8. **Filament management:** View and edit filament information, and control loading, unloading, and Auto Refill. After connecting an AMS, you can also enable Insertion update, Update on startup, Update remaining capacity, and other features.

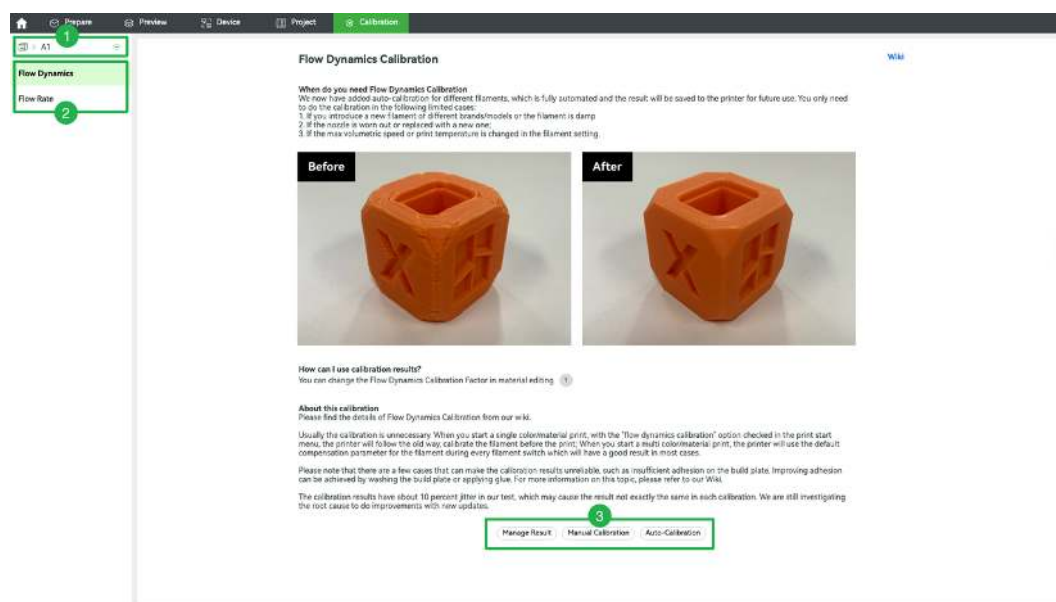
5.1.5 Project

Displays the project information contained in the current 3MF file, including model description, required accessories, and configuration file details.



5.1.6 Calibration

The **Calibration** page is used to adjust the printer's extrusion accuracy, ensuring accurate extrusion and stable print quality. Calibration is recommended when changing filament brands or hotends, or when obvious extrusion issues occur. For details, see [Filament Calibration](#).



1. Printer: Switch printers.
2. Calibration type: Choose Flow Dynamics Calibration or Flow Rate Calibration.
3. Calibration options: Manage calibration results and perform manual or automatic calibration.

5.2 Use the Top Toolbar

The top toolbar is located at the top of the Prepare page in Bambu Studio. It is used to import models, adjust model position and size, and perform auxiliary operations before printing.

**NOTE**

The toolbar updates automatically based on the selected objects, and only available functions are enabled. Select at least one object before using a tool.

5.2.1 Position and Resize the Model

Add Models

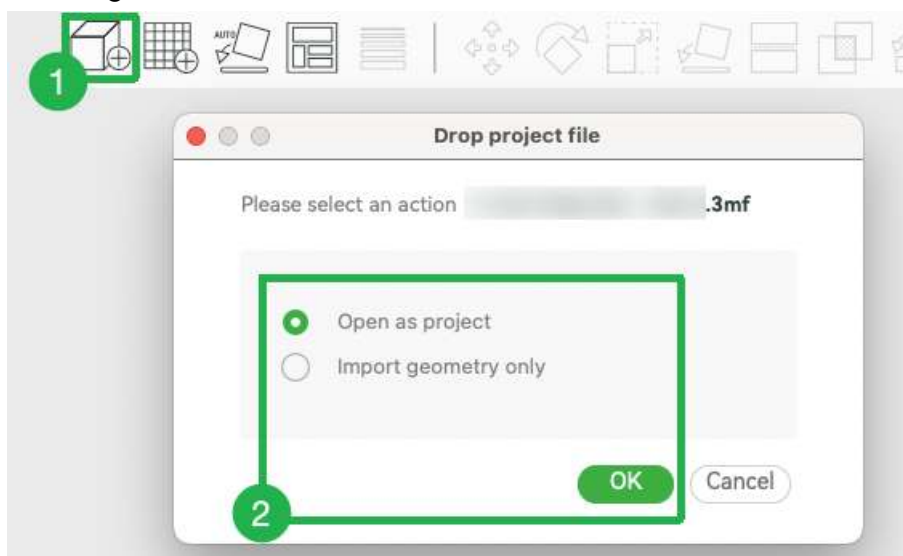
Import 3D model files (such as 3MF, STL, etc.) from your computer.

Operating Steps:

Step 1. Click  to select local files.

Step 2. If importing a 3MF file, select an action and click **OK**.

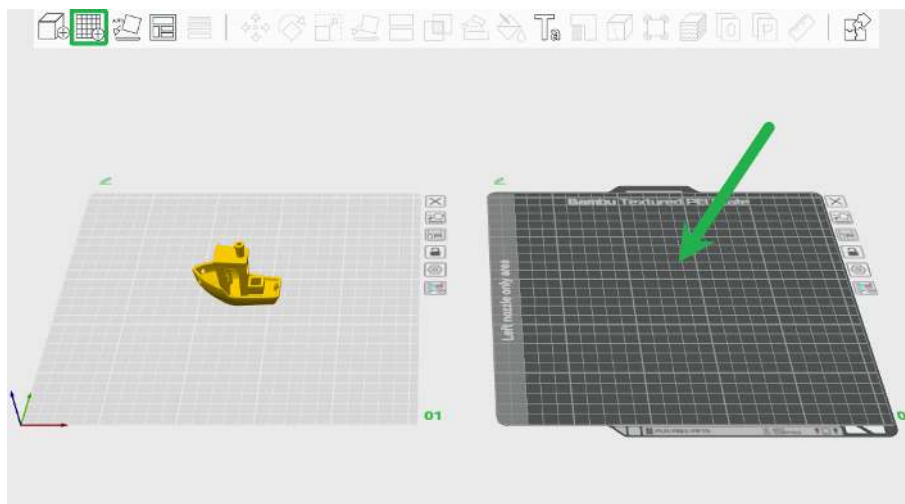
- Open as project: Closes the current project and opens a new one.
- Import geometry only: Imports only the model's geometry into the current project and ignores print settings.



Add Plate

Create 1 new print plate in the current project to place new objects.

Use this when preparing different models separately or applying different settings to the same model.

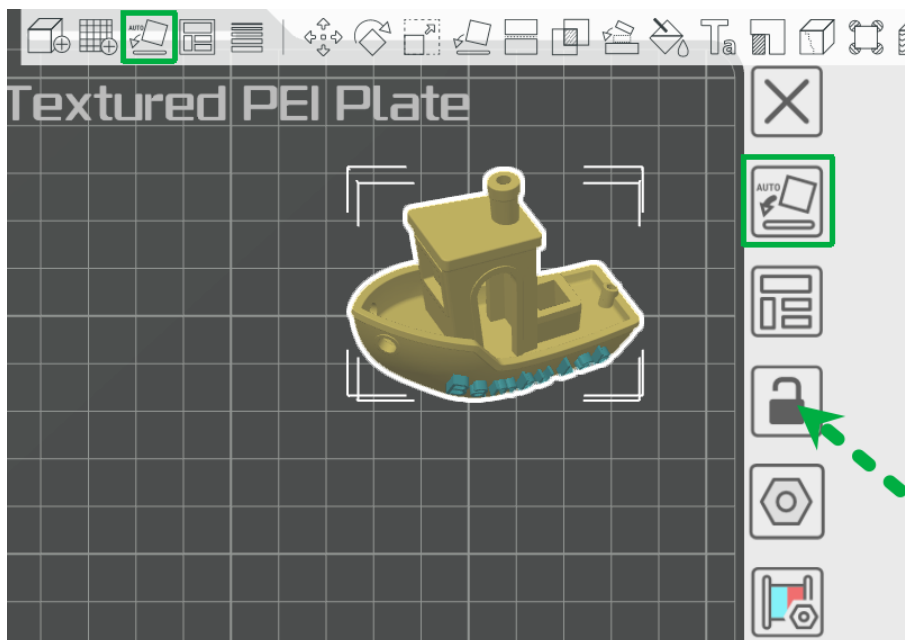


Auto Orient

Automatically adjust the orientation of all objects in the project to improve printability.

Use this feature first if you are unsure how to place objects.

- Adjust all **objects** in the project: Click  in the top toolbar.
- Adjust all objects on a **single plate**: Click  on the right side of the plate.
- Adjust an **object**: Use **rotate** tool to adjust manually (see [Rotate](#) for details).
- Adjust **all objects on selected plates**: Click  on the right side of the plate to lock plates you don't need to adjust, then click  in the top toolbar.



Arrange All Objects

Automatically arrange all objects in the current project to avoid overlap. After importing a model with multiple objects, use this to quickly create an initial layout.

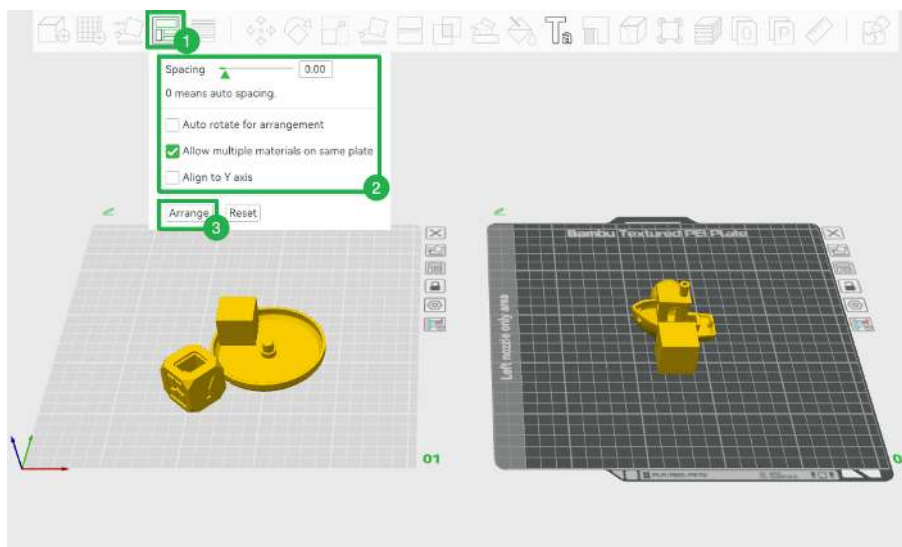
Operating Steps:

- **Arrange all objects in the project**

Step 1: Click .

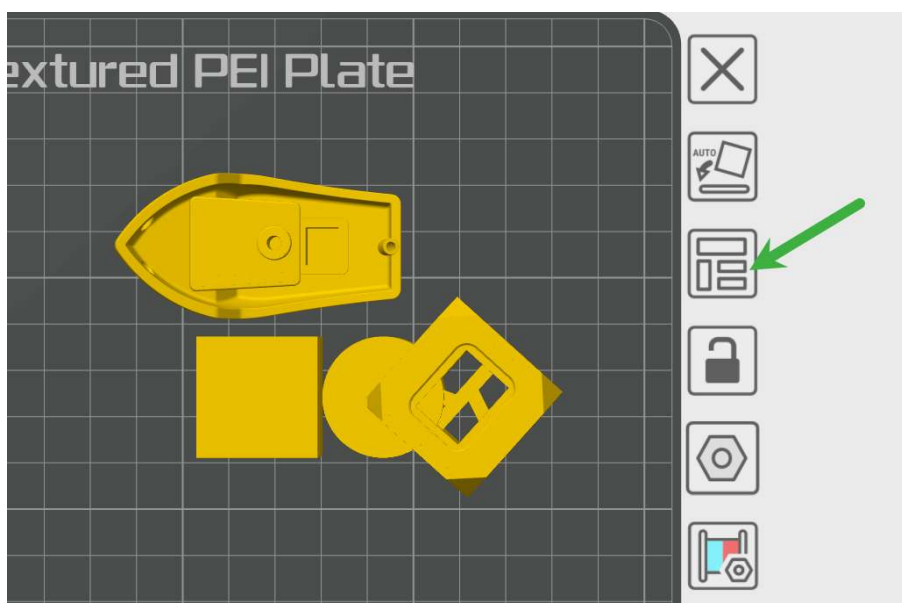
Step 2: Set placement requirements.

Step 3: Click **Arrange** (Shortcut: A).



- **Arrange all objects on the current plate**

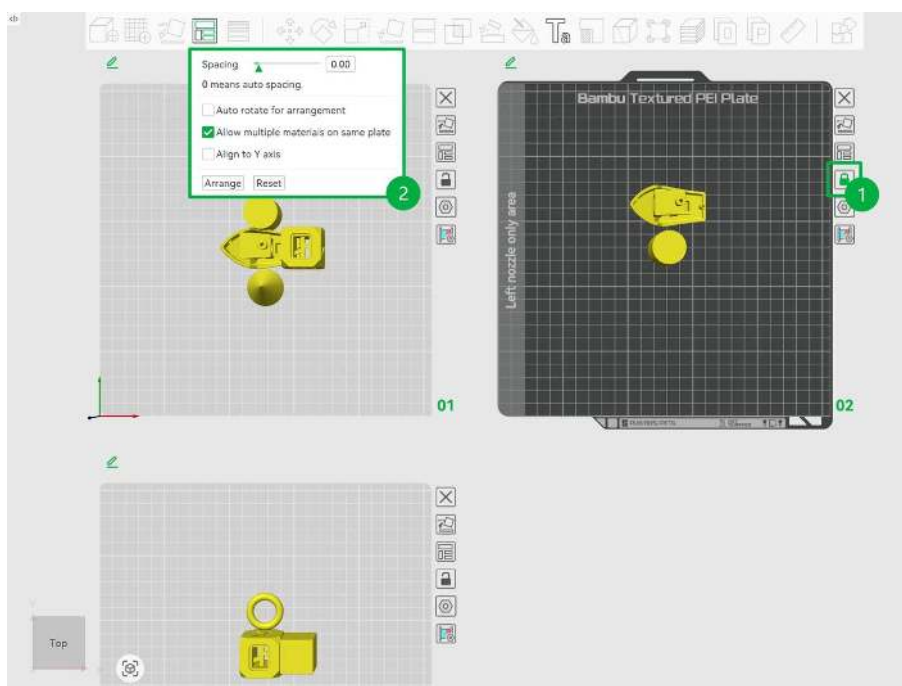
Click  on the right side of the plate (Shortcut: Shift + A).



- **Arrange all objects on selected plates**

Step 1: Click  to lock the plates you do not want to arrange.

Step 2: Click . Set placement requirements, then click **Arrange**.

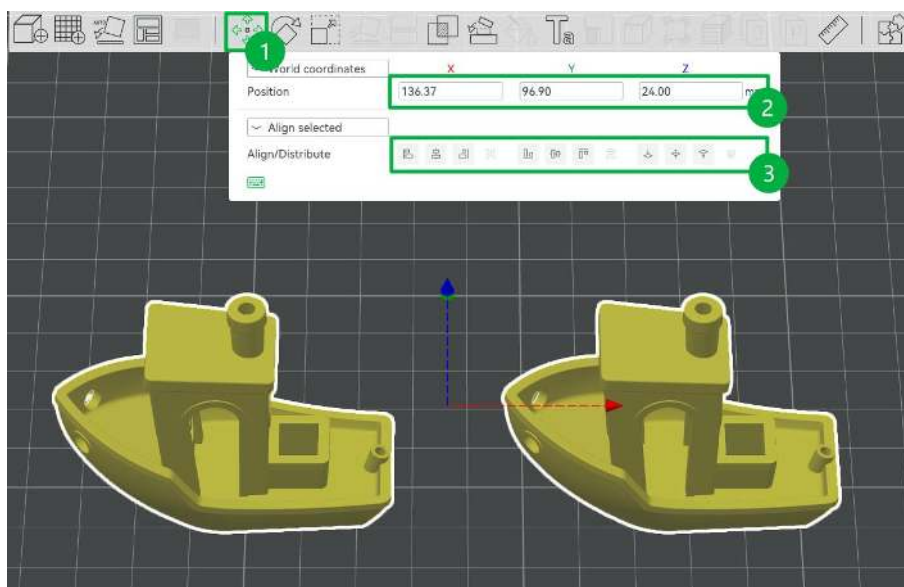


Move and Align

After selecting an object or part, you can drag it directly with the left mouse button or use the Move tool to view and precisely set its position coordinates. You can also select multiple objects to align them as needed, or align multiple parts within a single object.

Operating Steps:

- Step 1. Click .
- Step 2. Enter a value in the field for precise positioning.
- Step 3. Align the selected objects or parts.



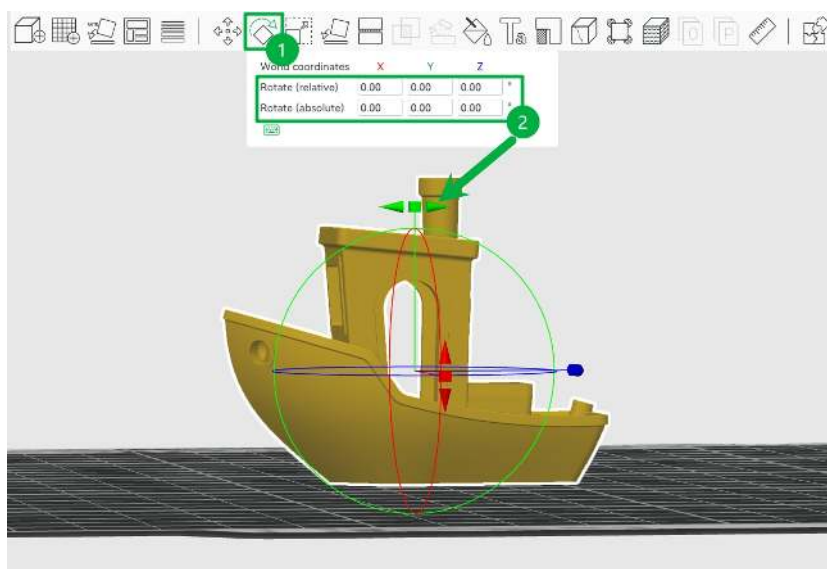
Rotate

Manually adjust the object's print orientation.

Operating Steps:

Step 1. Click  to enter the adjustment interface.

Step 2. Drag the endpoints of the **X / Y / Z** axis to rotate, or enter the rotation angle directly.



Scale

Adjust the overall or local size of an object.

Operating Steps:

Step 1. Click  to enter the adjustment interface.

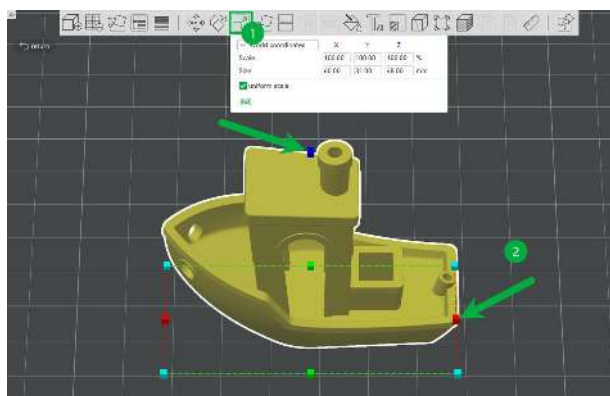
Step 2. Choose one method to adjust the size:

Method 1: Drag the model handles.

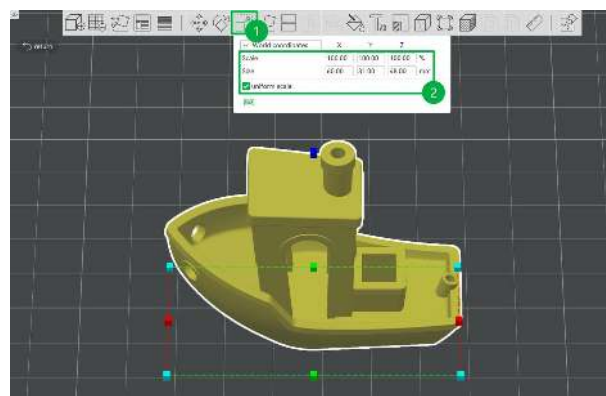
- Drag the four bottom corner handles to scale proportionally.
- Drag the other handles to stretch in a single direction.

Method 2: Enter dimensions or a scale ratio.

- Select **Uniform Scale** to keep proportions linked when changing any one value.
- Clear it to adjust the **X / Y / Z** dimensions independently.



Method 1



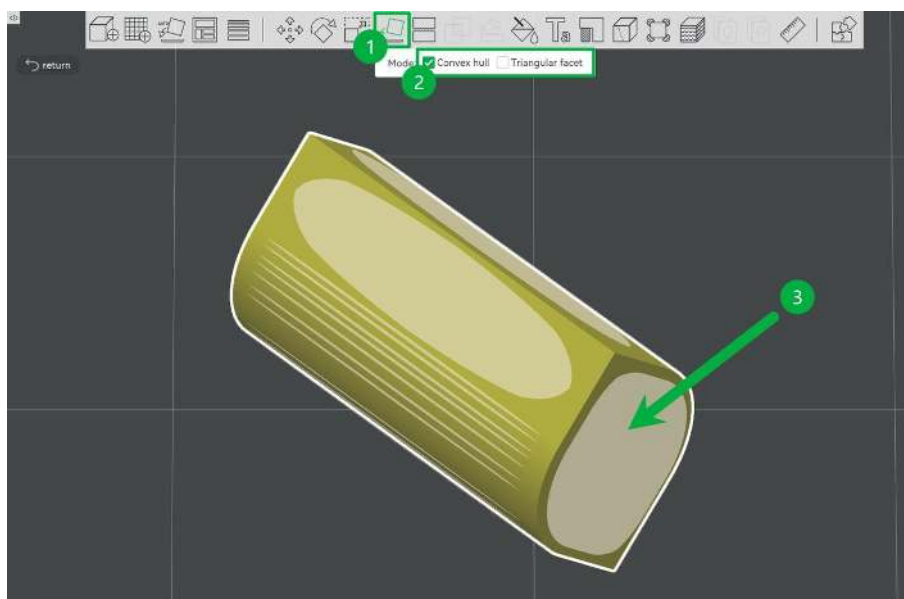
Method 2

Lay on Face

Manually set a selected face of the model as the print base. This feature is useful when Auto Orient does not give the desired result or when a specific face needs to be placed on the build plate.

Operating Steps:

- Step 1. Click  to enter the adjustment interface.
- Step 2. Choose a display mode: **Convex hull** or **Triangular facet**.
- Step 3. Click the face on the object that you want to use as the bottom face.



Measure

Measure the distance and angle between different positions on the same object or among multiple objects.

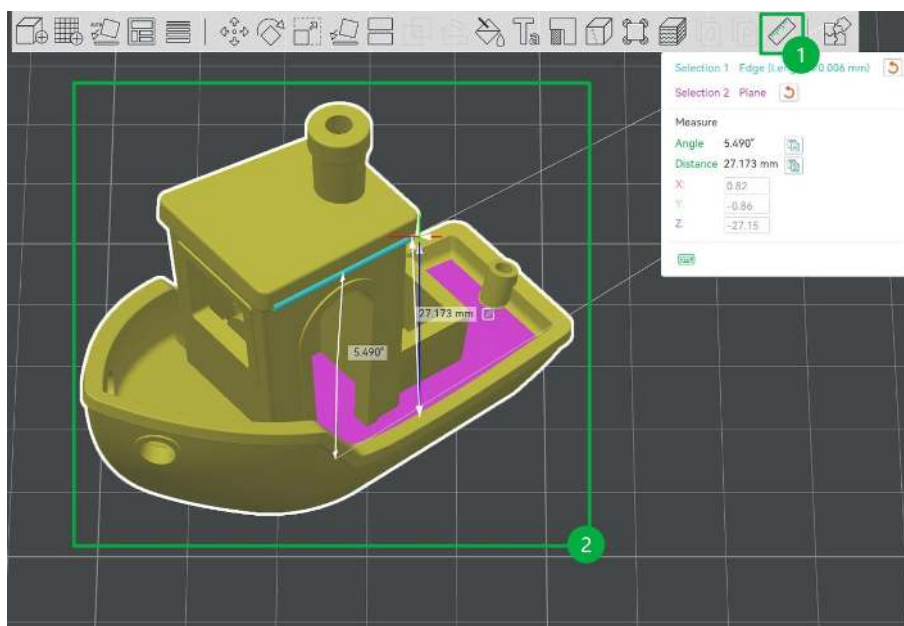
This is commonly used to verify if the model dimensions meet expectations before printing.

Operating Steps:

- Step 1. Click  to enter the adjustment interface.
- Step 2. Select the two measurement ends (such as line segments or faces) in sequence to view the results.

NOTE

To measure the distance and angle between multiple objects, first select the objects, then click .

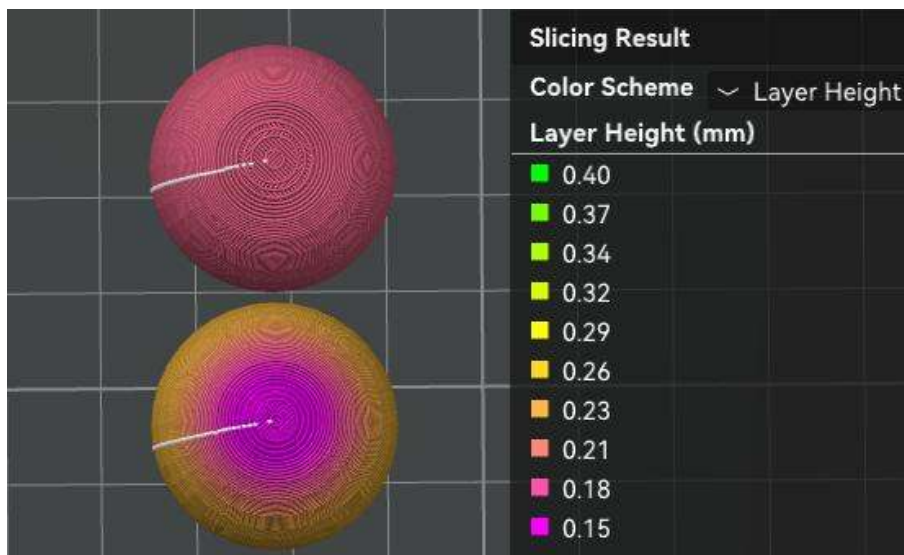


5.2.2 Control Print Quality and Local Features

Variable Layer Height

For models with spherical or sloped top surfaces, this feature automatically adjusts the layer height in different height ranges to make the top surface smoother and reduce visible stepping.

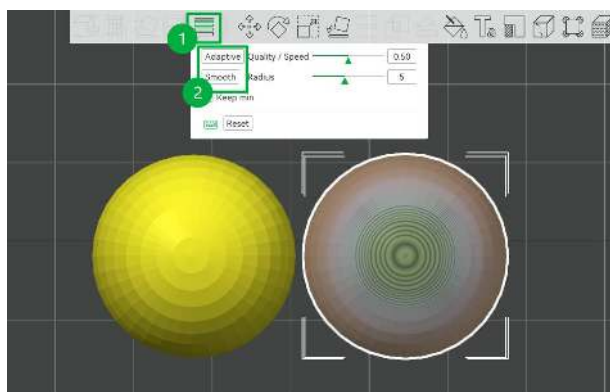
It is suitable for models with higher appearance requirements.



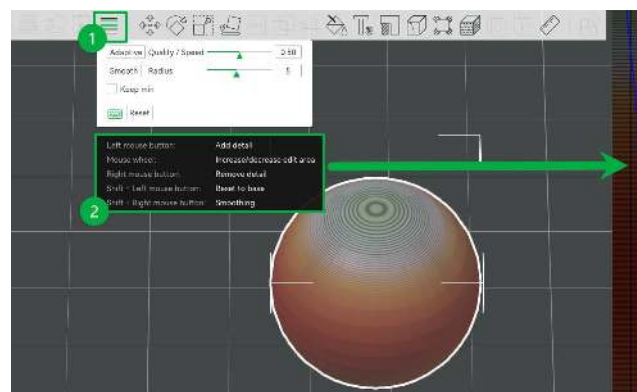
Step 1. Click  to open the adjustment interface.

Step 2. Adjust layer height.

- Method 1: Click **Adaptive**, then click **Smooth** several times.
- Method 2: Follow the key instructions to adjust the layer height bar on the right and precisely control the layer height at specific positions.



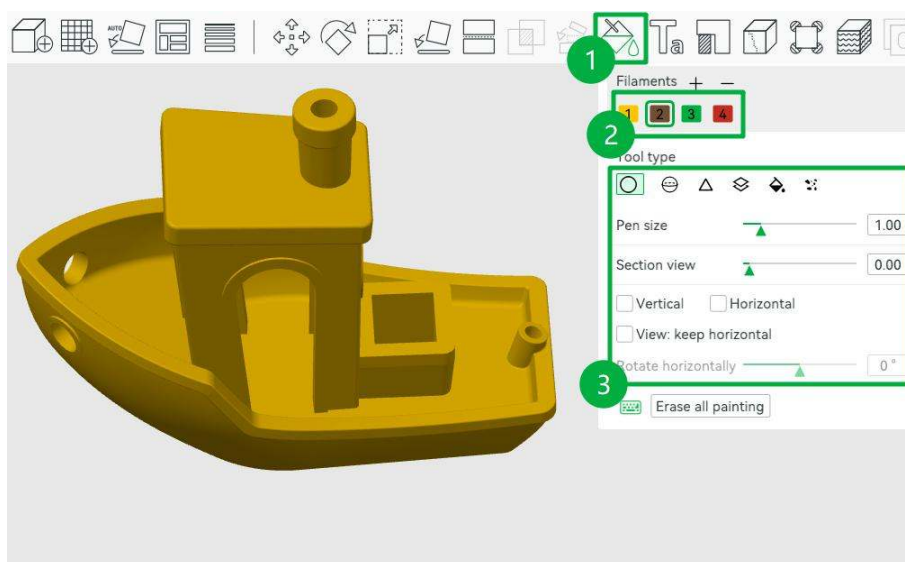
Method 1



Method 2

Color Painting

Assign filament colors to the whole object or a specific area, suitable for multi-color printing.



Step 1. Click  to enter the color painting interface.

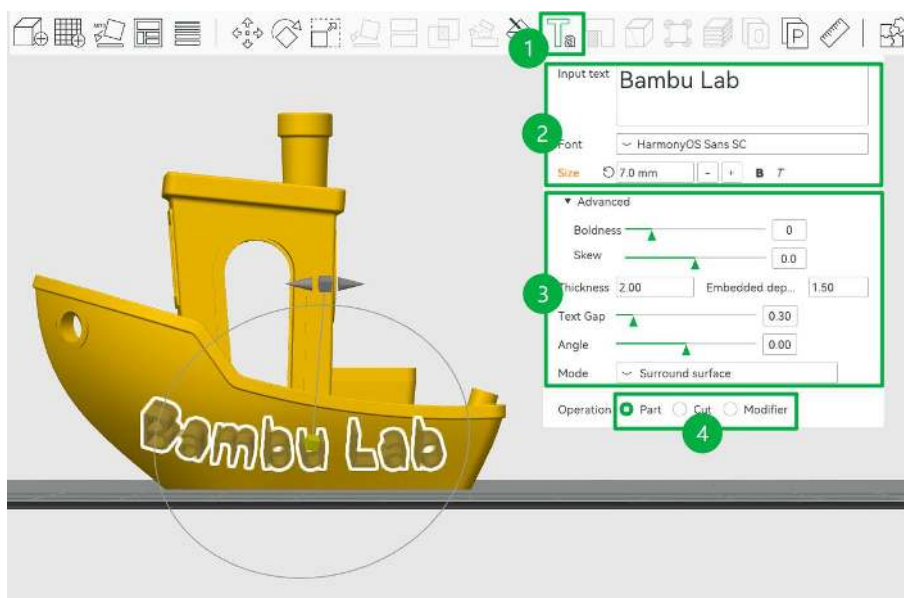
Step 2. Choose a color.

Step 3. Select a color painting tool, then adjust the pen size or section view.

- Circle: Paint curved lines on surfaces.
- Sphere: Paint all faces within the spherical area, including hidden faces.
- Triangle: Paint the triangular face under the cursor; drag to paint continuously.
- Height range: Paint all faces within the specified height range.
- Fill: Spread the color from the selected face to connected areas. When **Edge detection** is enabled, you can set a smart fill angle, and painting will stop at corners sharper than that angle.
- Gap fill: Automatically detect small gaps and fill them with adjacent colors.

Text Shape

Add 3D text to the model surface (supports flat and curved surfaces). Use it for labels, numbers, or descriptive text.



Step 1. Click **T** to enter the editing interface.

Step 2. Enter text and set the font and size.

Step 3. Adjust text position.

Step 4. Select a generation type

- **Part:** Creates an independent solid part, which is sliced as a regular model.
- **Cut:** Applies a Boolean subtraction to the model to create an engraved effect.
- **Modifier:** Does not change the geometry. It only modifies print settings, such as color, for the area overlapping the model. This can be used to create 2D text patterns flush with the model surface.

Support Painting

Manually add or block support structures in specific areas by painting on the model.

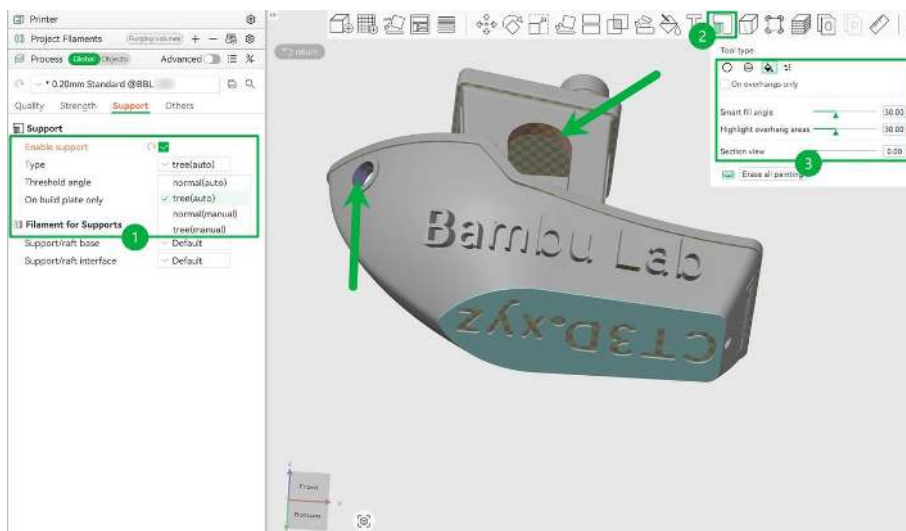
Step 1. In the Support settings under Process, select **Enable support** and choose a support type.

- **Auto:** The system generates supports automatically. You can slice the model and check the result before deciding whether manual adjustments are needed.
- **Manual:** Supports are generated only in painted areas.

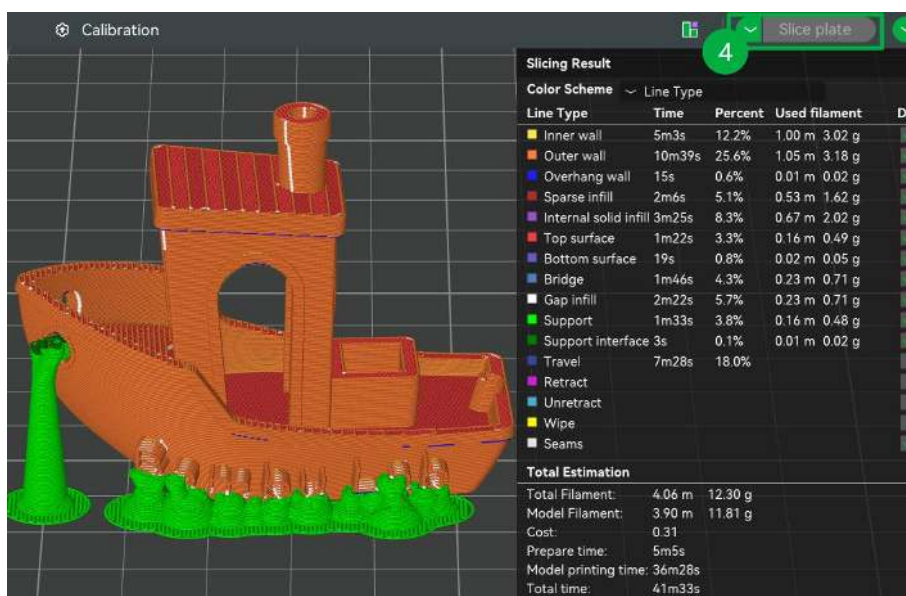
Step 2. Click  to enter the support painting interface.

Step 3. Select a painting tool and paint on the model:

- **Left click:** Add supports. The area is shown in blue.
- **Right click:** Block supports. The area is shown in red.



Step 4. Click **Slice Plate** to check the results.



Seam Painting

When the automatically generated seam affects appearance, you can manually specify the seam location.

Step 1. Set the seam position in the quality settings of the Process panel.

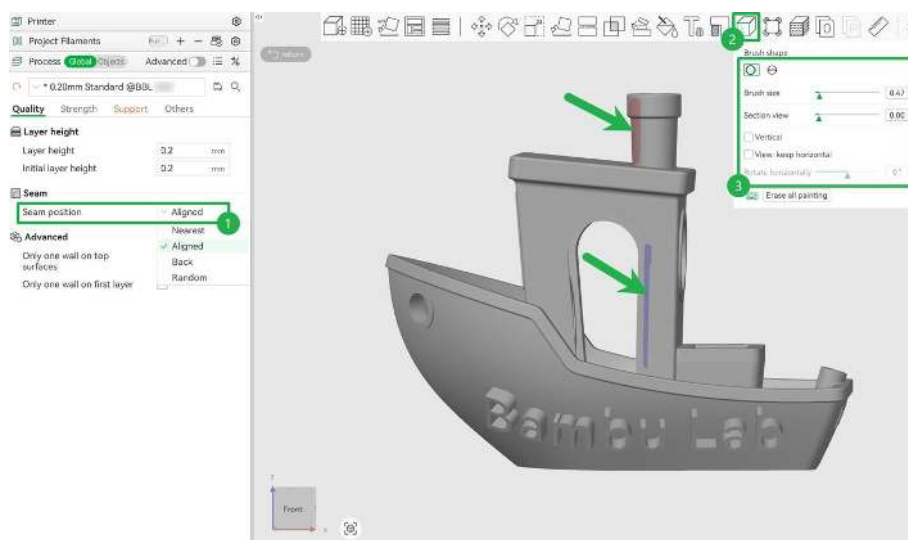
NOTE

Click **Slice Plate** to enter the Preview page and check the seam result.

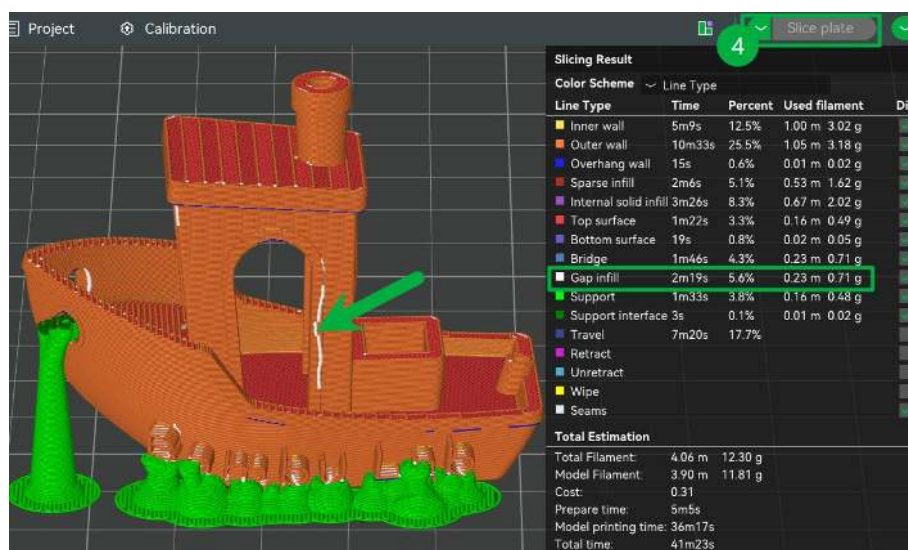
Step 2. Click  to enter the seam painting interface.

Step 3. Select a brush and paint on the model:

- Left-click: Set the Z seam (the area is shown in blue).
- Right-click: Block the Z seam (the area is shown in red).



Step 4. Click **Slice Plate** to check the seam result.



Brim Ears

Generate a brim around sharp corners and other areas to improve adhesion and reduce warping without making removal more difficult. Suitable when you need localized adhesion enhancement without a full brim around the model.

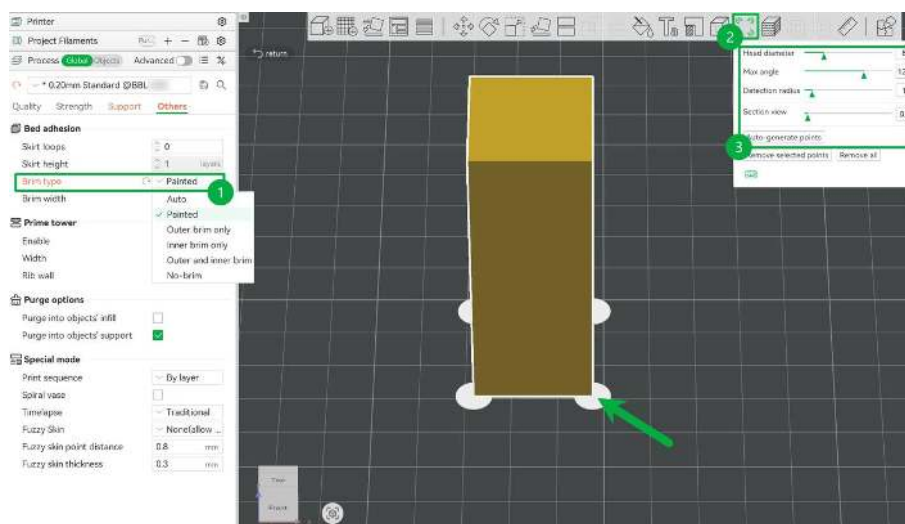
Step 1. In the Others section of the Process panel, set **Brim Type** to **Painted**.

NOTE

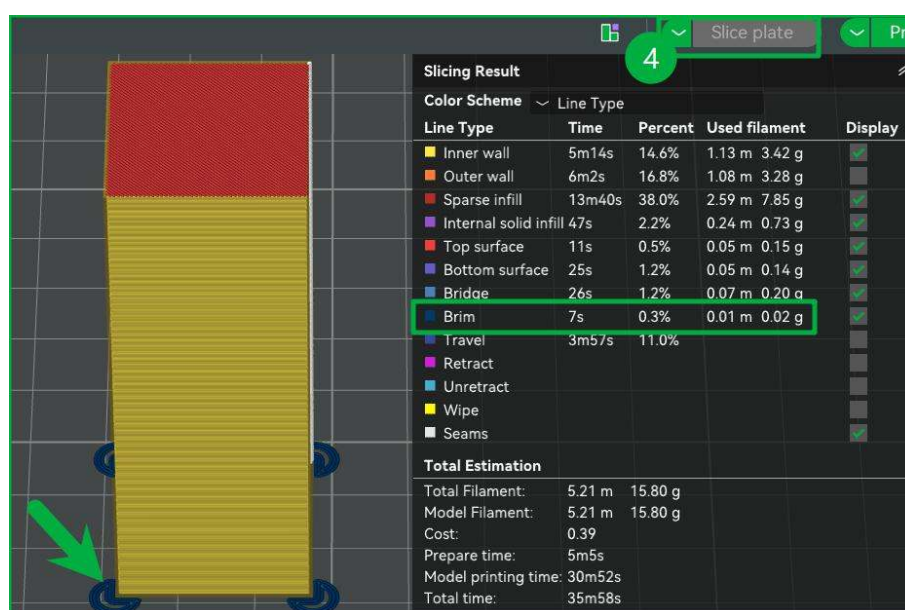
The Brim ear does not work unless the brim type is set to **Painted**.

Step 2. Click  to enter the brim ears painting interface.

Step 3. Select **Auto-generate points** or manually adjust brim parameters, then left-click to draw at the desired positions.



Step 4. Click Slice Plate and check the result.



Fuzzy Skin Painting

Create a rough texture similar to animal fur in a specified area by painting. This effect is used for special appearances.

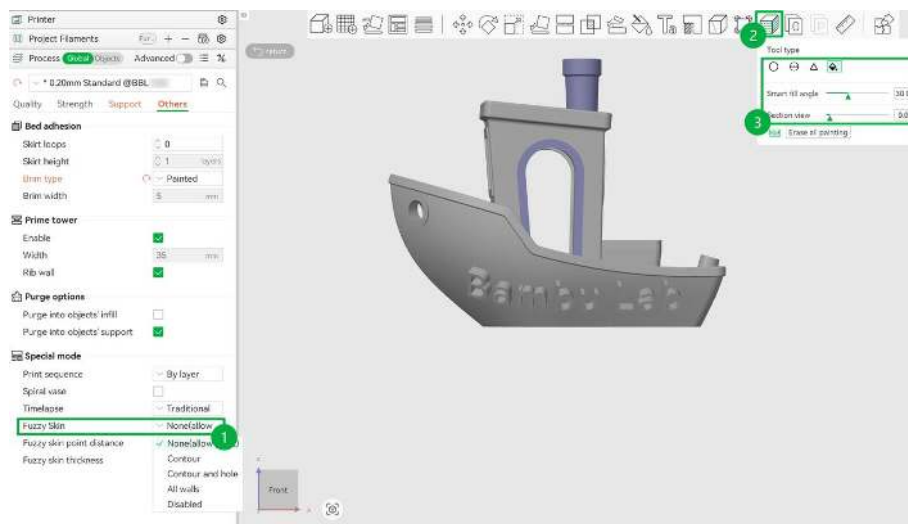
Step 1. In the Others section of the Process panel, set **Fuzzy Skin** to **None (allow paint)**.

NOTE

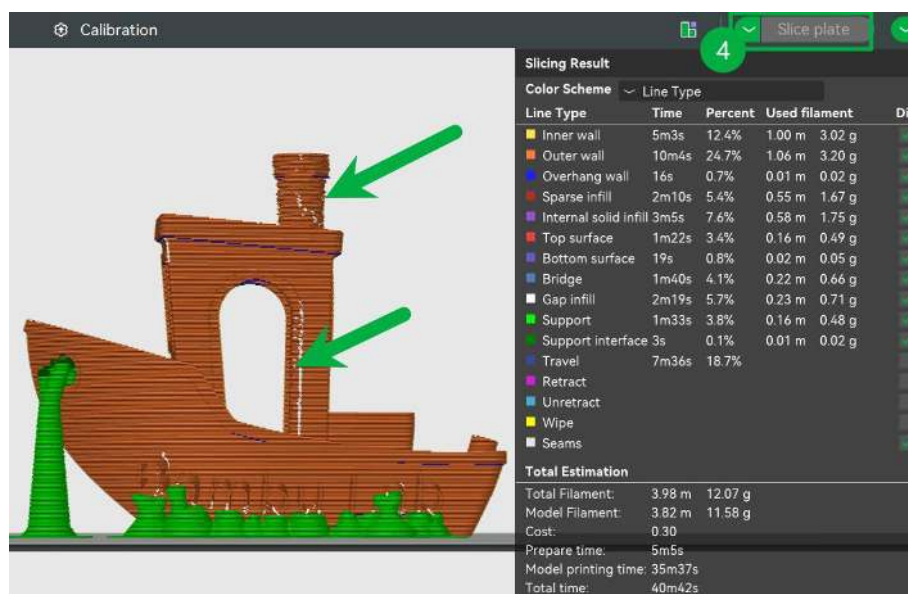
If set to other modes, the painting results will be overridden.

Step 2. Click  to enter the fuzzy skin painting interface.

Step 3. Select the painting tool and left-click where you want to paint.



Step 4. Click **Slice plate** to check the results.

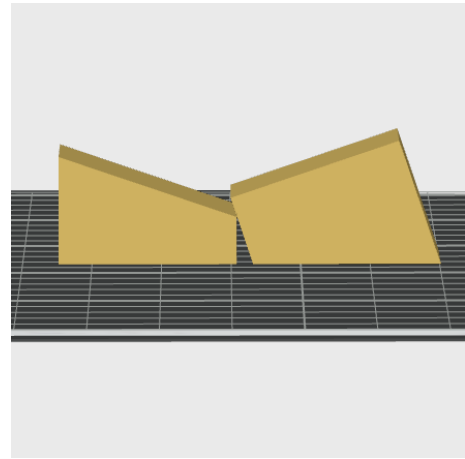
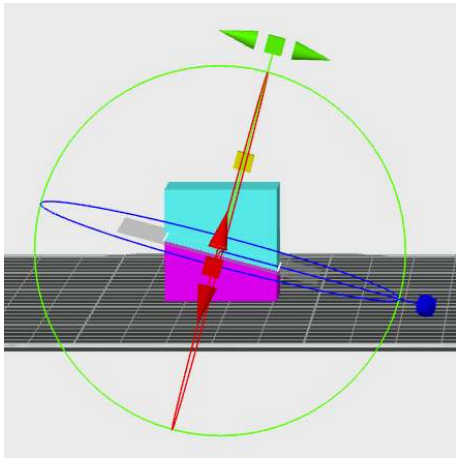


5.2.3 Adjust Model Structure

Cut

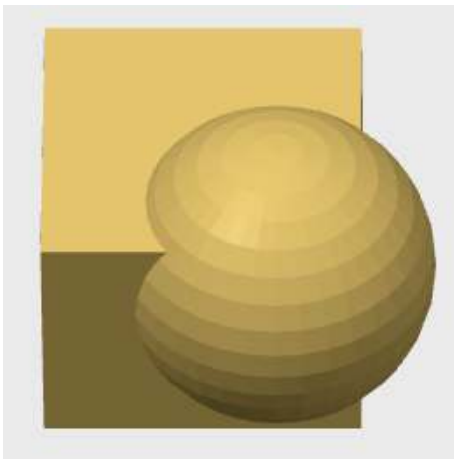
Define a custom cutting plane and cut the model. Common uses include:

- Split an oversized model into parts for printing and assembly.
- Create a flat bottom surface for printing.
- Print only part of the model.

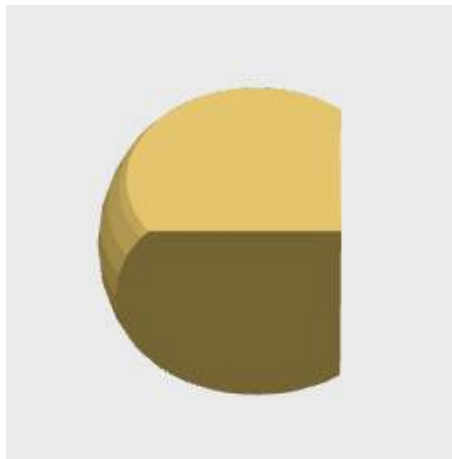


Mesh Boolean

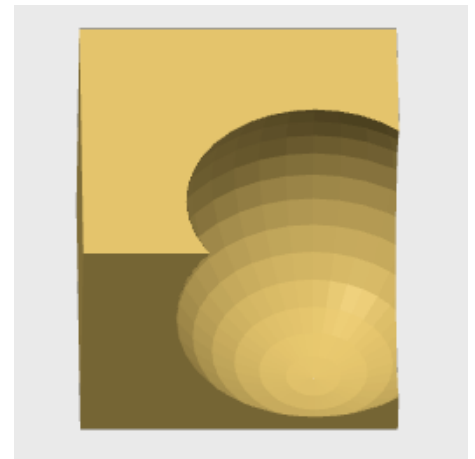
Perform union, intersection, or subtraction operations on multiple objects to generate new models.



Union



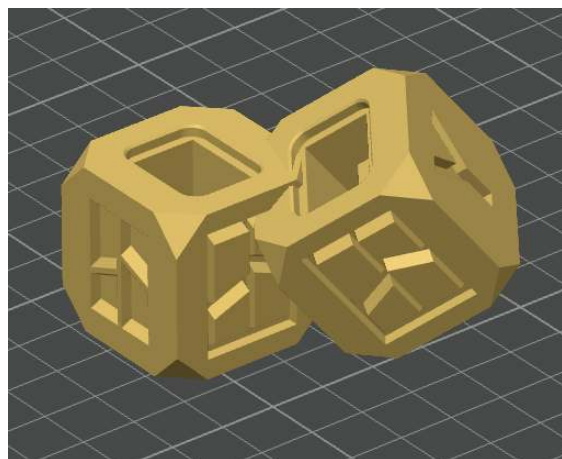
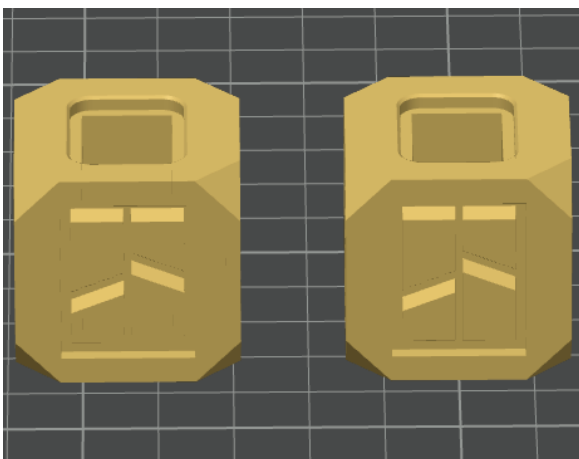
Intersection



Subtraction

Assemble

Quickly align and assemble objects by selecting 2 points or 2 faces without precise coordinate input.



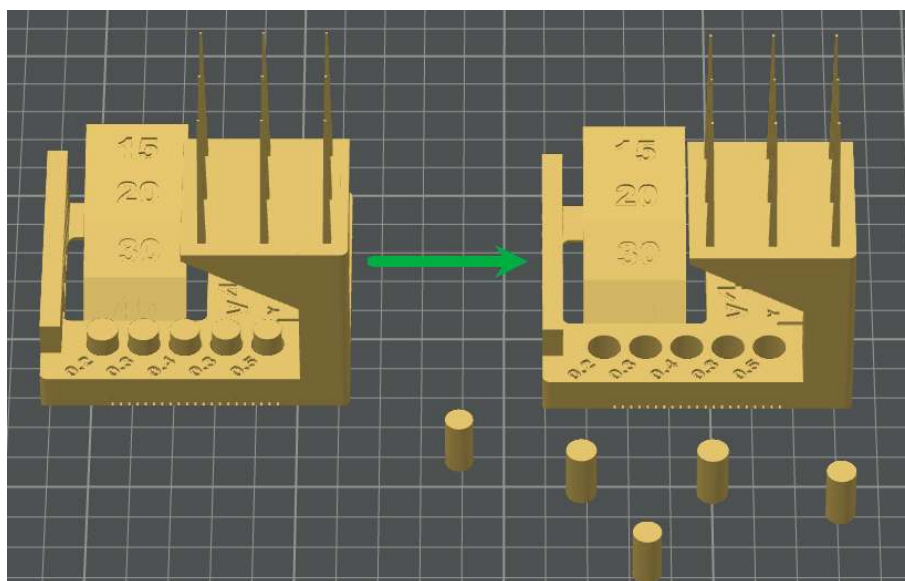
NOTE

When multiple objects are selected, assembly is supported only along the **X** and **Y** axes.

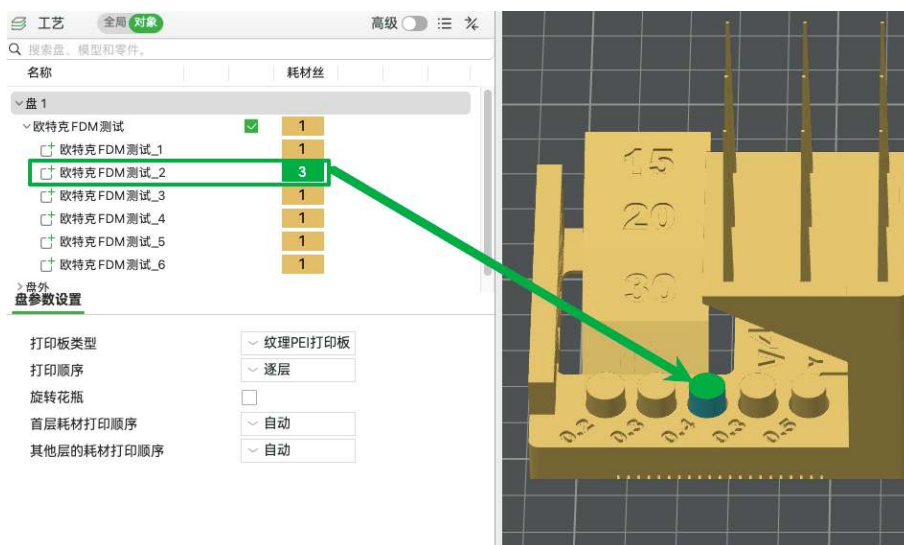
To assemble along the **Z** axis, first select the objects, right-click and choose **Merge**, then perform **Assemble**.

Split to Objects

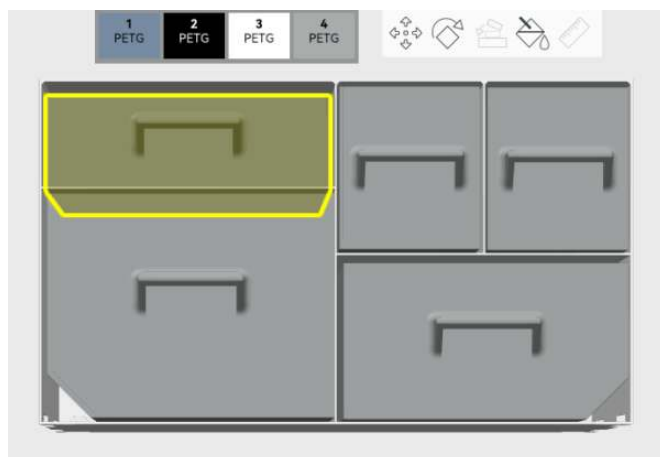
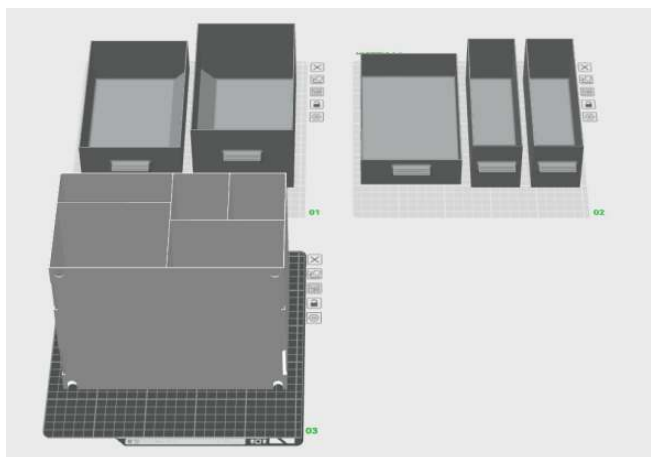
Split 1 object into multiple independent objects. Use this when the model is too large to print or when you need to set different parameters for different parts.

**Split to Parts**

Keeps the object intact while converting its sections into separate parts, allowing separate filament color settings for each part.

**Assembly View**

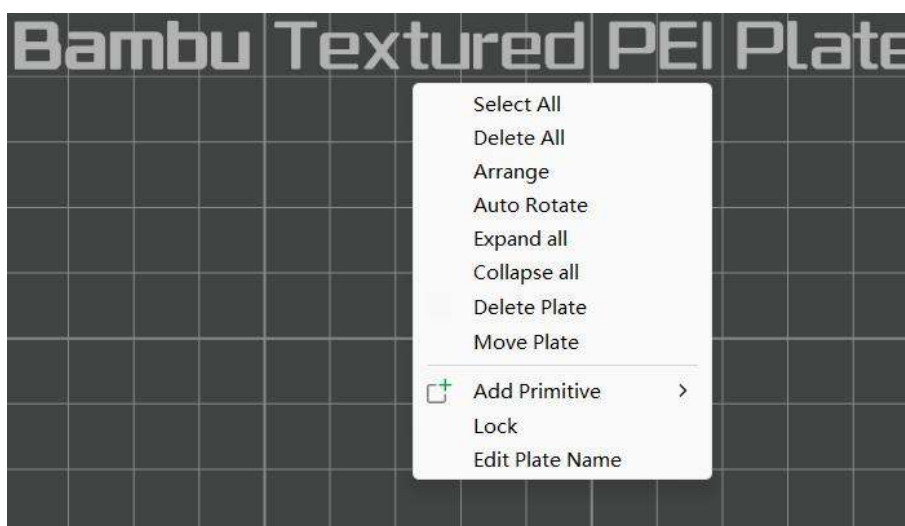
View the alignment and fit of model components. This is only a preview of the assembly and does not modify the model structure.



5.3 Use the Right-Click Menu

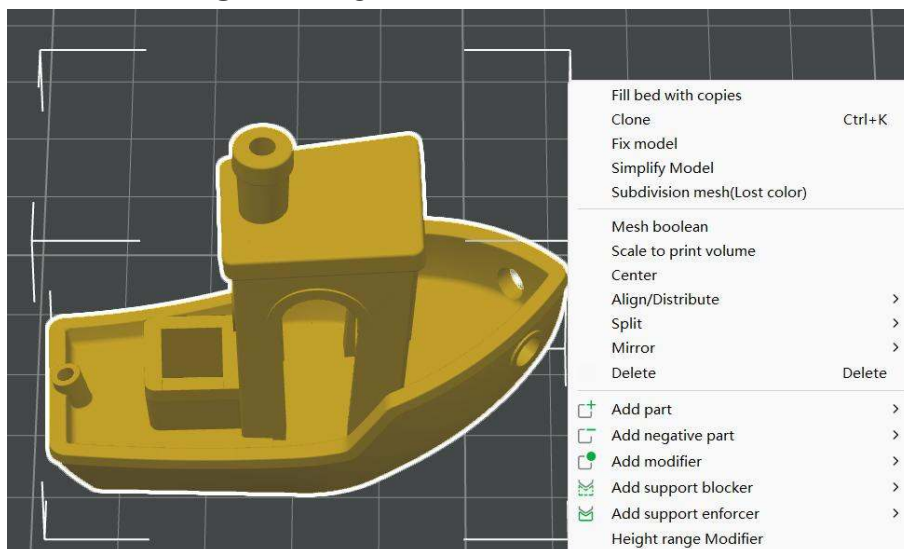
On the Prepare page, right-click in the object list or workspace to open a shortcut menu for the current selection.

5.3.1 Right-Click Plate



- **Select All:** Select all objects on the current plate.
- **Delete All:** Delete all objects on the current plate.
- **Arrange / Auto Rotate:** Automatically adjust the position and orientation of all objects on the current plate.
- **Delete Plate:** Delete the current plate. Objects on the plate will move to the off-plate area.
- **Move Plate:** Changes the number of the current plate, and its position will be updated accordingly.
- **Add Primitive:** Add a built-in standard model or import an SVG file.
- **Lock:** Locks the plate. When locked, the Arrange and Auto Orient tools are unavailable.
- **Edit Plate Name:** Change the name of the current plate.

5.3.2 Right-Click Single Object



Copy and Simplify

- **Fill bed with copies:** Automatically clone the selected object to fill the current plate.
- **Clone:** Select the number of copies and automatically arrange them on the current plate.
- **Simplify Model:** Adjust the number of triangles in the model to reduce slicing time (this may not shorten print time).

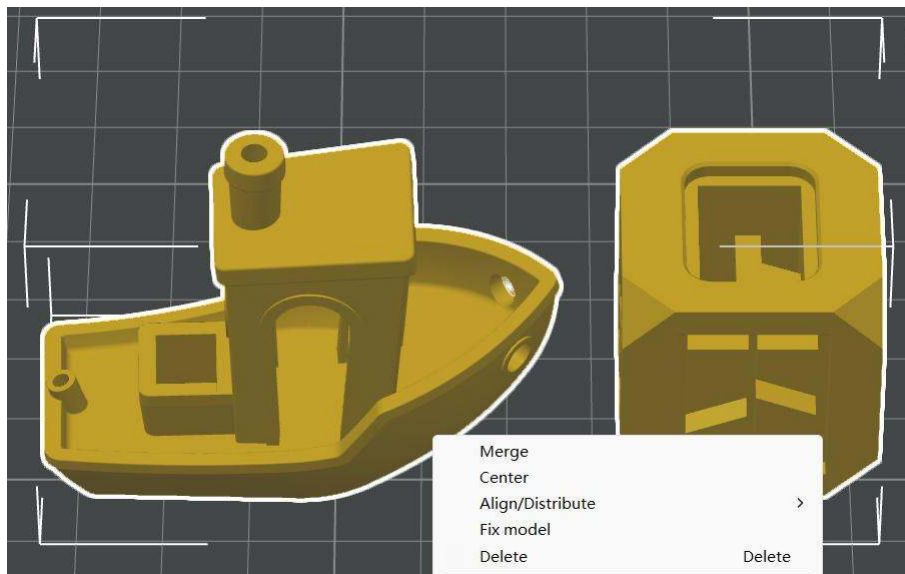
Placement and Transformation

- **Center:** Move the selected object to the center of the current plate.
- **Align/Distribute:** Adjust the alignment and distribution of parts within the selected object.
- **Split:** Divide the selected object into multiple objects or parts. For details, see [Adjust Model Structure](#).
- **Mirror:** Mirror the object along the **X / Y / Z** axis.

Local Features

- **Add part:** Add parts to the selected object.
- **Add negative part:** Subtract a specified shape from the selected object to create a hollow. Supports cubes, cylinders, spheres, cones, or custom shapes.
- **Add modifier:** Change print settings in the area where the selected object overlaps with the modifier, such as color, speed, or strength. Supports cubes, cylinders, spheres, cones, or custom shapes.
- **Add support blocker:** Prevent supports from being generated in the area where the selected object overlaps with the support blocker. Supports cubes, cylinders, spheres, cones, or custom shapes.
- **Add support enforcer:** Force supports to be generated in the area where the selected object overlaps with the support enforcer. Supports cubes, cylinders, spheres, cones, or custom shapes.
- **Height range modifier:** Change print settings for a specified height range of the object, such as color, speed, or strength.

5.3.3 Right-Click Multiple Objects



- **Merge:** Combine multiple objects into 1 object. The original objects remain as parts within the new object.
- **Center:** Move all selected objects to the center of the current plate.
- **Align/Distribute:** Adjust the alignment and distribution among the selected objects.

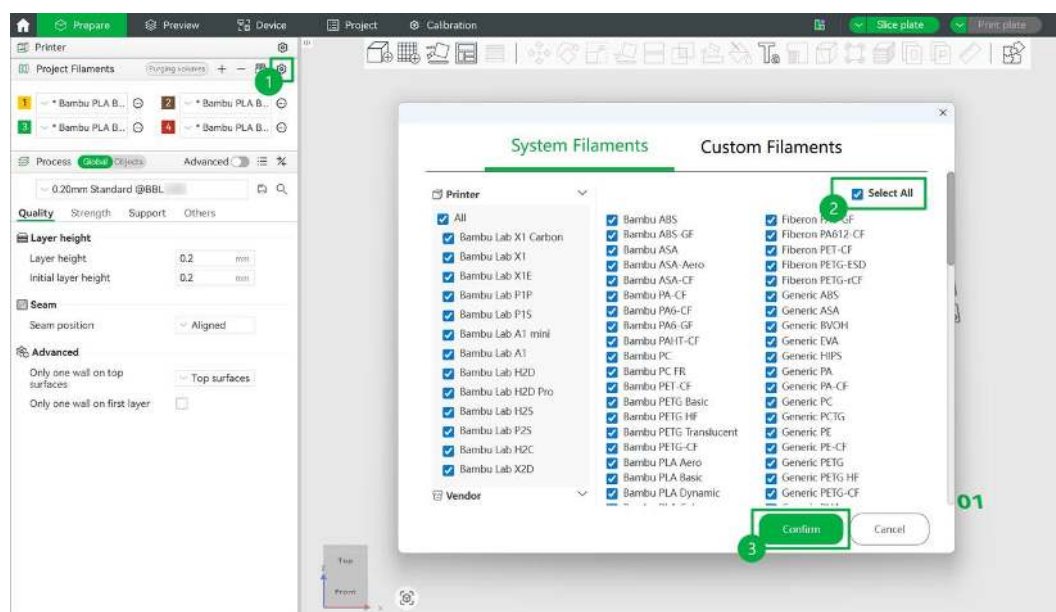
5.4 Adjust Slicing Parameters

5.4.1 Filament Presets

Filament presets include all parameters related to the filament itself during printing, such as temperature, flow rate, and cooling settings.

Use System Filament Presets

Bambu Studio features built-in official system presets, covering all official filaments and some third-party filaments. You can select all filaments with one click and use the default settings immediately.

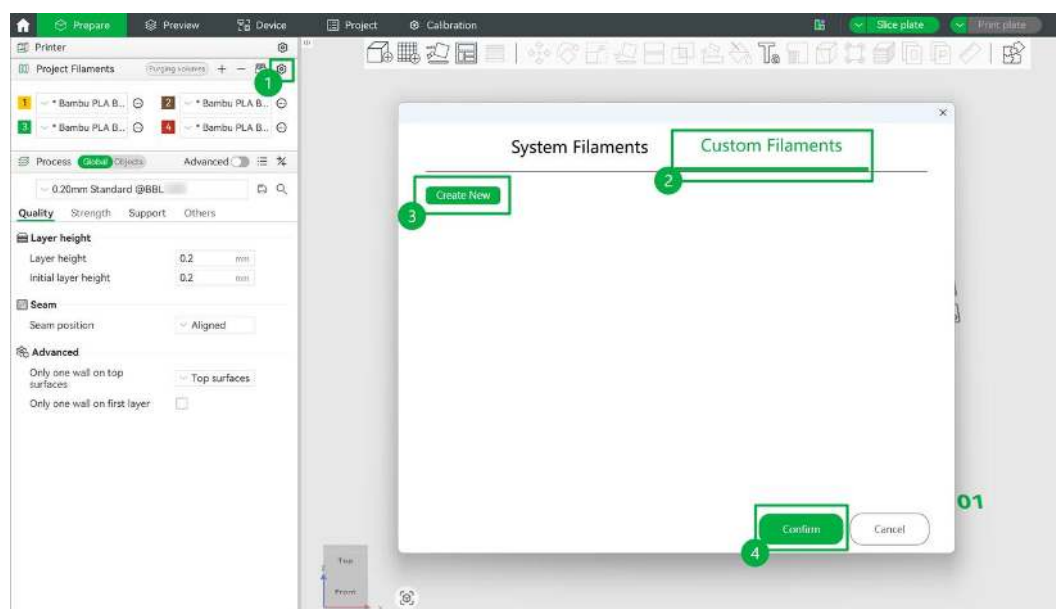


TIPS

System filament presets are pre-optimized for the printer and are recommended for new users.

Custom Filament Presets

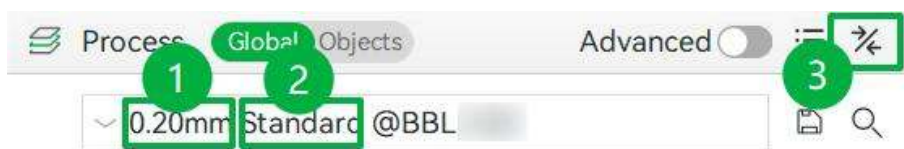
If your filament is not included in the system presets, select the corresponding Generic preset first, then fine-tune it based on the manufacturer's recommended settings and save it as a custom filament for future use.



5.4.2 Process Preset

Use Default Preset

Process presets include the main settings required for a print job, such as quality, strength, speed, and supports. You can select a system preset from the drop-down menu in the Process panel.



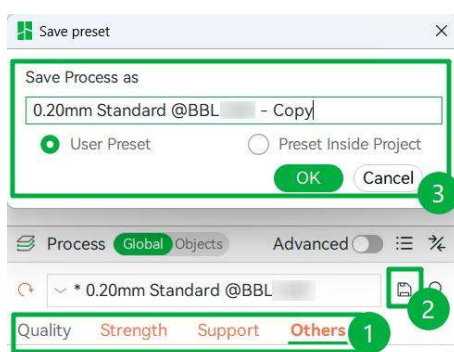
1. **Layer height:** A smaller layer height produces finer detail, but usually increases print time. The default value is **0.2 mm**.
2. **Quality level:** Presets are optimized with different priorities. Common types include:
 - Standard: Balances print quality, strength, and print time. Suitable for most models and everyday printing.
 - High quality: Lowers print speed and acceleration to improve surface quality and detail.
3. **Compare presets:** Select any two to view their settings and see the differences.

NOTE

- Beginners are advised to keep the default preset settings and avoid changing them unless necessary.
- Available presets may vary depending on the list shown in the software.

Create Custom Preset

Bambu Studio supports custom presets. For special needs, adjust parameters and save as a new process preset for future use.



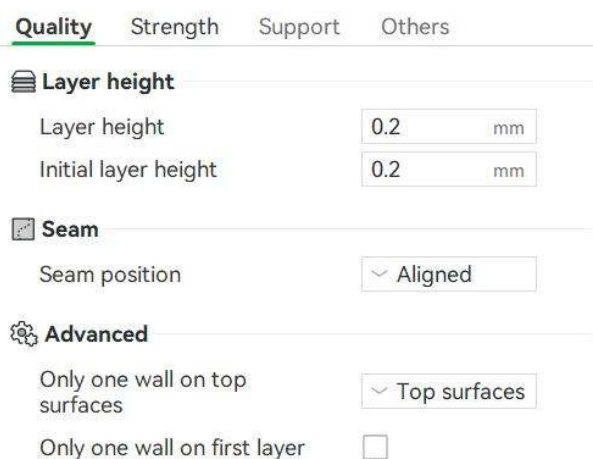
5.4.3 Quality Settings

Quality settings affect the model's **detail, surface smoothness, and overall appearance**. The system process presets are optimized for most scenarios to provide a good balance between print quality and print time.

For models with higher appearance requirements, such as curved, sloped, or display models, adjust the relevant settings to improve surface finish. If print speed matters more, reduce the level of detail accordingly.

TIPS

Quality settings are interrelated, and changing one setting in isolation may affect the overall result. Use the default settings unless you have specific requirements.



Quality Strength Support Others

Layer height

Layer height 0.2 mm

Initial layer height 0.2 mm

Seam

Seam position ▾ Aligned

Advanced

Only one wall on top surfaces ▾ Top surfaces

Only one wall on first layer ☐

5.4.4 Strength Settings

Print strength determines the model's **sturdiness, durability, and load-bearing capacity**. It is mainly affected by wall thickness and the internal structure, such as infill.

The system process presets provide balanced strength settings for common use cases, helping ensure reliable model structure while maintaining print efficiency.

For functional or load-bearing parts, you can increase strength-related settings as needed. For display-only models, no extra reinforcement is required.

TIPS

Increasing model strength usually uses more filament and extends print time. Adjust the settings based on the intended use.

Quality
Strength
Support
Others

Walls

Wall loops
2

Embedding the wall into the infill
☐

Top/bottom shells

Top surface pattern
Monotoni...

Top shell layers
5

Top shell thickness
1 mm

Top paint penetration layers
5

Bottom surface pattern
Monotonic

Bottom shell layers
3

Bottom shell thickness
0 mm

Bottom paint penetration layers
3

Internal solid infill pattern
Rectilinear

Sparse infill

Sparse infill density
15 %

Fill multiline
1

Sparse infill pattern
Grid

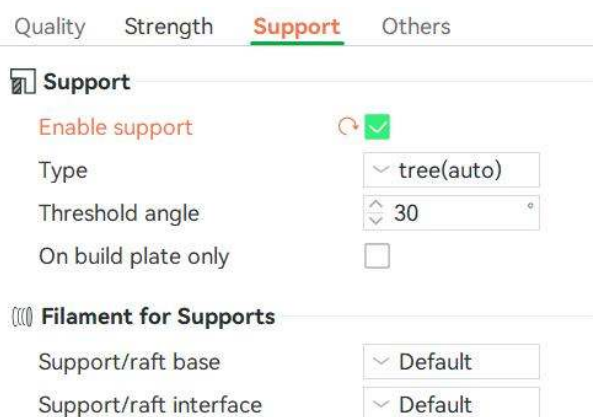
5.4.5 Support Settings

Models with overhangs, bridges, or complex structures usually require support to ensure print stability and prevent collapse during printing. Bambu Studio can automatically generate multiple support types. The default settings work well for most models and balance stability with ease of post-processing.

For models with high surface quality requirements or complex structures, you can adjust the support settings as needed to make supports easier to remove and reduce surface marks.

TIPS

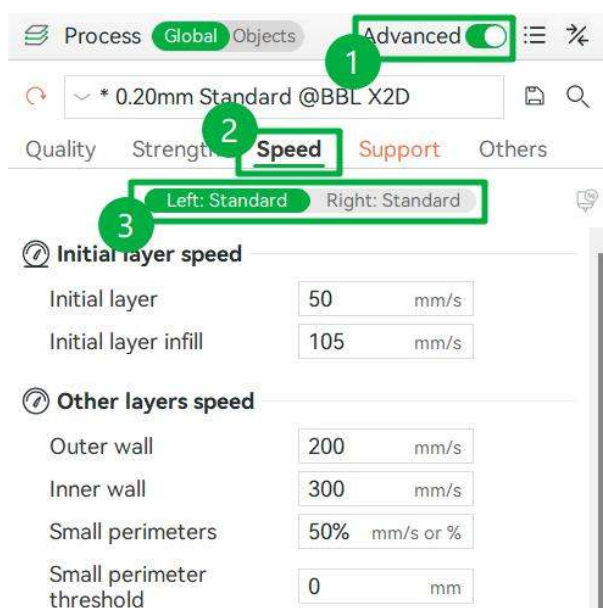
More support is not always better. Too much support increases post-processing work, so automatic support is recommended first.



5.4.6 Speed Settings

Print speed affects the **stability, surface quality, and efficiency** of the print. Speeds that are too fast can cause loss of detail or rough surfaces, while speeds that are too slow significantly increase print time.

The system process presets provide suitable default speed settings for different print tasks and work well for most scenarios.

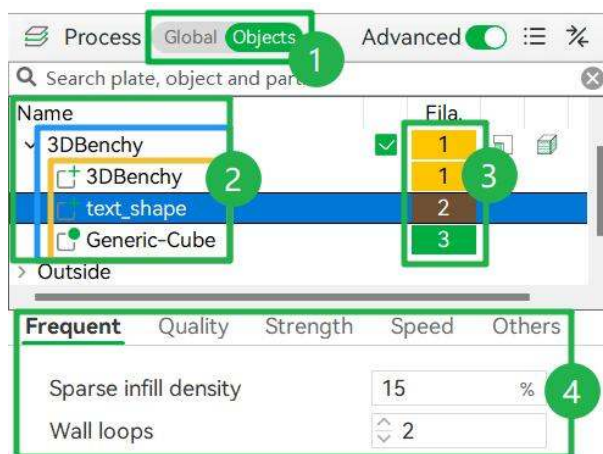


TIPS

If you are unfamiliar with the parameters, keep the default speed. To make adjustments, enable **Advanced** in the **Process** before changing them.

5.4.7 Adjust Local Parameters

Besides modifying global parameters, you can set parameters and assign filament for specific objects or local areas such as parts, negative parts, or modifiers.



Operating Steps:

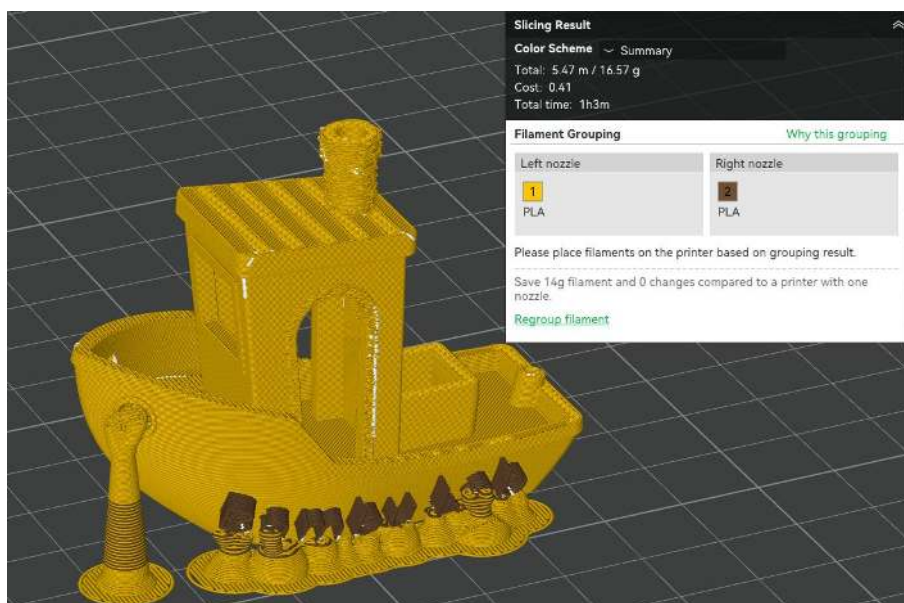
1. At the top of the process panel on the left, switch to **Objects** to access the object list.
2. Expand the list hierarchy (**Print plate** > **Objects** > **Parts / Negative Parts / Modifiers**), and select the target section to adjust.
3. Select dedicated filaments for the target section.
4. Modify its printing parameters separately in the list below.

5.5 Check Slicing Result

After slicing, the system automatically switches to the preview page. To ensure successful printing and avoid waste, review the following before starting the print job.

5.5.1 Print Summary

View a summary of the current print job in the slicing results panel.

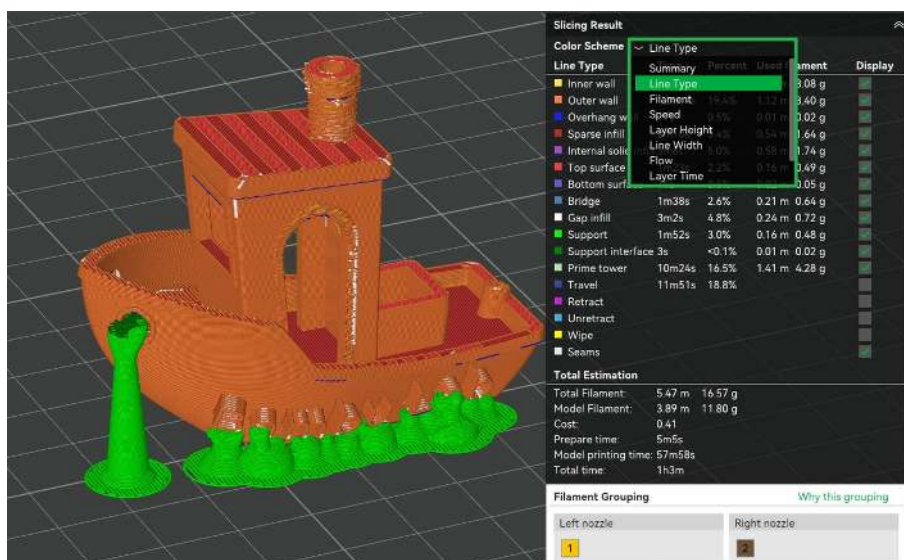


- **Filament Usage:** The estimated filament length and weight required to print the model.
- **Cost Estimate:** The estimated print cost, calculated automatically based on the **Price** in the filament settings.

- **Print Time:** The estimated total time required to complete the print.
- **Filament Grouping:** Check the filament-to-nozzle mapping and confirm the actual filament placement. If needed, click **Regroup filament**. For details, see [Select Filament Grouping Mode](#).

5.5.2 Color Scheme

Use the dropdown menu to check slicing information by different dimensions.

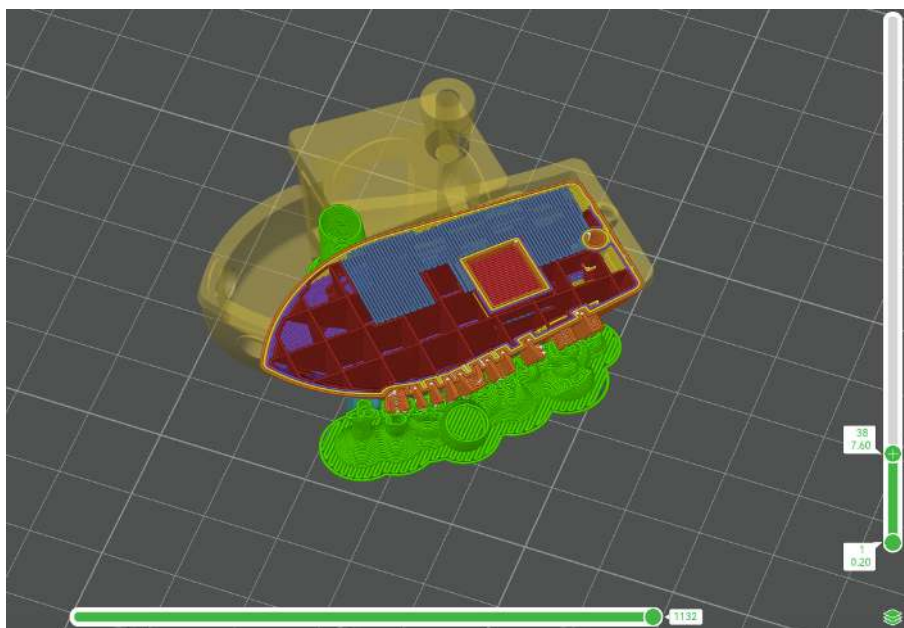


We recommend checking the following information:

- **Line Type:** Check the distribution of supports, outer walls, and infill, with particular attention to where supports are generated.
- **Speed:** Observe the toolhead speed at different locations to identify abrupt speed changes.
- **Layer Height:** Check the effect of variable layer height settings and observe whether the transitions are smooth.
- **Flow:** Observe whether the filament extrusion volume is evenly distributed.
- **Layer Time:** Identify areas with short cooling times (such as tips) to prevent overheating and deformation.

5.5.3 Print Path

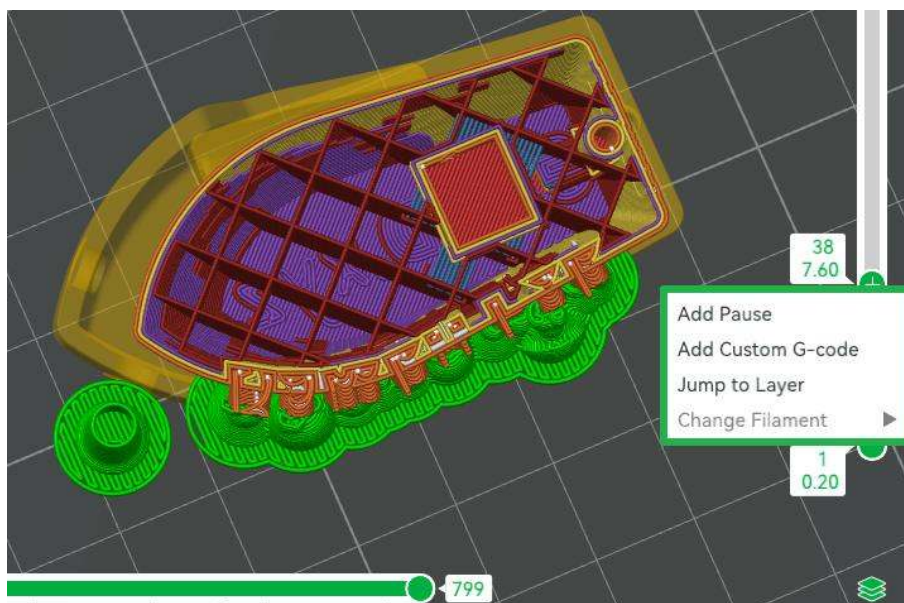
Use the sliders on the right and bottom of the preview page for detailed inspection:



- **Vertical Slider:** Drag vertically to view the stack of each layer and check internal fill structure or overhangs.
- **Horizontal Slider:** Simulate the exact toolhead movement on the current layer and verify the start and end points.

5.5.4 Layer Settings

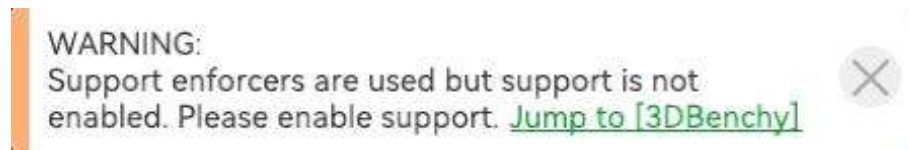
Right-click the + button on the vertical slider to customize the current layer:



- **Add Pause:** Pause printing before the selected layer and requires manual resumption. This can be used to embed materials such as magnets into the model.
- **Add Custom G-code:** Add custom G-code at the selected layer to activate various personalized functions.
- **Jump to Layer:** Enter a specific layer number to jump precisely to that layer.
- **Change Filament:** Change the filament at the selected layer. This feature requires using AMS.

5.5.5 Warnings and Tips

If the software detects a potential issue, such as the model not touching the build plate, an excessive overhang angle, or missing supports, a yellow warning icon appears next to the Slice button.



⚠ CAUTION

Before printing, always expand the warning details to check whether you need to reposition the model or enable supports.

Chapter 6 Key Features Introduction

6.1 Dual Extrusion System

The X2D features an innovative dual extrusion system. The main extruder handles near-range extrusion, while the auxiliary extruder manages remote extrusion, balancing print precision and filament feed stability.

The main extruder is installed in the toolhead. It handles extrusion for the main hotend filament and provides responsive flow control, making it a key component for print quality.

The auxiliary extruder is mounted at the top of the printer's rear panel. It handles remote extrusion for the auxiliary hotend filament, overcoming friction from the long path to ensure stable filament delivery.

With the integrated remote extrusion solution, the X2D offers the following key advantages:

- Smarter structure: Only the main extruder is installed in the toolhead, while the auxiliary extruder is mounted separately at the top of the rear panel. This gives the printer a more efficient structure and maintains a 256 × 256 mm build volume without increasing the overall printer size.
- Lighter motion: Separating the auxiliary extruder from the toolhead effectively reduces the toolhead's size and weight, improving its motion agility.
- More efficient printing: When printing multi-color models or support structures, the dual extrusion system significantly improves filament change efficiency and reduces filament waste.

6.2 Dual Hotends Printing

The printer features dual hotends that quickly switch filaments within the same print job. This enhances the model's appearance and functionality while significantly reducing print time.

6.2.1 Printable Area

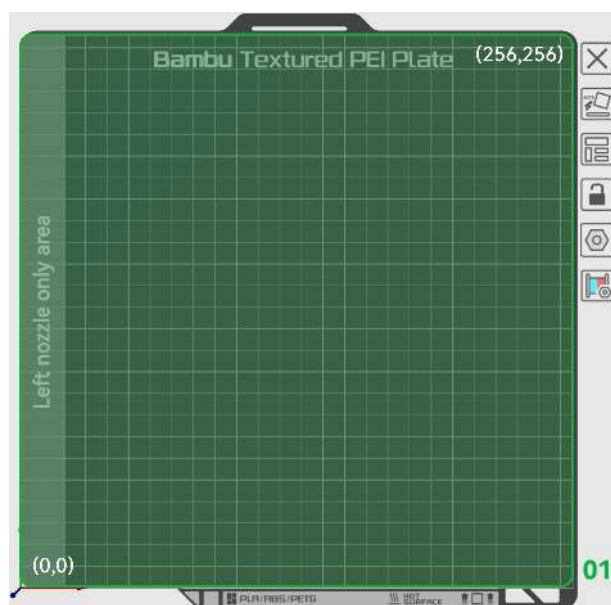
Because the printer has dual hotends, the printable areas of the two hotends differ slightly due to the machine's structure.

Horizontal Printing Area

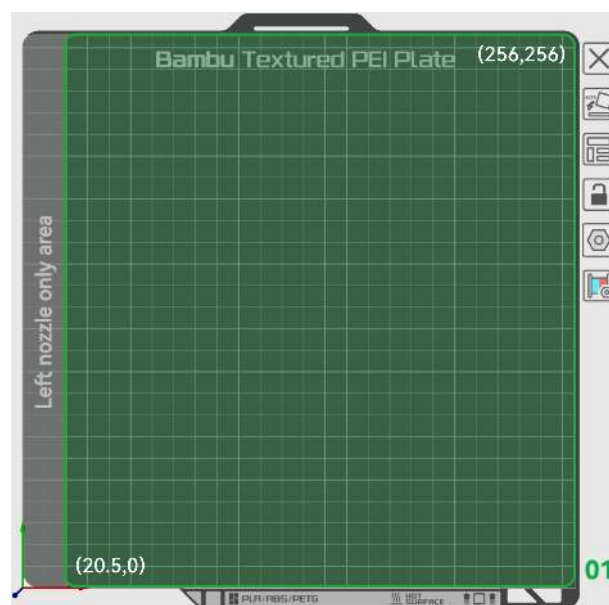
The printer's maximum build volume is 256×256 mm, but the two hotends have different maximum printable areas:

Main hotend: 256×256 mm

Auxiliary hotend: 235.5×256 mm



Main hotend printable area



Auxiliary hotend printable area

In the Prepare page of Bambu Studio, there is a light gray area on the left side of the plate marked “Left nozzle only area”. This means that objects placed in this area can only be printed with the main hotend.

Vertical Printing Area

The printer's maximum print height is 260 mm, but the two hotends have different maximum printable heights:

- Main hotend: 260 mm
- Auxiliary hotend: 256 mm

The model height must be ≤ 260 mm and must not exceed the maximum print height of the main hotend.

If the model is taller than 256 mm, such as 258 mm, it can only be printed by the main hotend, even if it is placed in the shared middle area covered by both hotends.

Check Model Placement

When a model is placed in the auxiliary hotend's **non-printable area**, all filaments* used by this model can only be printed using the main hotend.

NOTE

All filaments include the main filament set in the system, filaments applied to specific surface areas using the color painting tool, and filaments assigned to local model areas using modifiers.

When Bambu Studio detects a conflict between model placement and the printable area, an error message appears. Adjust the model position or filament position before slicing and printing. Common causes include:

- **Model too tall:** The overall model height exceeds 260 mm.
- **Auxiliary hotend and filament position conflict:** Filament is assigned to the auxiliary hotend in Custom mode, but the corresponding model position is outside the auxiliary hotend's printable area.
- **Auxiliary hotend and height limit conflict:** Filament is assigned to the auxiliary hotend in Custom mode, but the model height exceeds 256 mm.
- **Some filament paths exceed auxiliary hotend's printable area:** After using color painting or modifier functions, some filament paths extend beyond the auxiliary hotend's printable area.
- **Purge path extends beyond auxiliary hotend's printable area:** When the Flush into objects' infill/support function is enabled, slicing detects that the purge path exceeds the auxiliary hotend's printable area.

6.2.2 Multi-Material Support Printing

Multi-material support printing uses two different filaments to print the model body and supports separately. By taking advantage of the incompatibility between materials, it makes supports easier to remove and significantly improves the model's surface finish.

⚠ CAUTION

- Use fully dried filament. For detailed steps, see [Filament Drying](#).
- We recommend using dedicated support materials, such as **Support for XXX**. If using regular materials to support each other, apply the recommended software settings.

i TIPS

You can visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "printing guide for support" to get detailed filament combinations, operation instructions, preset profiles, and slicing parameter settings.

🔧 NOTE

It is recommended to choose **Filament-Saving Mode** or **Quality Mode** for filament grouping. For details, see [Select Filament Grouping Mode](#).

6.2.3 Select Filament Grouping Mode

Bambu Studio intelligently assigns suitable nozzles and print orders based on the required filament number, the purge volume of different print sequences, and the physical properties of the hotends. It provides 4 filament grouping modes: Filament-Saving, Convenience, Quality, and Custom. Filament-Saving mode is enabled by default and does not need to be turned on manually.

To switch the grouping mode, use one of the following methods:

Method 1: Hover over the Slice button and select the desired mode from the pop-up window.

Method 2: Click the  on the right side of the plate to view and set the filament grouping mode for the plate.



☒ Filament-Saving Mode

Generates filament grouping for the left and right nozzles based on the most filament-saving principles to minimize waste

☐ Convenience Mode

Generates filament grouping for the left and right nozzles based on the printer's actual filament status, reducing the need for manual filament adjustment

☐ Quality Mode

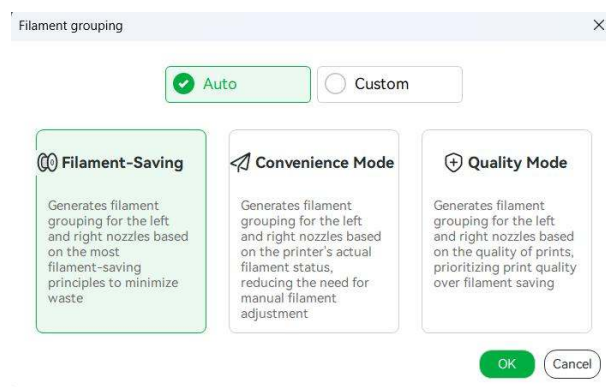
Generates filament grouping for the left and right nozzles based on quality optimization principles

☐ Custom Mode

Manually assign filament to the left or right nozzle

[Video tutorial](#)

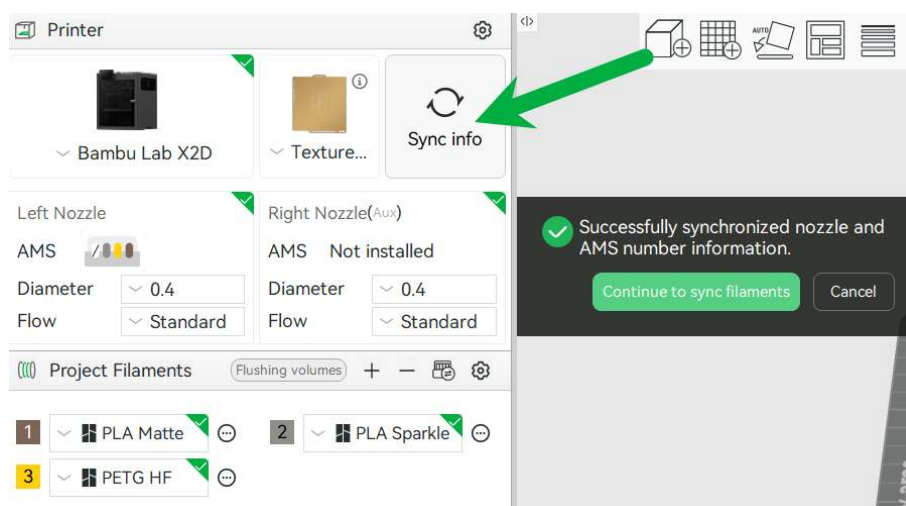
[Learn more](#)



Filament-Saving Mode

Filament-Saving Mode aims to minimize filament waste caused by purging during filament changes. It assigns filaments to different hotends when they frequently appear on the same layers or require a large purge volume during filament changes.

Before using this mode, it is recommended to manually set or sync the AMS-to-hotend pairing so that filament grouping matches the actual filament placement. If the printer is not connected to an AMS, each hotend defaults to connecting to an external filament spool.



After slicing, each filament is bound to a specific nozzle. When sending the print job, the printer cannot switch to another nozzle even if it has a filament with a closer color match. If you want to save filament while achieving a better color match, manually adjust the filament placement based on the grouping result.

To enable fully automatic printing in filament-saving mode, you can purchase the filament track switch separately. This accessory supports flexible mapping between AMS units and two hotends, allowing filaments in an AMS to be delivered to either target hotend and greatly reducing manual intervention. For details, see [Filament Track Switch](#).

 NOTE

Filament-Saving Mode considers only the amount of filament saved from reduced purging. In some cases, it may result in more filament changes than Convenience Mode or Custom Mode, which is normal.

Convenience Mode

Convenience Mode groups filaments based on their actual placement in AMS, typically requiring no additional adjustments. It suits scenarios where frequent manual AMS adjustments are inconvenient.

Before using this mode, ensure the printer is connected. To ensure accurate filament matching, it is recommended to sync the AMS information in the filament list before slicing so the software data matches the actual filament placement.

 NOTE

This mode is easy to operate but may consume more filament than the filament-saving mode.

Quality Mode

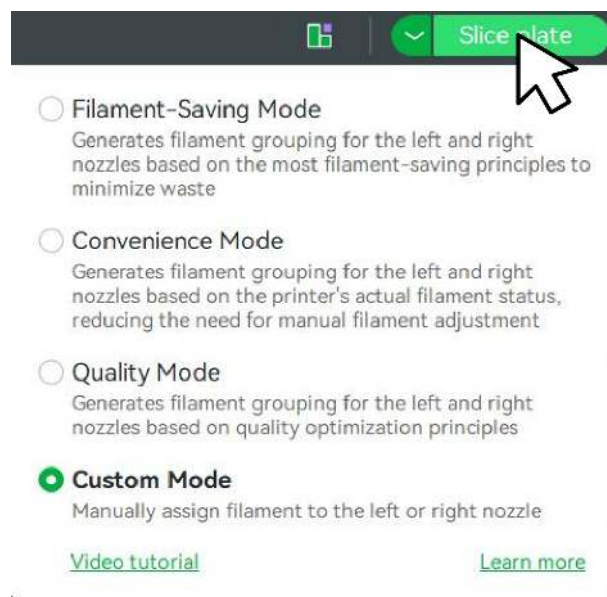
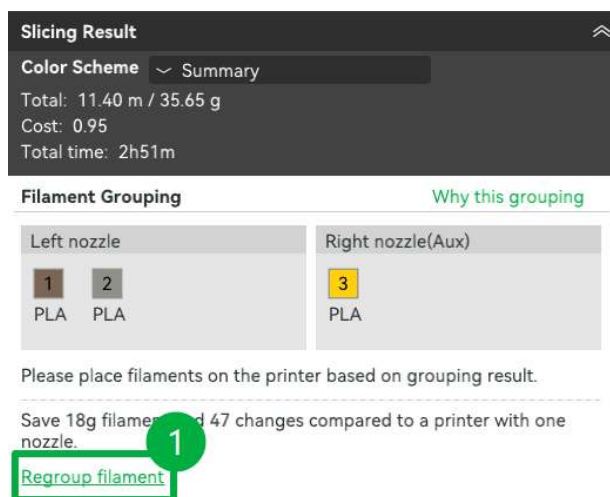
Quality mode focuses on overall print quality, prioritizing dimensional accuracy and surface finish.

When using a different filament for the **support or raft interface**, this mode assigns the auxiliary hotend to print the support interface and the main hotend to print the model body, improving print quality. See [Multi-Material Support Printing](#) for details.

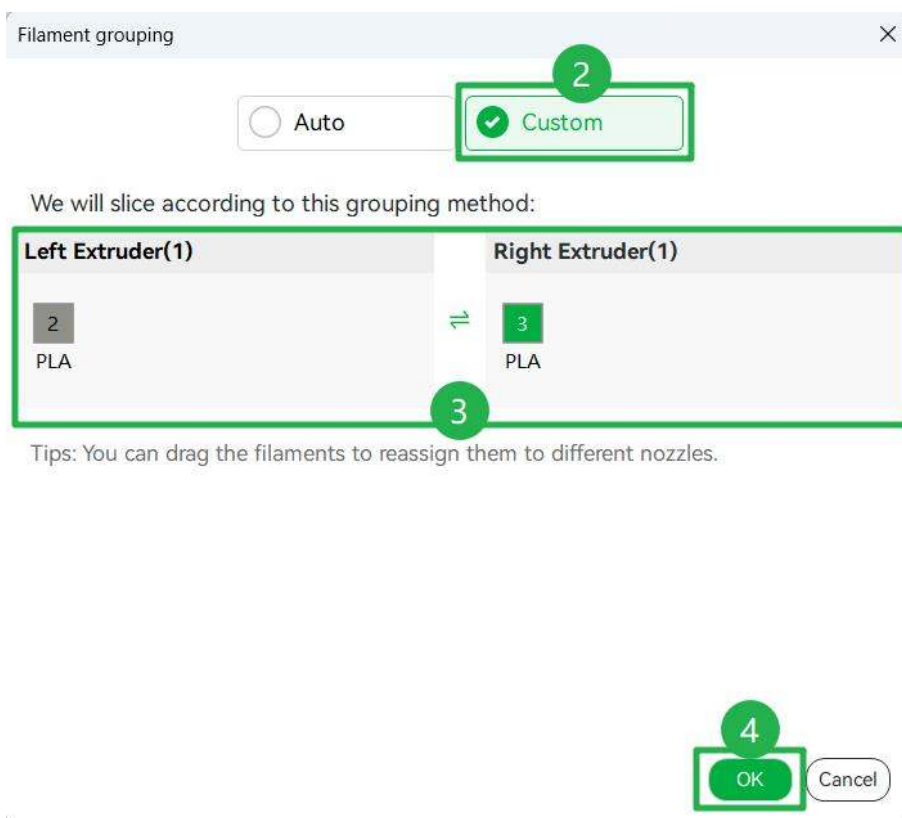
Custom Mode

In Custom Mode, you can freely adjust the filament-to-nozzle mapping as needed. This mode is suitable when none of the other three modes meet your printing requirements. Follow these steps:

1. Select Custom Mode.
 - In the Preview page, click **Regroup filament** in the slicing result panel.
 - In the Prepare page, hover over the slice button, select **Custom Mode** from the pop-up window, then click **Slice Plate**.



2. Select **Custom** in the pop-up window
3. Drag the filament to your target nozzle.
4. Click **OK**, and Bambu Studio will recalculate the slicing results based on your adjustments.



5. After slicing, the system will display how much filament could be saved by using the filament-saving mode compared to your manual grouping. This helps you decide whether to optimize the grouping.

Select Slicing Mode

To apply the same filament grouping mode to all build plates, select a grouping mode and click **Slice all**. All plates will use the same grouping strategy, and the original plate settings will be overwritten.

To set filament grouping modes individually for each plate, configure the filament grouping for a single plate, then click **Slice plate**.

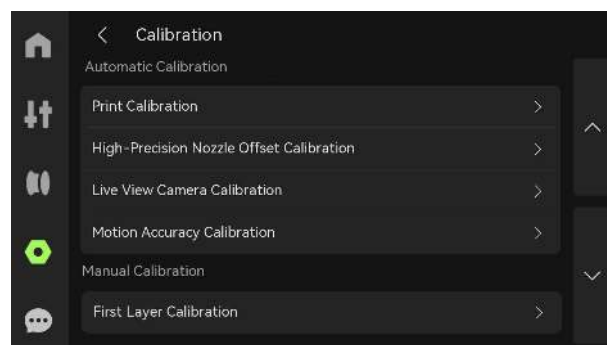
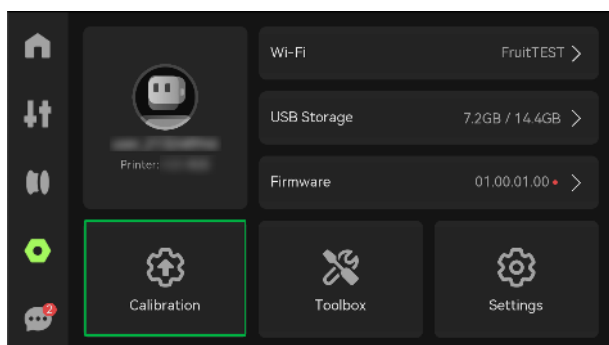


6.3 High Precision Printing

6.3.1 Start Calibration

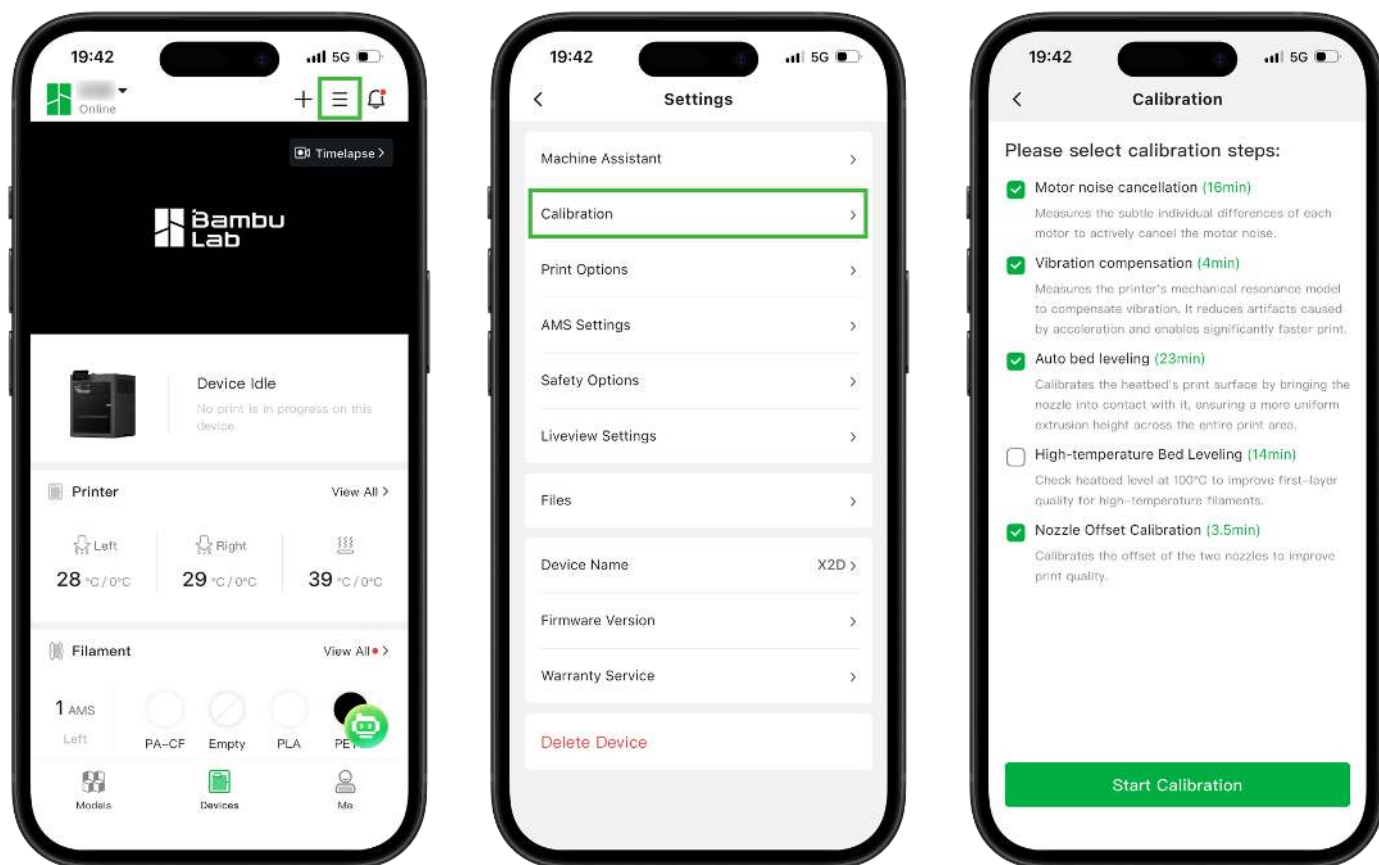
Method 1: Start calibration from the printer screen

Tap  > **Calibration** on the printer screen to enter the calibration page, then select the desired calibration.



Method 2: Start calibration from Bambu Handy

Go to **Devices** page in Bambu Handy, tap the icon in the top-right corner  > **Calibration**, then choose the calibration task.

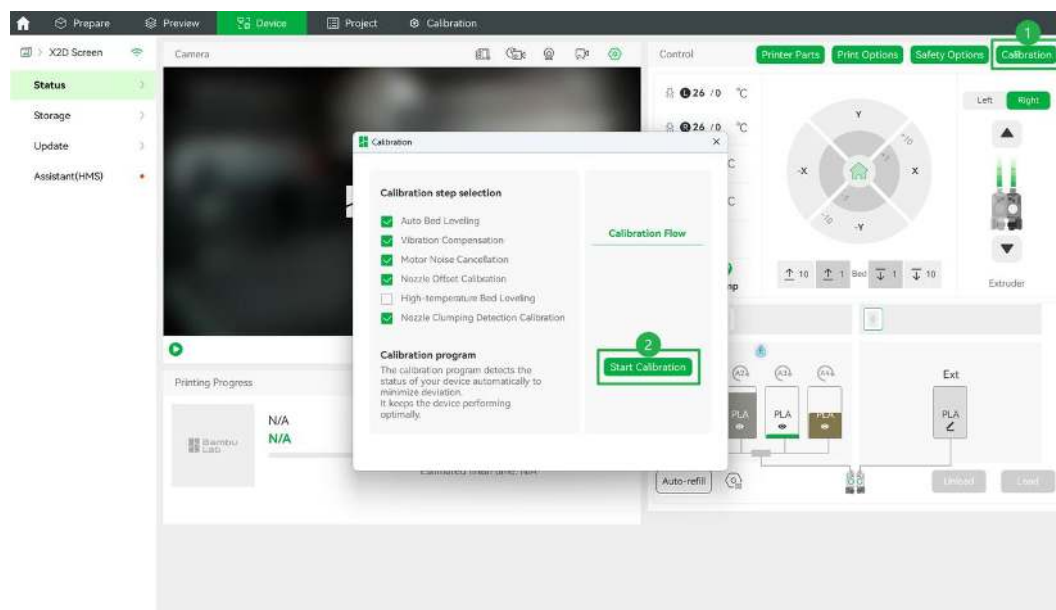


⚠ CAUTION

Bambu Handy supports only some calibration tasks. For others, start calibration from the printer screen.

Method 3: Start calibration from Bambu Studio

At the top of the Bambu Studio interface, select **Device**, click **Calibration** in the top-right corner, and choose the calibration task as needed.



6.3.2 Print Calibration

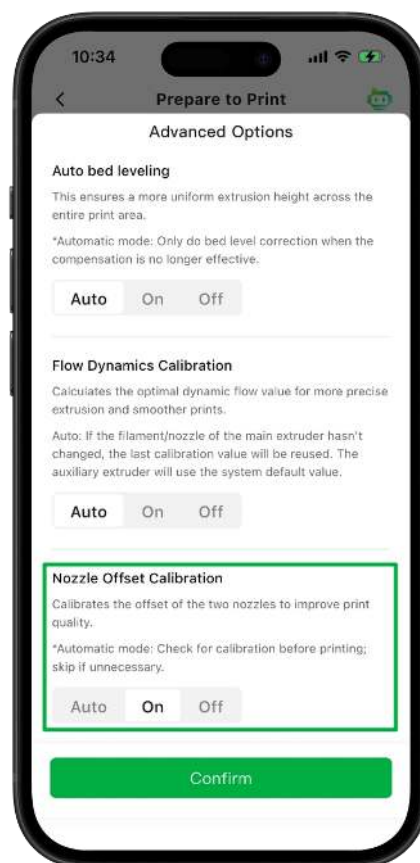
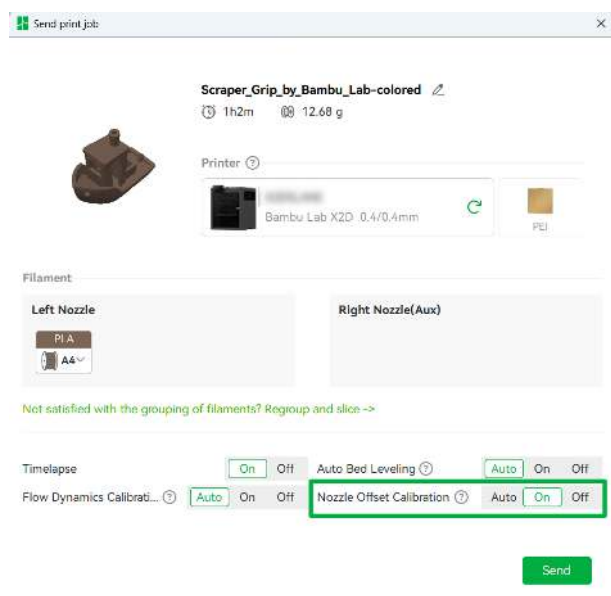
Print Calibration automatically adjusts key printer settings using built-in sensors to ensure optimal print conditions.

- **Motor Noise Cancellation:** Reduces motor noise to improve print surface quality.
- **Vibration Compensation:** Detects and compensates for vibration during printing to reduce acceleration artifacts and increase print speed.
- **Auto Bed Leveling:** Detects heatbed flatness by touching the nozzle to the build plate, ensuring more consistent first-layer extrusion.
- **High-temperature Bed Leveling:** Measures the flatness of the heatbed at 100 °C to improve the first-layer print quality for high-temperature filaments such as ABS, ASA, PC, and PA.
- **Nozzle Offset Calibration:** Calibrates the XYZ position offset between the two nozzles to prevent model misalignment when switching nozzles.

How to use nozzle offset calibration data?

Method 1: Enable nozzle offset calibration on the Send Print Job page in Bambu Studio.

Method 2: On the Prepare to print page in Bambu Handy, enable nozzle offset calibration in **Advanced Options**.



When is print calibration required?

- Before the first print on a new printer.
- After the printer experiences a severe collision, is moved, or is disassembled and reassembled.
- After adjusting the belt tensioner.
- When print quality issues occur.
- As part of routine maintenance.

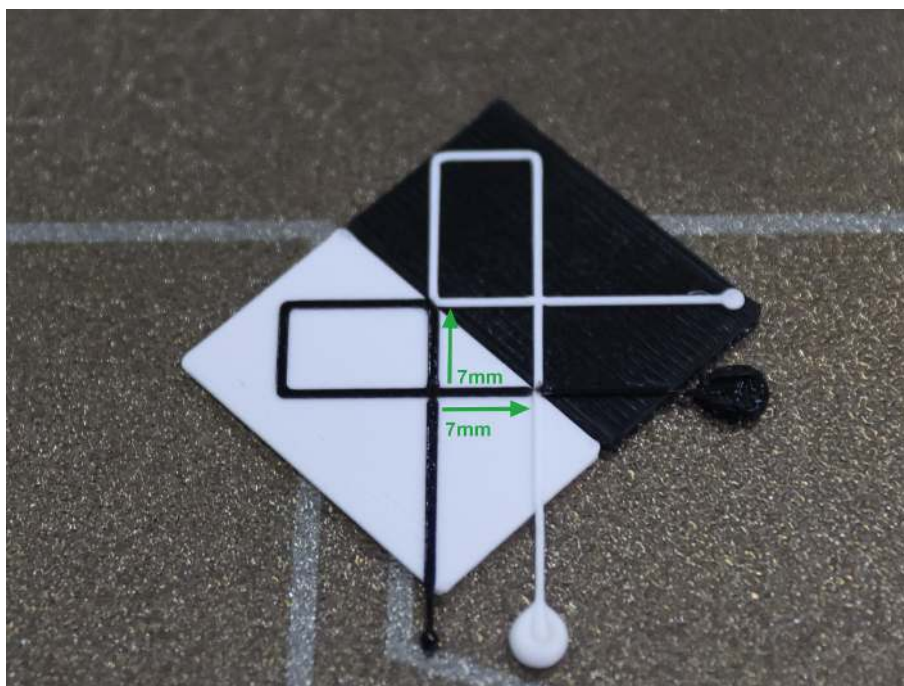
6.3.3 High-Precision Nozzle Offset Calibration

Precisely calibrates the XY position offset between the two nozzles to ensure print paths align correctly when switching nozzles, improving surface quality and layer alignment.

Using AI vision recognition, the printer detects the actual printed line positions from both nozzles, calculates the XY offset, and automatically compensates during printing.

Compared with nozzle offset calibration, this method calculates the offset based on actual printed lines for higher positioning accuracy.

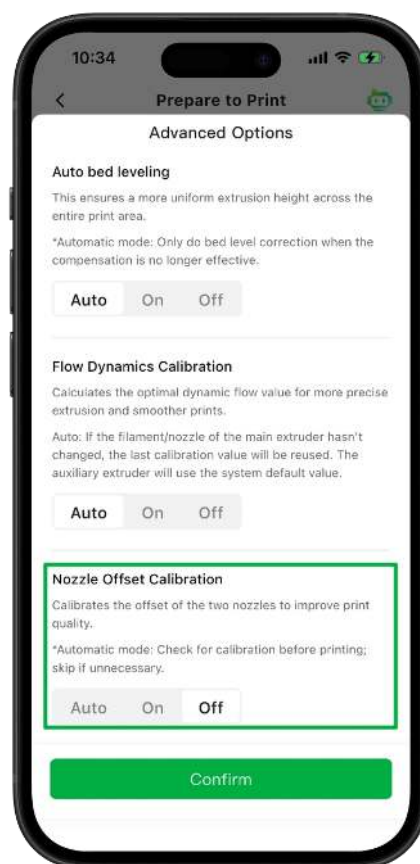
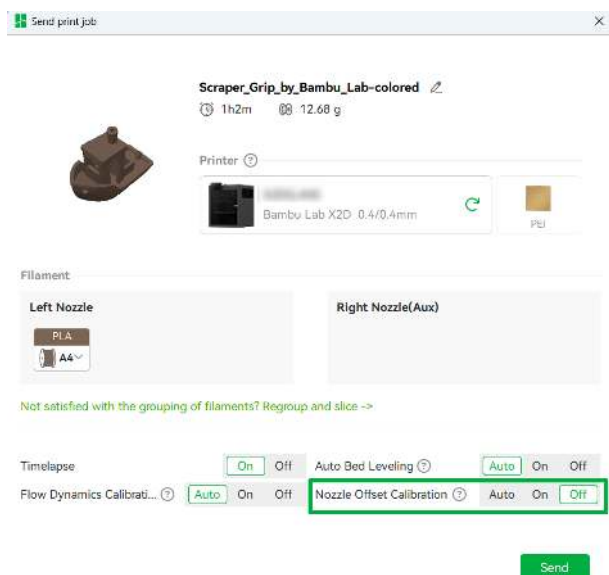
On the printer screen, select  > **Calibration** > **High-Precision Nozzle Offset Calibration**, then tap **Start**.



How to use high-precision nozzle offset calibration data?

Method 1: On the Send Print Job window in Bambu Studio, turn off nozzle offset calibration.

Method 2: On the Prepare to print page in Bambu Handy, turn off nozzle offset calibration in **Advanced Options**.



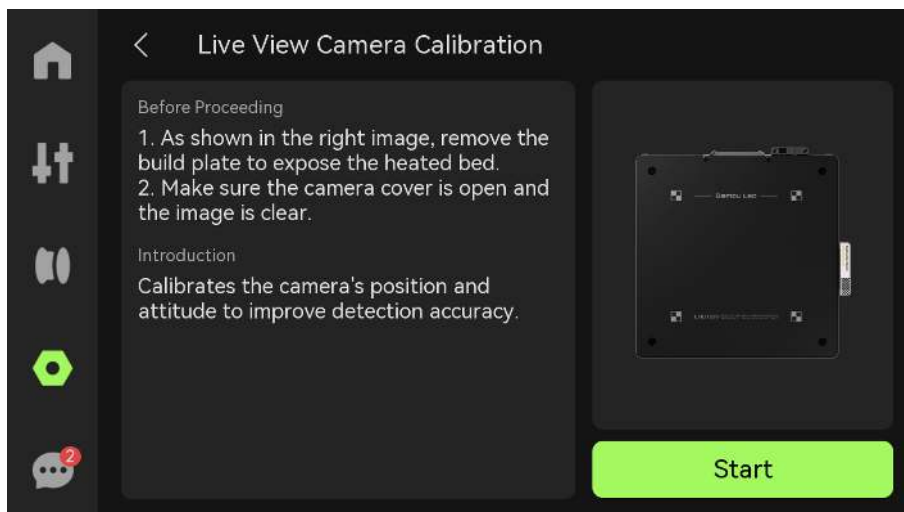
When is nozzle offset calibration needed?

Run nozzle offset calibration when noticeable layer shifts occur during dual-nozzle printing. Choose either nozzle offset calibration or high-precision nozzle offset calibration as needed.

6.3.4 Live View Camera Calibration

After replacing the live camera, calibrate it to ensure accurate visual AI detection results.

On the printer screen, select  > **Calibration** > **Live View Camera Calibration**, then tap **Start**.



NOTE

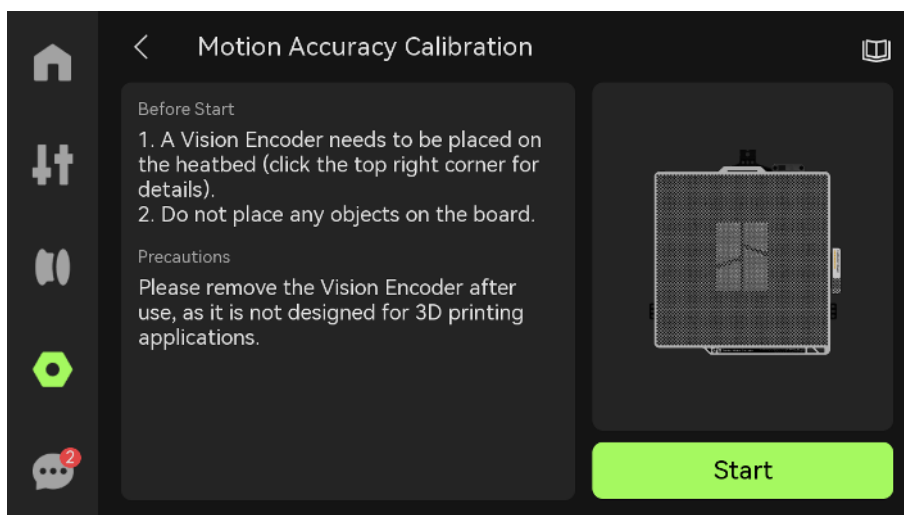
The printer is calibrated before shipment, so live camera calibration is usually not required during normal use.

6.3.5 Motion Accuracy Calibration

Improves printer positioning accuracy for large-format or high-precision prints. After calibration, motion lag and distortion are reduced, improving dimensional accuracy and assembly fit.

During calibration, the toolhead camera scans the pattern on the vision encoder to obtain the actual coordinates. The system compares the actual coordinates with the theoretical coordinates, calculates and compensates for motion errors, and generates corrected high-precision motion coordinates.

The calibration result remains stable. Frequent calibration is not required unless there are assembly changes or damage, and the result is not affected by filament or hotend changes.

**NOTE**

This is an advanced add-on feature and requires the vision encoder, which is sold separately.

CAUTION

Do not place the vision encoder on the heatbed while it is hot, as thermal expansion or deformation may cause calibration errors.

How to use motion accuracy calibration data?

On the printer screen, tap > **Settings** > **Print Options**, and select Motion Accuracy Enhancement. This option is enabled by default.

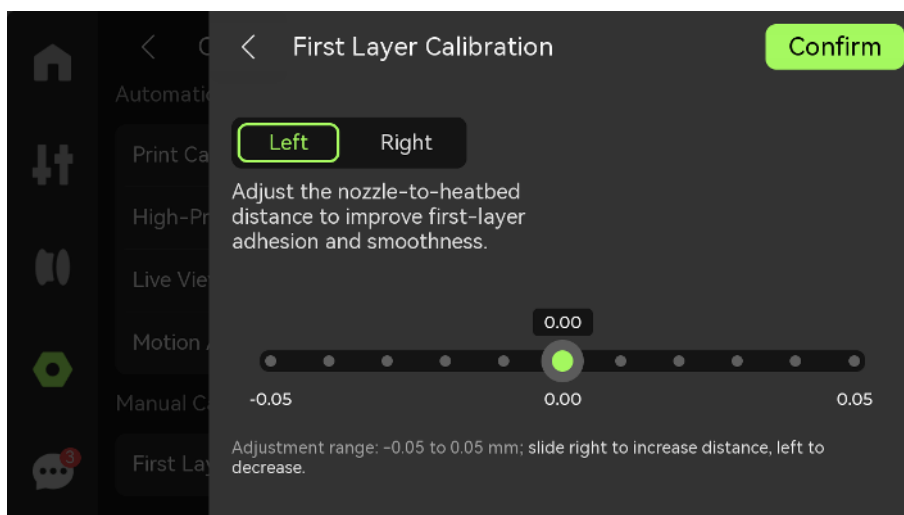
When is motion accuracy calibration needed?

- When enabling Motion Accuracy Enhancement for the first time on a new printer.
- After the printer experiences a severe collision, is moved, or is disassembled and reassembled.
- After adjusting the belt tensioner.
- As part of routine maintenance. We recommend running it every two weeks.

6.3.6 First Layer Calibration

Fine-tune the distance between the nozzle and heatbed during first layer printing to fix poor adhesion and uneven surfaces caused by the first layer being too high or too low.

On the printer screen, go to > **Calibration** > **First Layer Calibration**. Select the hotend, then slide to adjust the distance between the nozzle and the heatbed.



⚠ CAUTION

If you encounter first layer quality issues, first try the solutions under [First Layer Issues](#). If problems persist, perform first layer calibration.

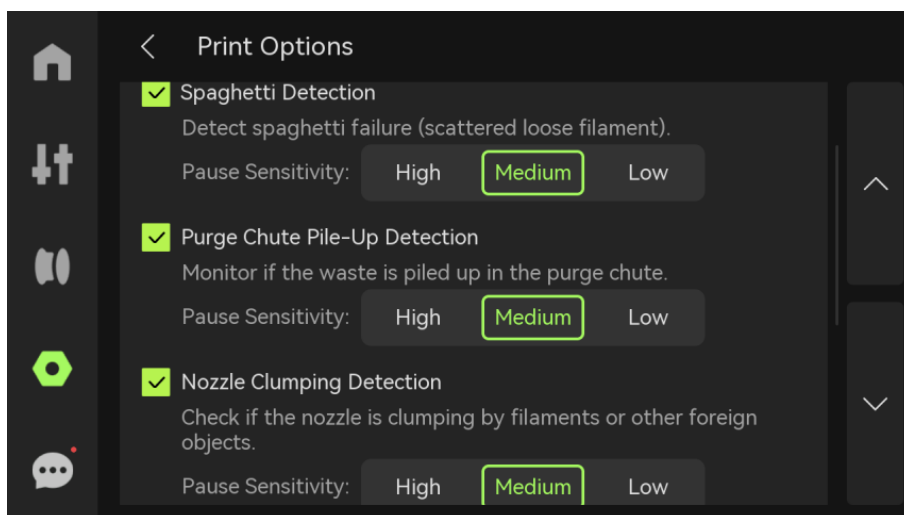
This function meets differentiated tuning needs in specific scenarios. It is generally unnecessary and should be used only when needed.

6.4 Intelligent Detection

This printer is equipped with multiple intelligent detection features that can automatically identify issues such as nozzle clogs, air printing, or material buildup during printing and provide timely alerts. This helps improve print success rates while reducing material waste and the risk of equipment damage. The entire detection process is fully automated, making printing more reliable and worry-free.

6.4.1 Enable Intelligent Detection

- On the printer screen, tap > **Settings** > **Print Options**, then select intelligent visual detection (AI detection), and adjust the detection sensitivity.
- In Bambu Studio or Bambu Handy, go to Devices Page > Print Options to configure.



NOTE

AI detection relies on good lighting conditions. Please ensure the printer's internal LED light is turned on.

TIPS

Do not turn off the chamber light during printing once detection is enabled.

6.4.2 Live View Camera Intelligent Detection

During printing, the live view camera captures images at a fixed frequency, and the AI algorithm compares and analyzes them. If a print issue is detected, the printer automatically pauses and displays a pop-up alert.

- **Spaghetti Detection:** Triggers an alert when filament tangling or a stable blob is detected under the nozzle.

CAUTION

Spaghetti detection cannot completely prevent print failures. False alerts may occur, and detection performance may be affected when using black or dark-colored filament.

- **Purge Chute Pile-Up Detection:** Monitors the purge wiper and detects waste buildup to prevent excessive waste from causing toolhead collisions or Step Loss.
- **Nozzle Clumping Detection:** When clumping reaches a certain size, the printer usually detects it within 2 minutes, displays a pop-up alert, and pauses printing.

CAUTION

- Nozzle clumping detection cannot completely prevent print failures. False alerts may occur, and detection performance may be affected when using black filament or Ludi-crous mode.
- Nozzle clumping detection alerts are triggered only once per print job. If you ignore the alert and continue printing, no further alerts will appear.

- **Foreign Object Detection:** Captures two images at different heatbed heights to identify any foreign objects on the heatbed area.
- **Printed Part Displacement Detection:** Detects whether the printed part has collapsed or shifted.
- **Build Plate Detection:** Includes **Type Detection** and **Alignment Detection**. The printer takes photos to check whether the build plate type matches the slicing information and whether the build plate is properly placed.

CAUTION

The X2D printer comes standard with a second-generation Textured PEI Plate. To use a first-generation Textured PEI Plate, disable **Build Plate Type Detection**. After it is disabled, the system no longer automatically identifies the build plate type. Make sure the actual build plate matches the slicing settings to avoid print failures.

- **Live View Camera Obstruction and Dirt Detection:** After starting a print job, the printer automatically checks whether the camera is blocked or dirty.

TIPS

The printer performs this check automatically. No manual settings are required.

6.4.3 Toolhead Camera Intelligent Detection

The toolhead camera performs motion accuracy calibration and high-precision nozzle offset calibration. It also supports detection of build plate alignment and toolhead camera contamination.

- **Build Plate Alignment Detection:** After completing heatbed homing and build plate type recognition, the printer takes a photo of the heatbed positioning block to check if the build plate is placed correctly.
- **Toolhead Camera Contamination Detection:** Before performing calibration and detection tasks, it takes a photo of the calibration sticker on the right side of the heatbed to check its cleanliness.

6.4.4 Air Printing and Filament Tangle Detection

The printer firmware integrates air printing and filament tangle detection features. These functions work together through the filament buffer, the in-house servo motor in the main extruder, and the AMS to detect issues and send alerts.

AMS detection

During filament loading, the AMS monitors odometer wheel sensor data in real time. If the expected feed length increases but the odometer wheel count does not change, air printing is detected. If motor resistance is too high, a filament tangle or jam is detected.

Filament buffer detection

The filament buffer is located on the rear panel of the printer. When filament tangles, the orange slider moves left. The system detects the abnormal slider position and pauses printing.

Extruder motor detection

The extruder motor is located in the main extruder inside the toolhead. It detects extrusion status based on load current. Low load may indicate a thin or worn filament, causing air printing. High load may indicate filament tangle or clogging.

CAUTION

- Extruder motor detection currently supports only 0.4 mm hotends.
- Detection is unavailable when the filament flow rate is below 9.6 mm³/s.

6.5 Adaptive Airflow System

This printer is equipped with an adaptive airflow system composed of an adaptive airflow switching unit, chamber heater unit, air filter, and exhaust fan. It automatically switches air ducts based on the current air management mode to regulate the internal temperature and airflow, providing the optimal printing environment for different filaments.

During slicing, the printer automatically selects the appropriate air management mode based on the filament type. This prevents warping with high-temperature materials and clogging with low-temperature materials. It also dynamically adjusts fan speed and heating power to keep the temperature stable, save energy, and reduce noise, ensuring print quality and efficiency across different printing scenarios.

NOTE

The printer can automatically select the appropriate air management mode for different filaments. To manually set a specific mode, go to  > **Air Management System** on the printer screen.

6.5.1 Strong Cooling Mode

When printing heat-sensitive filaments such as PLA and TPU, the air management system is set to strong cooling mode.

In this mode, the auxiliary part cooling fans built into both sides of the chamber draw in external cool air to lower the chamber temperature. Meanwhile, the heated air is filtered through the air filter and expelled via the external exhaust fan. The vents at the back of the printer and the gaps around the purge wiper also help with cooling.

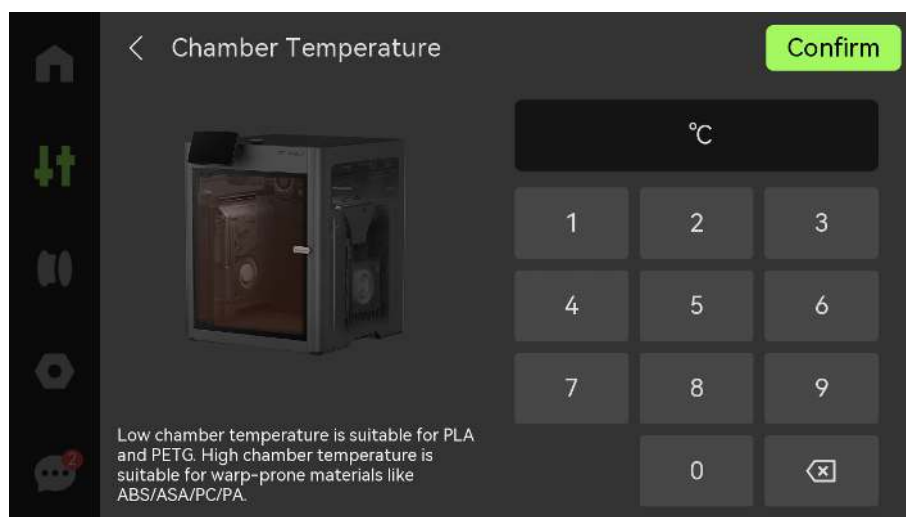
6.5.2 Heating Mode

When printing high-temperature filaments such as ABS, ASA, PC, and PA, the air management system switches to Heating Mode.

In this mode, the left and right side units no longer draw in outside cool air. The chamber heating fan on the left turns on automatically, while the auxiliary part cooling fan on the right works with the air filter to create internal circulation. This keeps the hot air inside the chamber evenly distributed while filtering and purifying the air.

6.5.3 Custom Chamber Temperature

You can set the chamber temperature via the printer screen, Bambu Studio, or Bambu Handy. The system will automatically switch to heating mode.



6.6 Optional Upgrade Accessories

6.6.1 Filament Track Switch

When a dual-hotend printer is connected to multiple AMS units, the mapping between AMS units and hotends is fixed. If the **filament grouping mode** is set to Filament-Saving and the actual filament connection does not match the system-assigned layout, you need to manually adjust the AMS connections or rearrange the filaments.

The **filament track switch** allows flexible mapping between AMS units and the two hotends. Filaments in an AMS can be delivered to either target hotend as needed, greatly reducing manual intervention.



i TIPS

Please visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "filament track switch" to download bracket model files and detailed usage instructions.

6.6.2 TPU Feeding Assist Module

TPU feeding assist module helps load flexible filament. When printing softer filaments like TPU 90A or 85A, feeding resistance is high. In most cases, you need to open the top cover, position the filament from above, and load it directly through the toolhead filament inlet.

After installing the assist module, you can load filament directly through the module's filament inlet while the enclosure remains closed. This greatly simplifies TPU printing preparation and reduces loading resistance in various setups.

**i TIPS**

Please visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "TPU feeding assist module" to download bracket model files and access detailed assembly and usage instructions.

Chapter 7 Basic Controls and Functions

This chapter introduces the printer's common control methods and basic functions, including screen operation, basic settings, print status monitoring, and access to common features. By understanding these operations, you can quickly get started with the daily use and maintenance of the printer.

NOTE

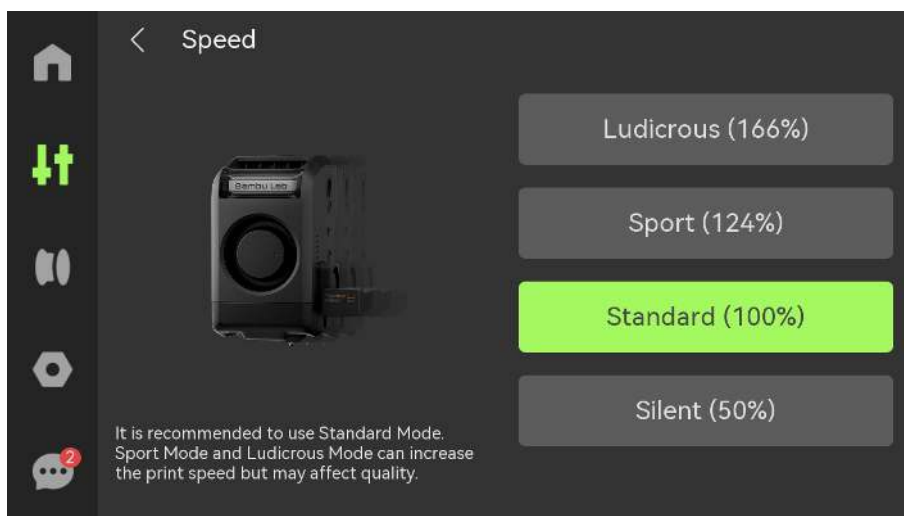
To improve the user experience, some interfaces may change. Refer to the actual interface.

7.1 Common Screen Controls

This printer is equipped with a full-color touchscreen for displaying the status of the printer and its main components. It also allows you to configure multiple printer settings.

7.1.1 Print Speed

Adjust the print speed in real time during printing. This affects print time and model surface quality. On the printer screen, select  > **Speed** to adjust the print speed. Four modes are available:

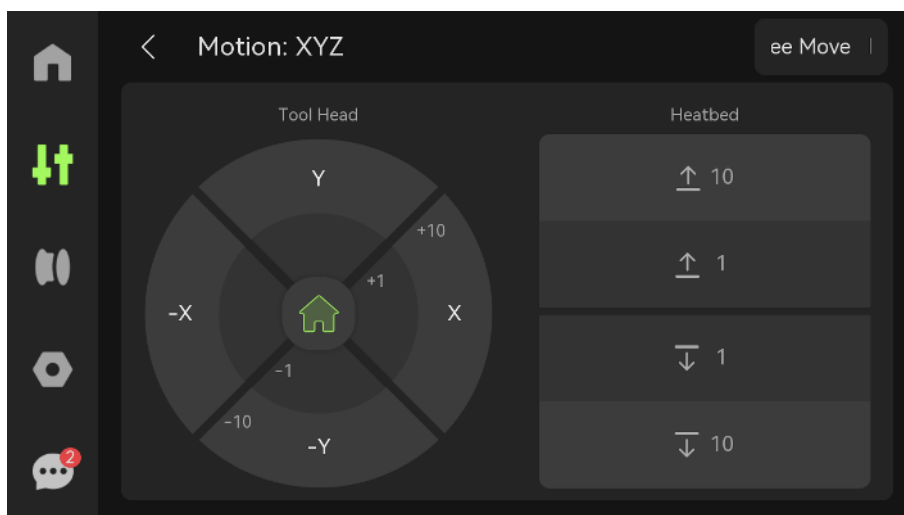


- **Ludicrous:** 166% of normal print speed and acceleration.
- **Motion:** 124% of normal print speed and acceleration.
- **Standard:** normal print speed and acceleration.
- **Silent:** 50% of normal print speed and acceleration.

Adjust the print speed flexibly according to your needs. Increasing speed shortens print time but may reduce surface quality. Decreasing speed improves surface quality but extends print time.

7.1.2 XYZ Axis Movement

Move the toolhead and heatbed when the printer is idle for easier cleaning or maintenance. On the touchscreen, select  > **Motion** to move the toolhead and heatbed.

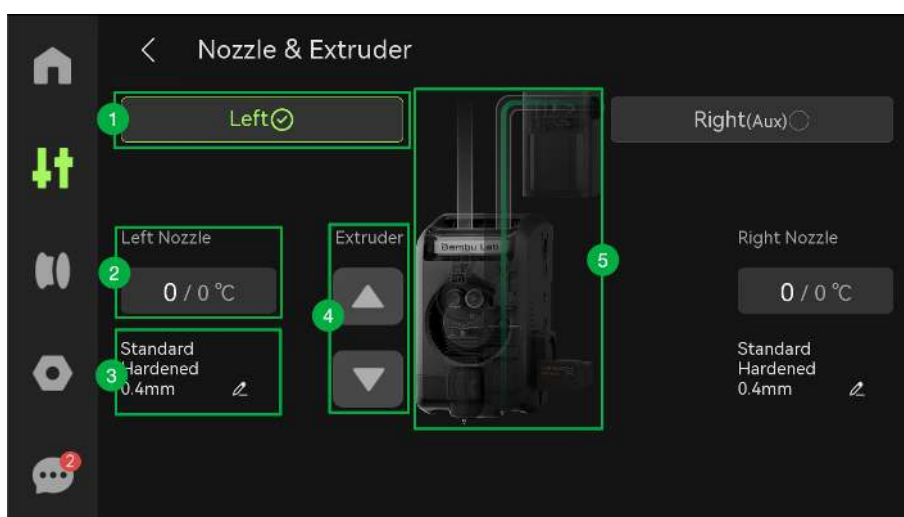


- **Toolhead:** Tap **X/-X** and **Y/-Y** to move the toolhead. The inner ring (+1/-1) moves it in small increments, while the outer ring (+10/-10) moves it in large increments.
- **Heatbed:** Tap or to raise or lower the heatbed. 1 indicates a small movement, and 10 indicates a larger movement.
- **Free Move:** When enabled, you can manually move the toolhead and heatbed while the XYZ motors are idle, making maintenance and repair easier.

7.1.3 Nozzle and Extruder

Use this page to switch nozzles, set nozzle temperatures and information, view extruder load status, and manually extrude or retract filament. It is useful for routine maintenance, filament changes, nozzle cleaning, and print preparation.

On the touchscreen, select > **Nozzle & Extruder** to set the nozzle and extruder parameters.



1. **Switch nozzles:** Select **Left/Right (Aux)** to switch between two nozzles. When selecting one hotend, the flow blocker moves beneath the other one.
2. **Set nozzle temperature:** Enter a value to set the nozzle temperature (°C).
3. **Set nozzle information:** After replacing a hotend, manually update its type, material, and diameter.
4. **Control the extruder:** Tap the buttons to extrude or retract 1 cm of filament.

5. **Extruder status:** Displays the current filament color and load status.

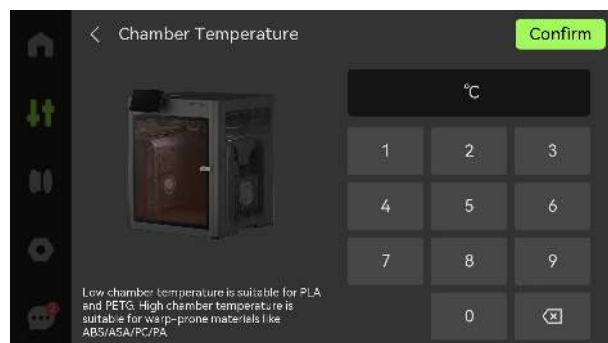
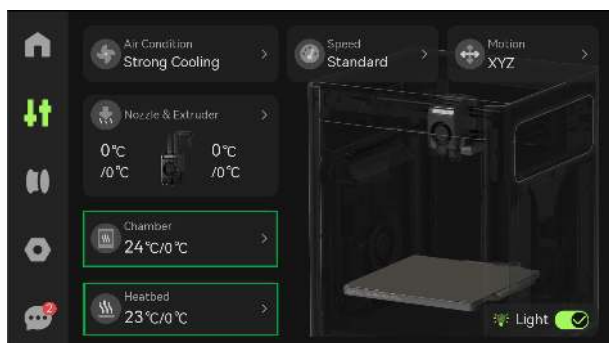
NOTE

The flow blocker is located below the hotend and is used to block the inactive nozzle to prevent material leakage. When the printer is powered on, you can switch hotends via the screen. During maintenance when the printer is powered off, you can toggle the lever to switch nozzles.



7.1.4 Heatbed and Chamber Temperature

On the  page, you can view real-time chamber and heatbed temperatures. Tap **Chamber** or **Heatbed** to enter a value and set the temperature.



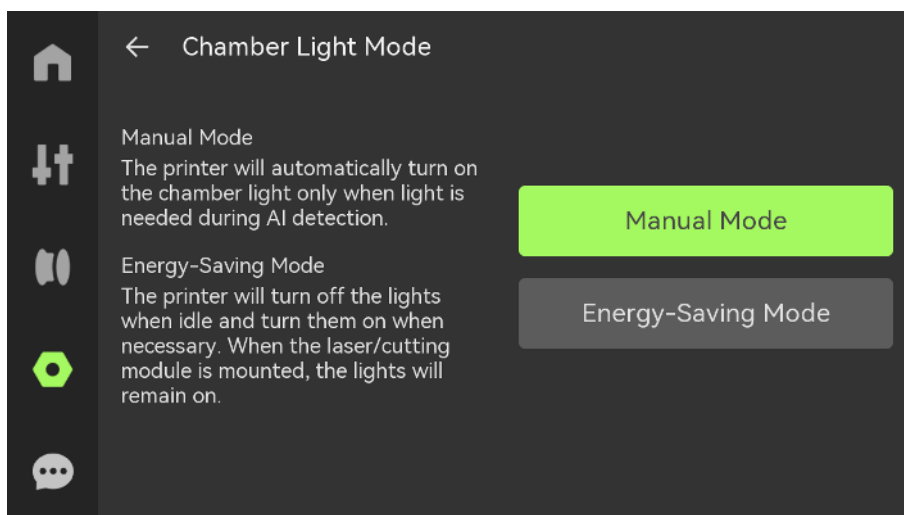
TIPS

To manually adjust the chamber temperature, set both chamber and heatbed temperatures at the same time to reduce overall heating time and improve efficiency.

7.1.5 Chamber Light Mode

On the touchscreen, select  > **Settings** > **Chamber Light Mode**.

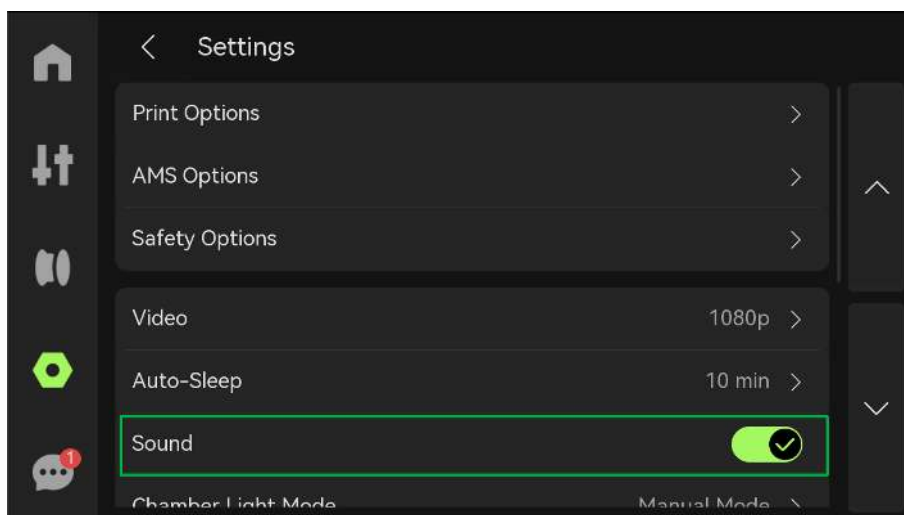
- **Manual Mode:** The light turns on automatically when required for AI detection. When checking print status or performing maintenance, you can manually switch the light on or off via  > **Light**.
- **Energy-Saving Mode:** The light automatically turns off when the printer is idle and turns on only during operation or while a task is in progress to save energy.



7.1.6 Sound

When enabled, the printer plays a notification sound when it powers on and when printing starts or finishes.

On the touchscreen, select  > **Settings** > **Sound** to turn it on or off.



7.2 Photo and Video

The printer is equipped with a 1920x1080, 30 fps HD live view camera located at the front left of the chamber. This camera is used for real-time monitoring, timelapse photography, photo and video recording, and intelligent detection.

7.2.1 Video Recording

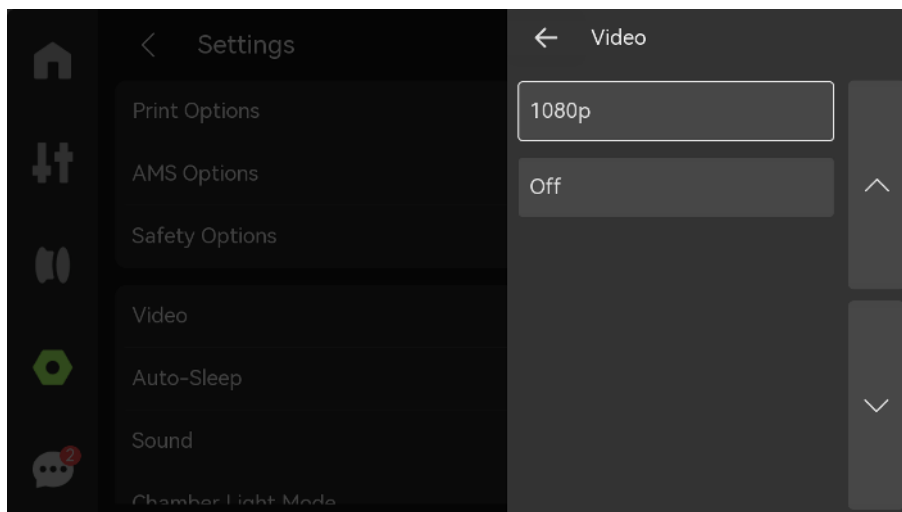
The printer supports video recording throughout the entire print process, making it easy to review print status at any time and providing useful reference for troubleshooting and after-sales support. The printer includes a USB port to connect a USB flash drive for saving video files. See [Connect USB Flash Drive](#) for specifications and usage details.

⚠ CAUTION

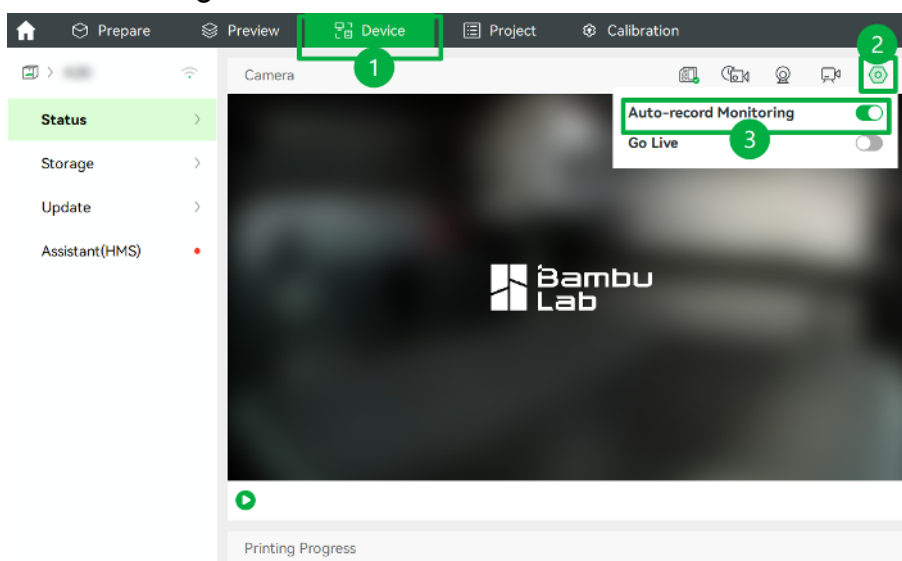
Insert a USB drive before recording. Otherwise, this feature cannot be enabled.

You can turn video recording on or off in either of the following ways:

- On the printer screen, tap **⚙ > Settings > Video** to turn the recording feature on or off and adjust the resolution.

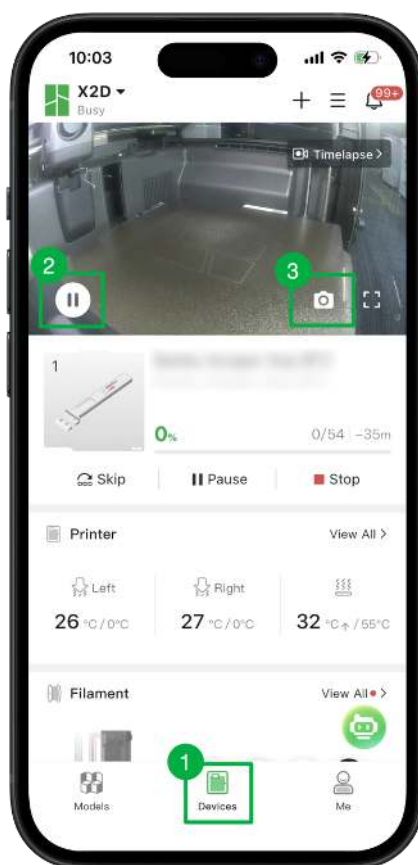


- In Bambu Studio, click **Device > Camera > Camera Setting > Auto-record Monitoring** to enable or disable video recording.



7.2.2 Photo

Use the live view camera to remotely monitor the printer and take photos to record the print status of your model.



Step 1. Open the **Devices** page in Bambu Handy.

Step 2. Tap  to view the camera preview.

Step 3. Tap  at the bottom right of the camera preview to take a photo. The photo will be saved to your phone's photo album.

7.2.3 Timelapse

During printing, the printer automatically captures one photo per layer and combines them into a sped-up video.

How to Enable

When starting a print job, you can choose whether to enable timelapse.

- **Printer touchscreen:** On the Plate to Print page, expand **Advanced Options > Timelapse**, then tap to enable.
- **Bambu Studio:** After slicing, click **Print plate/Print all** in the upper-right corner. In the pop-up **send print job** window, find **Timelapse** and turn it **On**.
- **Bambu Handy:** On the **Prepare to Print** page, go to **Options > Timelapse**, and enable it.

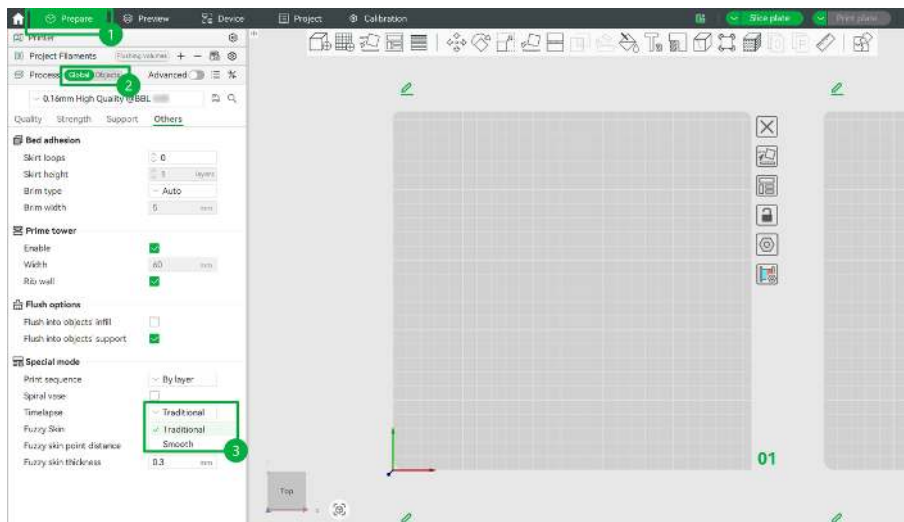
NOTE

- The interface is continuously updated to improve the user experience. Please refer to the actual interface.
- Timelapse can be used without a USB drive inserted. The video will be saved to the printer's internal storage. For more storage capacity, using a USB drive is recommended.

Shooting Mode

Timelapse offers two shooting modes. You can switch the modes on the **Prepare** page in Bambu Studio by navigating to **Process > Global > Others > Special mode > Timelapse**.

- **Traditional mode (default):** After each layer is printed, the printer takes a photo at the current position, and the toolhead stays at the end of the layer. As a result, you can see the toolhead moving in the video.
- **Smooth mode:** After each layer is printed, the toolhead moves to the prime tower or a safe position before taking a photo so the toolhead remains stationary in the video. This mode automatically generates a prime tower.



TIPS

- If you select the smooth mode, please ensure prime tower is enabled (enabled by default).
- During dual-hotend printing, the heatbed moves up or down by 4 mm when switching nozzles. To avoid visible heatbed “jumping” in traditional mode timelapse videos, the printer adjusts the shooting timing or switches shooting mode based on nozzle usage to create a smoother timelapse video.

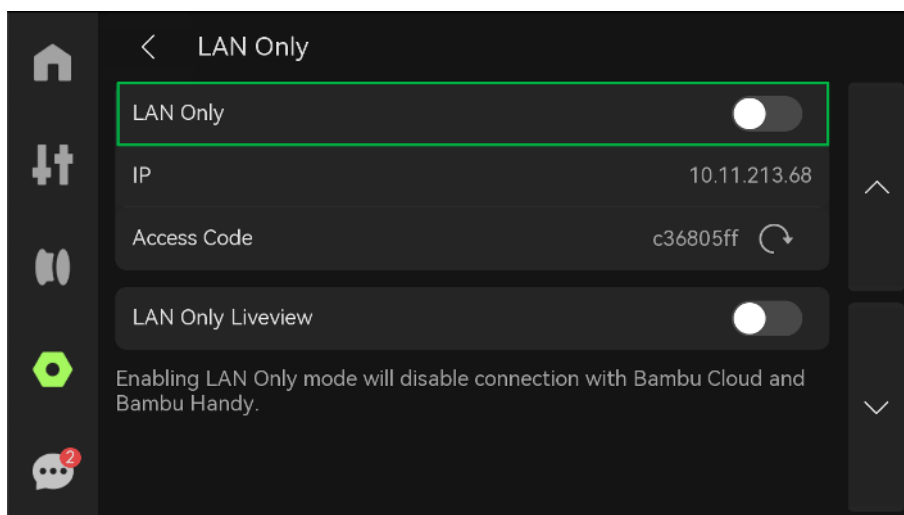
7.3 Connect to Network

This printer supports Wi-Fi and LAN-only mode. When LAN-only mode is enabled, you can further configure parameters in the developer mode.

7.3.1 LAN Only Mode

When enabled, the printer can only be accessed and controlled within the local area network. It cannot be accessed remotely via the internet, nor can it use cloud features such as Bambu Handy and print history. This mode is suitable for users or enterprise environments with higher data security and privacy requirements.

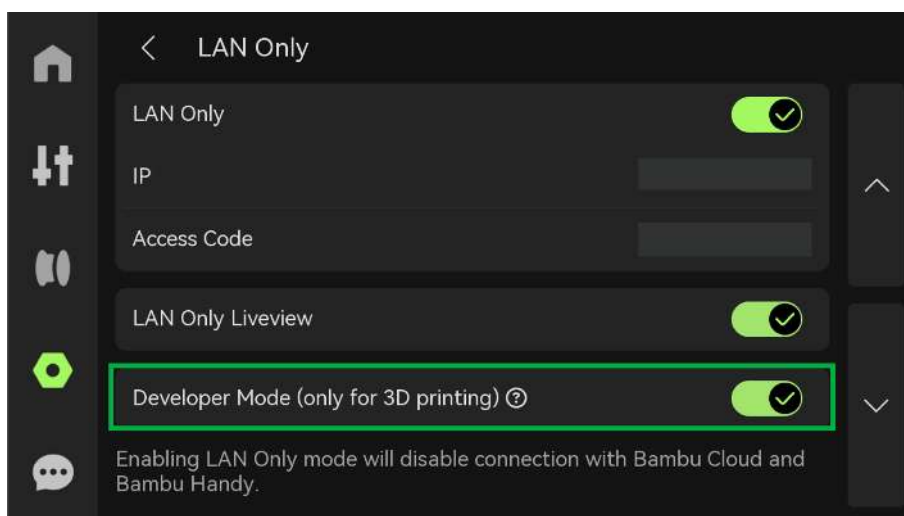
On the printer touchscreen, select **Settings > LAN Only** to enable LAN Only mode.



7.3.2 Developer Mode

When enabled, the printer allows third-party software or devices to directly control and manage print tasks and process data. This offers greater flexibility and customization but may involve security risks.

After enabling LAN Only mode, enable developer mode in **Settings > LAN Only > Developer Mode (only for 3D printing)**.



7.4 Connect USB Flash Drive

The printer is equipped with a USB port for importing sliced files, starting prints from the screen, and storing recordings, timelapses, and print cache.

7.4.1 Specifications

1. Supports USB 2.0 and above protocols, compatible with FAT32 and exFAT file systems.
2. The printer does not limit the USB flash drive's capacity. **The maximum supported capacity depends on the file system:**

File System	Operating System Used for Formatting	Maximum Capacity	Maximum Size for Single File
FAT32	Linux or macOS systems	2 TB	4 GB
	Windows	32 GB	4 GB
exFAT	Any operating system	128 PB	16 EB

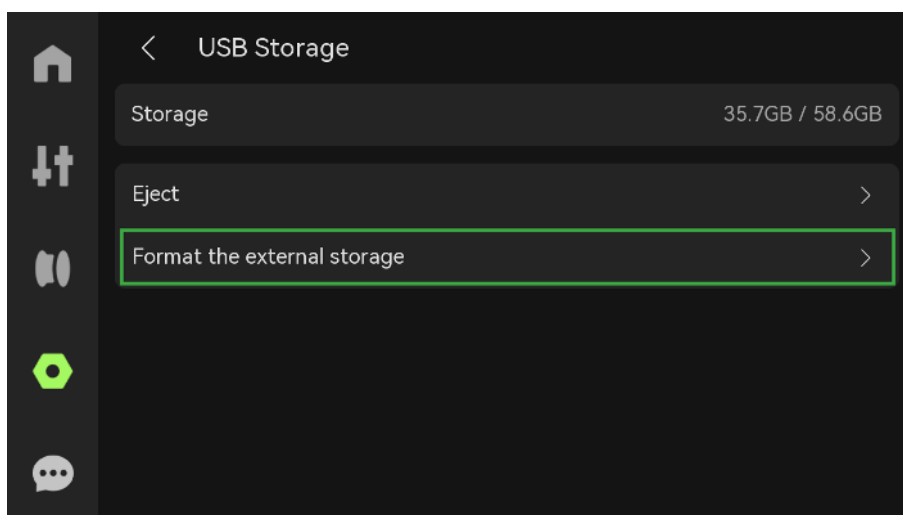
NOTE

- Video files can use up to 65% of the USB flash drive's capacity, with a maximum of 500 files.
- 15% of the USB drive capacity is reserved as unused space. Recording cannot be enabled when data usage exceeds 85%.
- Recording can be enabled normally when more than 15% of the USB drive space is free. When data usage reaches 85%, the system automatically deletes existing video files to free up space.

7.4.2 Connect and Format

Step 1. Insert a compatible USB flash drive into the printer's USB port.

Step 2. Format the USB drive if needed. On the touchscreen, tap  > **USB Storage** > **Format External Storage** to format the USB drive as FAT32 (suitable for USB drives up to 2 TB).



7.4.3 Ejection

To eject the USB flash drive, select  > **USB Storage** > **Eject** to safely remove the drive and prevent data corruption.

NOTE

The printer only supports one USB flash drive at the same time. You cannot connect multiple drives via a USB hub.

7.5 Update and Restore

7.5.1 Update Firmware

The printer firmware is continuously updated for new features. When a new firmware version is available, you can update it using the following methods:

Online Update

When the printer is connected to Wi-Fi, you can update the firmware online from the touchscreen.

- After the new firmware is released, a prompt will appear on the printer screen. Tap **Yes** and follow the instructions to complete the update.
- You can also update manually by going to  > **Firmware** > **Update**.

Update Offline

If the printer is not connected to the internet, you can update the firmware using a USB drive and an offline update package.

Step 1. Insert and format a USB drive.

Step 2. Download the corresponding offline update package from the Bambu Lab firmware download page: bambulab.com/support/firmware-download/all.

Step 3. On the screen, select  > **USB Storage** > **Eject** to safely remove the USB drive.

Step 4. Copy the offline update package to the root directory of the USB drive.

Step 5. Reinsert the USB flash drive. On the touchscreen, select  > **Firmware** > **Offline Update**. Then, select the version to update to, and tap **Update**. Once it is complete, the printer will automatically restart.

7.5.2 Initialization

Reset the printer to its factory default state. All custom settings and user data will be erased. This action is irreversible, so make sure no important data remains before proceeding.

On the touchscreen, select  > **Settings** > **Restore to Factory Settings** to complete initialization.

Chapter 8 Filament Introduction and Usage

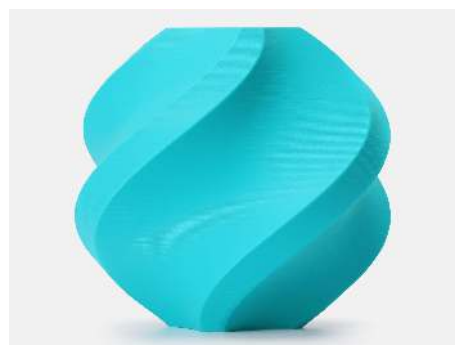
8.1 Common Filament Types

Different 3D printing filaments have their own physical properties and applications. Choosing the right filament based on your printing needs helps improve print quality and model performance. Below is a brief introduction to several common filaments. For detailed features and specifications, see the Bambu Lab Filament Guide (bambulab.com/filament-guide).

Basic Filaments

PLA

- The most common entry-level 3D printing filament. It is eco-friendly, non-toxic, biodegradable, and easy to print, but has limited mechanical performance.
- Suitable for everyday prototyping, home printing, and low-load applications.



PETG

- Offers good mechanical performance, with water, heat, and chemical resistance. However, it must be kept dry, and its smooth surface can show scratches easily.
- Suitable for containers, durable parts, and functional parts.



Aesthetic Filaments

PLA Silk/Silk+

- Has a silky texture and high gloss. However, it must be kept dry, as moisture can easily cause stringing.
- Suitable for models that require a silky texture or metallic sheen.



PLA Wood

- Contains natural wood particle additives for a matte, solid-wood-like texture. However, it must be kept dry, as moisture can easily cause discoloration.
- Suitable for natural or forest-style models. The matte texture also helps hide layer lines.



Engineering Filaments

ABS

- Offers good mechanical performance and high durability, but is prone to warping.
- Suitable for mechanical housings and functional parts.



ASA

- Similar to ABS but with superior UV resistance.
- Suitable for outdoor parts and automotive components.



PC

- Offers good heat resistance, strength, and rigidity, but is prone to warping and moisture absorption.
- Suitable for high-strength structural parts, high-temperature applications, and mechanical components.



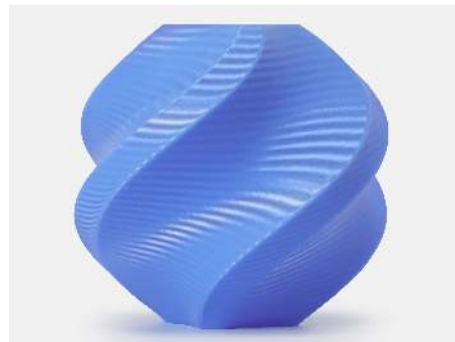
NOTE

Engineering filaments may emit irritating fumes during printing. Use enclosed printers and ensure good ventilation.

Flexible Filaments

TPU

- Highly elastic and wear-resistant, but relatively slow to print.
- Suitable for flexible models, such as shoe sole prototypes, seals, and cushioning pads.



NOTE

- The hardness of TPU filament is measured by the Shore A hardness. A lower value means the filament is softer, while a higher value means it is harder. Common hardness levels include 75A, 80A, 83A, 85A, 90A, and 95A.
- It is recommended to print with TPU of 80A hardness and above. Higher hardness improves printing stability and reduces the risk of print failure.

Fiber-Reinforced Filaments

Carbon Fiber Reinforced (-CF)

- Carbon fiber is added to filaments such as PLA or PETG to significantly improve rigidity and strength while keeping the material lightweight.
- Suitable for load-bearing structural parts and lightweight structural designs.



Glass Fiber Reinforced (-GF)

- Glass fiber is added to filaments such as ABS to improve toughness and wear resistance.
- Suitable for industrial mechanical parts and structural frame components.



Support Filaments

Support for PLA/PETG

- A breakaway support filament with good print compatibility, easy removal, and smooth contact surfaces.
- Designed specifically for use with PLA and PETG printing.



PVA (Water-soluble)

- A flexible, biodegradable polymer with strong moisture absorption. It absorbs water from the air and dissolves in water. Commonly used as a water-soluble support filament in 3D printing.
- Suitable for complex models or models where supports are difficult to remove manually.



NOTE

Support filaments are specially optimized for good stability. They should only be used for printing support structures. Using them for the model body may reduce model strength and surface quality.

8.2 Printing Conditions

The printer uses a fully enclosed structure with dual hotends equipped with standard hardened steel 0.4 mm nozzles. The nozzle temperature can reach up to 300 °C, and the heatbed temperature can reach up to 120 °C, supporting a wide range of filaments from basic to engineering materials.

The following lists common printing conditions for Bambu filaments. Please confirm all settings before printing to ensure stable and reliable print quality. For detailed filament parameters and printing guides, visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for the filament name, such as PLA.

CAUTION

- The auxiliary hotend cannot print PLA Aero.
- Use the auxiliary hotend with caution when printing PLA Silk, PETG-CF, ASA-CF, PA6-CF, TPU for AMS, and Support for PA/PET. For better surface accuracy and detail, use the main hotend whenever possible.
- Use the 0.2 mm nozzle with caution on the auxiliary hotend, as it may cause print failures.

Symbol Guide

NOTE

- ✓ Indicates recommended, required, or mandatory actions, such as drying required or a 0.6 mm hotend recommended.
- Indicates allowed or suggested settings, such as drying recommended or AMS compatible.
- ✗ Indicates unsupported or incompatible options, such as AMS incompatible or a 0.2 mm hotend not supported.

Filament	Hotend Compatibility			Usage Requirements		AMS*
Name	Nozzle Size*	Nozzle Material*	Main/Auxiliary Hotend	Temperature (°C)*	Drying	Compatibility
PLA Basic	All	All	All	190–230 °C	○	All
PLA Wood	✗ 0.2 mm	All	All	190–230 °C	○	All
PLA Silk/ Silk+	✗ 0.2 mm	All	Main hotend recommended	190–230 °C	○	All
PLA Aero	✓ 0.4 mm	All	Main hotend only	220–260 °C	✓	All
PETG	All	All	All	230–260 °C	✓	All
TPU for AMS	✗ 0.2 mm	✗ High flow	Main hotend recommended	220 – 240 °C	✓	All
TPU 95A HF	✗ 0.2 mm	All	Main hotend only	220 – 240 °C	✓	✓ AMS HT
TPU 90A	✗ 0.2 mm	✗ High flow	Main hotend only	200 – 250 °C	✓	✓ AMS HT
TPU 85A	✗ 0.2 mm	✗ High flow	Main hotend only	200 – 250 °C	✓	✓ AMS HT
	✗ 0.4 mm					
ABS	All	All	All	240 – 280 °C	○	✗ AMS lite
ASA	All	All	All	240 – 280 °C	○	All
PC	✗ 0.2 mm	All	All	260 – 290 °C	✓	All
PLA-CF	✗ 0.2 mm	✓ Hardened steel	All	210 – 240 °C	○	All

PETG-CF	× 0.2 mm	✓ Hard- ened steel	Main hotend recommended	240 – 270 °C	○	× AMS lite
ABS-GF	× 0.2 mm	✓ Hard- ened steel	All	240 – 280 °C	○	× AMS lite
PVA	× 0.2 mm	All	All	190 – 240 °C	✓	All
Support for PLA/PETG	All	All	All	190 – 240 °C	○	All

NOTE

- **Nozzle Size:** Includes nozzles with diameters of 0.2 mm, 0.4 mm, 0.6 mm, and 0.8 mm.
- **Nozzle Materials:** Includes hardened steel and stainless steel, as well as their high-flow versions.
- **AMS Compatibility:** Includes AMS 1st generation, AMS 2 Pro, AMS HT, and AMS lite.

CAUTION

Based on printing temperature, filaments can be classified as low-temperature, medium-temperature, or high-temperature materials. **When printing with multiple materials, follow these requirements to avoid extruder clogs or damage:**

- Do not mix high-temperature and low-temperature filaments in the same print. When starting a print from the printer screen, Bambu Handy, or Bambu Studio, the system automatically restricts this combination.
- When mixing high-temperature and medium-temperature filaments, or medium-temperature and low-temperature filaments, adjust the nozzle and chamber temperatures carefully to prevent lower-temperature filaments from softening too early.

8.3 Filament Preparation

Filament dryness and flow settings often affect print quality. For example, damp PLA Silk is more likely to cause stringing during printing. When using third-party filament, the preset flow settings may not provide the best print results.

This section explains when drying and calibration are needed and provides step-by-step instructions. You can prepare the filament as needed.

8.3.1 Filament Drying

When stored in a non-sealed environment, some filaments absorb moisture from the air. During printing, the moisture rapidly vaporizes in the hot nozzle, causing stringing, holes, reduced part strength, and other issues.



Filament not dried



Filament dried

For moisture-sensitive filaments, dry the filament before printing for more stable print quality:

- PLA: PLA Wood, PLA Silk/Silk+, PLA-CF, PLA Aero.
- PETG: PETG HF, PETG Translucent, etc.
- PVA, PC, PA, TPU, and others.
- All carbon fiber/glass fiber reinforced filaments.

NOTE

Please visit MakerWorld (makerworld.com), search for “stringing”, download a suitable test model, and print it to determine whether the filament needs drying based on the print quality.

Drying Filament with the Heatbed

To dry filament using the printer’s heatbed, prepare a container, such as the original filament package box or a filament drying hood*.

NOTE

Please visit MakerWorld (makerworld.com), search for the “filament drying hood” model, and print it using high-temperature filaments, such as PC or PA-CF.

On the printer screen, select  > **Toolbox** > **Dry Filament**. Follow the on-screen instructions to complete the steps:

Step 1. Remove any debris from the build plate and the bottom of the printer chamber.

Step 2. Tap **Prepare**. The toolhead and heatbed will move to the preset position automatically.

Step 3. Place the filament on the build plate and cover it with the box or filament drying cover.

Step 4. Select the **filament type**. The printer will automatically set the heatbed temperature and drying time. You can also set them manually.

Step 5. Tap **Start** to begin drying.

TIPS

It is recommended to manually flip the filament halfway through drying for more even results.

Drying Filament with AMS 2 Pro/AMS HT

AMS 2 Pro and AMS HT have built-in drying modules that heat and dry filament. During drying, the spool rotates automatically for more even results. When drying filament with AMS, follow the notes and steps below:

AMS Model	Filament Capacity	Max Temperature
AMS 2 Pro	4	65 °C
AMS HT	1	85 °C

CAUTION

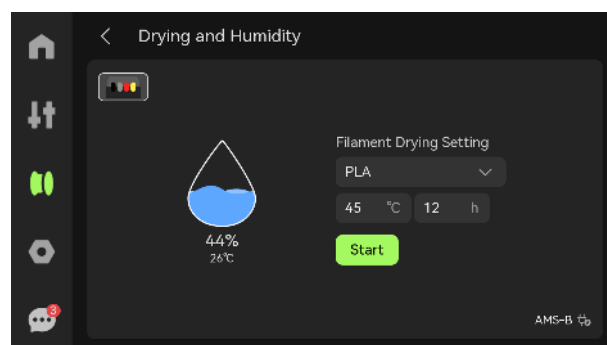
- When using multiple AMS units for drying at the same time, only one unit can draw power from the printer. The other AMS units must be connected to a power outlet using the official power adapter.
- If drying while the printer is idle, pull the filament out of the AMS filament inlet and secure it to the inside of the spool with tape to prevent it from unwinding.

Step 1. Connect the AMS to the printer. See the Quick Start Guide or [Initial installation](#).

Step 2. Place the filament into the AMS slot, then close the AMS cover and locking tab.

Step 3. On the printer screen, select  > .

Step 4. Select the **filament type**. The printer automatically applies the preset drying temperature and duration. Tap **Start** to begin drying.

**NOTE**

If multiple AMS units are connected, you can switch between units on  page to start drying one by one, or switch devices on the **Drying and Humidity** page.

Other Drying Methods

You can use a forced-air dryer to dry filament, such as high-temperature filaments like PPS. Please visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for “filament drying guide” to find drying parameter tables for various filaments.

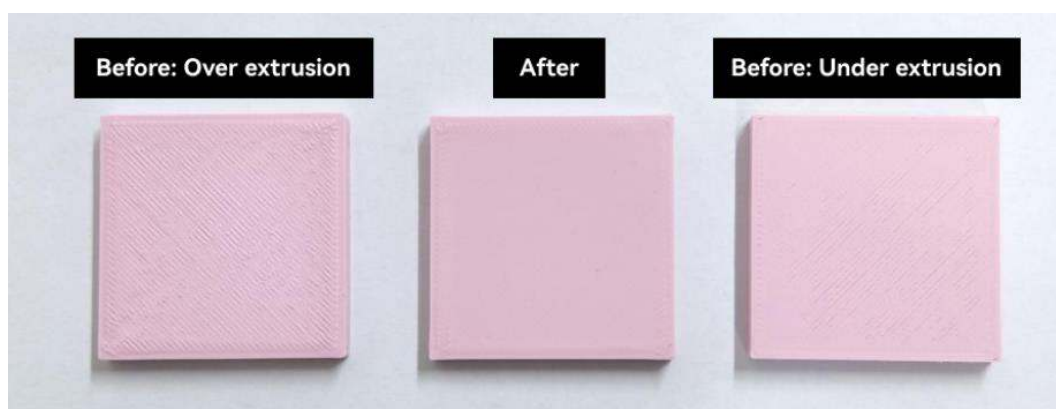
8.3.2 Filament Calibration

Filament calibration includes two dimensions: flow dynamics and flow rate. Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "flow dynamics calibration" and "flow rate calibration" to learn about calibration principles and detailed steps.

- **Flow dynamics calibration** compensates for extrusion pressure lag and improves extrusion stability, such as print quality around model corners.



- **Flow rate calibration** helps reduce under-extrusion and over-extrusion, improving surface smoothness, layer adhesion, and more.



If you are using Bambu filament, you can directly apply the official preset parameters without frequent filament calibration. When **changing filament brands** or **hotends**, or encountering **specific print quality issues**, follow the applicable calibration scenarios and steps below.

Flow Dynamics Calibration

The printer supports both **automatic** and **manual** calibration. **Dynamic flow calibration** is recommended when using third-party filament, replacing the hotend, or changing filament settings, such as max volumetric speed or print temperature in Bambu Studio.

i TIPS

Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "flow dynamics calibration" to learn how to determine the coefficient for manual calibration.

Calibration type

Type	Stage	Platform	Method
Manual calibration	When the printer is idle	Bambu Studio only	Visually check the print quality of the test model and manually enter the corresponding coefficient.
Auto-calibration	When the printer is idle or starting a print job	Printer screen, Bambu Handy, and Bambu Studio	The printer automatically performs calibration and provides the recommended result.

Calibration Steps

- **Calibrate when starting a print job:**

On the Send print job page, **Enable** flow dynamics calibration to automatically calibrate the filament used for printing. If you cannot find this option, expand **Advanced Options**.

- **Calibrate when the printer is idle:**

1. On the **Calibration** page in Bambu Studio, click **Flow Dynamics**, select **Auto-Calibration** or **Manual Calibration**.
2. Select the printer **preset** and wait for the printer to start calibration. Then enter the filament **coefficient (K)** based on the recommended automatic calibration result or your visual inspection of the printed test model.

Flow Rate Calibration

If the preset flow rate does not match the filament, under-extrusion or over-extrusion may occur, causing poor surface quality, weak layer bonding, and other issues. However, these issues are not always caused by an incorrect flow rate. Before running flow rate calibration, first check the printer's basic calibration items and the model structure. See [Print Quality Issues and Solutions](#).

If these issues have been ruled out and the print defect is mainly related to a specific filament, follow the notes and steps below:

Step 1: On the **Calibration** page in Bambu Studio, click **Flow Rate** and select **Manual Calibration**.

Step 2: Select the printer **preset** and **Calibration Type**. **Complete Calibration** is recommended for first-time use.

Step 3: Wait for the printer to start calibration, then enter the filament **coefficient (K)** based on the recommended automatic calibration result or your visual inspection of the test model.

NOTE

Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "flow rate calibration" to learn how to determine the calibration coefficient.

8.4 Special Filament Printing Requirements

8.4.1 TPU

TPU is a flexible filament that easily absorbs moisture. It has higher requirements for storage, dryness, and loading method. TPU filaments with different hardness levels also vary in printer compatibility and loading method. Common TPU hardness levels and supported feeding methods are listed below:

Hardness Level		X2D Printer	AMS Compatibility	Supported Loading Method
68D (TPU for AMS)	High	Compatible	All	Filament buffer > Main extruder filament inlet
95A	Relatively high	Compatible	AMS HT (manual loading)	Main extruder filament inlet
90A, 85A	Medium	Compatible	AMS HT (manual loading)	Main hotend toolhead filament inlet / TPU feed assist module
Below 85A	Low	None	None	/

CAUTION

- TPU filaments, except TPU for AMS, cannot be loaded through the printer's filament buffer.
- Due to the higher loading resistance of the X2D auxiliary hotend, **TPU can only be printed with the main hotend.**

NOTE

- When AMS HT is used to print TPU, it only works as a sealed container and feeds filament out through its TPU filament outlet. It does not support automatic loading.
- The TPU feed assist module is an upgrade accessory. For details, see [TPU Feed Assist Module](#).

Print Preparation

You can visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "TPU printing guide for X2D" to get detailed instructions and illustrated guidance. The following general TPU checklist can help you prepare before printing:

Stage	Preparation	Steps
-------	-------------	-------

Before printing	Dry the filament	Select the drying equipment and settings based on the filament type.
	Check printer configuration	Make sure the current AMS, build plate, and hotend support TPU printing.
	Clean the printer	• Clean and dry the build plate. • Use a new hotend if possible, or perform cold pull maintenance. • Check the extruder gear for debris and clean it if needed.
Load filament	Confirm the loading method	95A HF: Load from the main extruder filament inlet. 90A/85A: Load from the main hotend toolhead filament inlet or TPU feed assist module inlet.
	* Prepare a filament sealed box and spool shaft	For longer prints, place the filament in a sealed container, such as a rice storage container, and print a spool shaft holder for filament loading.
	Load 95A HF	Move the spool holder base to the other side, then feed the filament from the main extruder inlet as with an external spool.
	Load 90A/85A	Use the top-mounted holder*: 1. Print a holder for the filament spool or sealed container, and make sure the filament outlet is higher than the toolhead. 2. Heat the hotend, insert the filament directly into the main hotend inlet on the toolhead, and tap  on the touchscreen at a low frequency.
		Use the TPU feed assist module*: 1. Move the spool holder base to the other side, then print and assemble the TPU feed assist module. 2. Feed the filament through the assist module into the main extruder filament inlet, following the normal external spool loading method.
Start printing	Adjust filament parameters and model position	• Keep the default print temperature and speed. Set Flow Dynamics Calibration to Auto or Off • In Bambu Studio, move the model to the front-center area of the plate.
After printing	Unload 95A HF	Tap Unload on the touchscreen and retract the filament as prompted.

	Unload 90A/85A	Use the top-mounted holder: Heat the hotend, then tap  at low frequency on the touchscreen to slowly pull out the filament.
		Use the TPU feed assist module: tap Unload on the touchscreen and retract the filament as prompted.
	Store the filament	Store the filament in a sealed box with desiccant, and keep the ambient humidity below 20% RH.

 NOTE

When printing TPU that is not compatible with AMS, prepare a filament sealed box and sealed container yourself. Visit MakerWorld (makerworld.com), search for "top spool holder TPU," download a suitable holder model, print and install it according to the model instructions.

8.4.2 High-Temperature Filament

High-temperature filaments, such as ABS, ASA, PC, and nylon, offer excellent strength and heat resistance, but require higher nozzle temperatures, chamber temperatures, and better print environment control. Before printing, check the configuration and adjust the slicing settings to reduce the risk of warping, cracking, and nozzle clogging. Use the following general checklist to prepare:

Stage	Preparation	Steps
Before printing	Dry the filament	Select the drying equipment and settings based on the filament type.
	Check printer configuration	Make sure the current build plate and hotend support high-temperature filaments. Do not use the Bambu Cool Plate SuperTack.
	Clean the printer	- Clean and dry the build plate, then apply Bambu glue stick or adhesive to improve stability. - Perform cold pull maintenance on the hotend.
Start printing	Adjust model settings in Bambu Studio	- Set an appropriate layer height. The default 0.2 mm is recommended. - For multiple models, select By object for print sequence.
	Preheat the printer	The printer is equipped with an active chamber temperature control system and will automatically switch to heating mode.
After printing	Remove the model	- Wait until the model has fully cooled to room temperature before removing it. - Remove supports within 2 hours after printing to prevent moisture absorption.

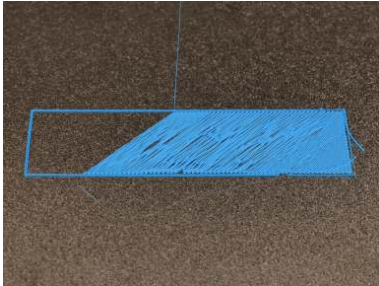
	Post-process the model	• Annealing is recommended for models printed with some filaments. • For moisture-sensitive filaments, apply a water-resistant coating such as paint or wax.
	Future use	To use low-temperature filaments later, set the nozzle temperature to 250–300 °C and manually extrude filament to ensure smooth printing.

 NOTE

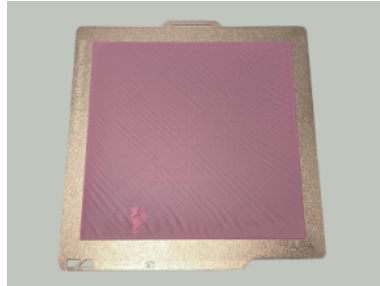
Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for “high-temperature filament” for detailed instructions and illustrated guides.

Chapter 9 Print Quality Issues and Solutions

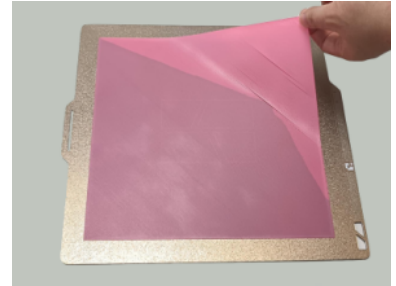
9.1 Find Your Print Issue



First layer not sticking



First layer too low



First layer too high or sparse



Air printing, clogging,
and under-extrusion



Model warping or falling off



Model collapse and Spaghetti



Poor overhang quality



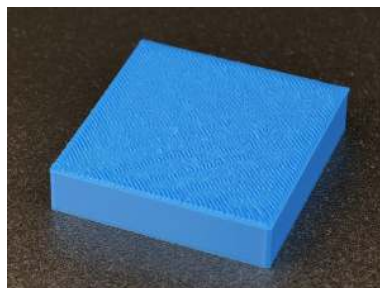
Stringing and oozing



Gloss difference



Seam



Top layer overflow
(over-extrusion)

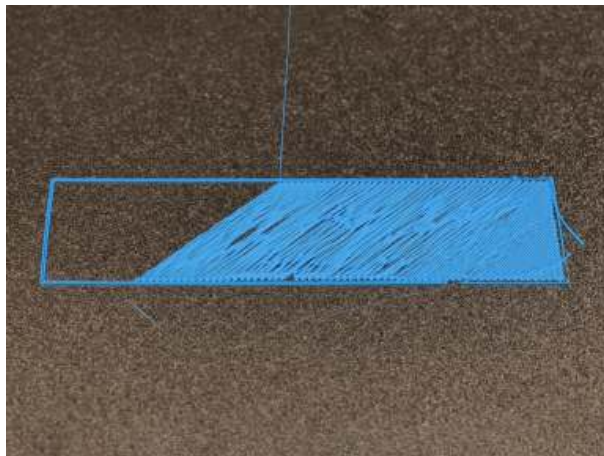


Top layer gaps
(under-extrusion)

9.2 First Layer Issues

9.2.1 First Layer Not Sticking

When printing the first layer, if the material does not firmly adhere to the build plate surface, the printed lines may be thin, wavy, or dragged as the nozzle moves. As printing continues, the model may shift or detach from the build plate, causing print failure.



Possible Causes and Solutions

1. **Mismatched build plate**

Ensure the build plate is compatible with the filament, and select the correct build plate in Bambu Studio.

i TIPS

Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for “build plate introduction” to see detailed information on build plate and filament compatibility.

2. **Dirty build plate surface**

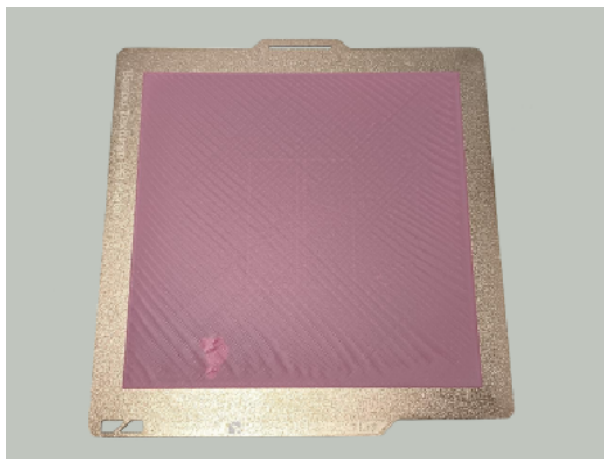
Clean the build plate surface with warm water and a neutral detergent to remove any contaminants without damaging the build plate coating.

3. **Bed leveling not performed**

On the printer screen, select **Calibration > Print Calibration > Bed Leveling** to perform heatbed leveling. Alternatively, on the Device page in Bambu Studio, select **Calibration > Bed Leveling** to perform heatbed leveling.

9.2.2 First Layer Too Low

When printing the first layer, if the nozzle is too close to the build plate, the extruded material will be over-compressed. The printed lines may appear significantly wider, with raised edges from excess extrusion. The surface may look flattened, and the nozzle might scrape the printed material as it moves.



Possible Causes and Solutions

1. Heatbed not leveled

- On the printer screen, go to **Calibration > Print Calibration**, and run Auto Bed Leveling and High-temperature Bed Leveling.
- Enable Auto Bed Leveling when sending the print job.

2. Loose hotend locking tab

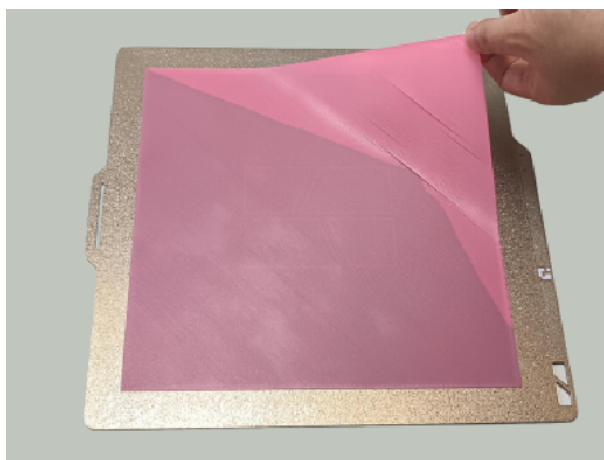
Remove the silicone sock for hotend and check whether the locking tab is securely fastened.

3. Incorrect distance between the nozzle and heatbed

On the printer screen, go to **Calibration > First Layer Quality Calibration**. Set the gap to 0.02, then print a test.

9.2.3 First Layer Too High or Sparse

If the nozzle is too far from the build plate when printing the first layer, the extruded material cannot be properly pressed down and spread out. The lines may appear thin and rounded, with noticeable gaps between them, preventing them from forming a continuous surface. Overall, the first layer may look loose or incomplete.



Possible Causes and Solutions

1. Heatbed not leveled

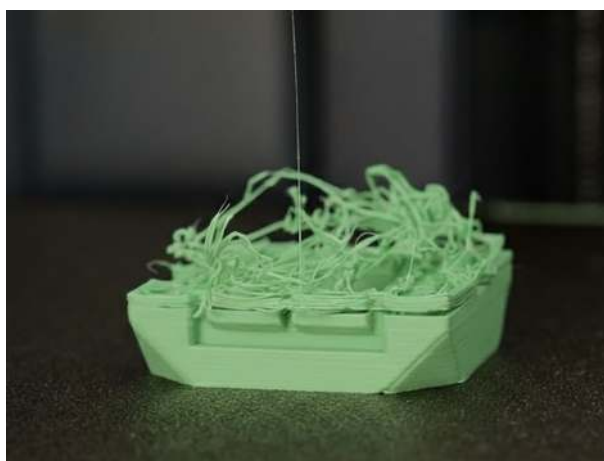
- On the printer screen, go to **Calibration > Print Calibration**, and run Auto Bed Leveling and High-temperature Bed Leveling.

- Enable Auto Bed Leveling when sending the print job.
2. **Loose hotend locking tab**
Remove the silicone sock for hotend and check whether the locking tab is securely fastened.
 3. **Residual material on the nozzle causing height errors**
Check and clean the nozzle wiper, including the wiping plate and nozzle wiping pad. Ensure the center of the nozzle wiping plate is not deformed, and the nozzle wiping pad is clean and not cracked. Replace the nozzle wiping pad and nozzle wiping plate if necessary.

9.3 Print Issues During Printing

9.3.1 Air Printing, Clogging, and Under-Extrusion

During printing, if the nozzle or extrusion path becomes clogged or extrusion is unstable, filament may not be extruded consistently. This can cause missing lines, layer gaps, or areas with little or no material. In severe cases, the nozzle continues moving, but little to no filament comes out, and the print cannot continue properly.



Possible Causes and Solutions

1. Clogged nozzle
Check whether the extrusion path is clogged. For details, see [Toolhead Clog Troubleshooting](#)
2. Clogged extruder
Clear any blockage from the nozzle or extruder based on the troubleshooting results. For nozzle cleaning methods, see [Clean Hotend Clog](#)

9.3.2 Model Warping or Falling Off

During printing, if the model shrinks locally or does not adhere firmly to the build plate, it may warp, detach completely, or even collapse. Warped areas are often accompanied by a visible horizontal ridge. This happens because the warped area moves closer to the nozzle, causing the extrusion lines to be flattened and overflow.



Possible Causes

Insufficient adhesion between the model and the build plate.

Solutions

1. Make sure the build plate is compatible with the filament and select the correct build plate type in Bambu Studio or Bambu Handy.
2. Enable or increase Brim in Bambu Studio to increase the contact area between the model base and the build plate.
3. Perform heatbed leveling.
4. Clean the build plate and nozzle.
5. Apply glue to the build plate surface if necessary to enhance adhesion.
6. Increase the bed temperature appropriately.

9.3.3 Model Collapse and Spaghetti

During printing, if the model does not adhere firmly to the build plate or lacks structural stability, it may shift or partially collapse. The extruded filament cannot stack along the intended path, gradually forming tangled strands or blobs that look like spaghetti.



Possible Causes and Solutions

1. **Small contact area between the model and the build plate**
Enable Brim in Bambu Studio to increase the contact area.

2. **Part of the model is floating above the build plate in Bambu Studio**

Click  in the top toolbar of Bambu Studio to automatically use a larger flat surface as the base.

3. **The model has tall, thin, or overhanging sections**

Add extra supports to secure these areas. You can also paint supports manually.

4. **The model is too tall or has an unstable center of gravity.** Add supports and reduce print speed and acceleration. Lay the model flat whenever possible, or split the model before printing if needed.

9.4 Surface Quality Issues

9.4.1 Poor Overhang Quality

When printing overhangs, if the extruded material does not cool and solidify in time, it may sag because there is no support underneath. The overhang area may show drooping, uneven edges, or a rough surface, affecting both appearance and structural quality.



Possible Causes and Solutions

1. **Insufficient support**

Check the overhang angle. If the angle from vertical is greater than 45°, add support structures.

2. **Print speed too high**

Reduce the print speed, or enable the Slow down for overhangs function.

3. **Insufficient cooling**

Lower the nozzle temperature as needed, increase the auxiliary part cooling fan and part cooling fan speeds, and open the printer front door and top glass cover to improve heat dissipation.

9.4.2 Stringing and Oozing

During printing, if molten filament continues to ooze from the nozzle during movement or travel, fine strands may appear on the model surface, or excess material may build up in some areas. This

usually appears as stringing between models or across surfaces, or as small blobs of excess material.



Possible Causes and Solutions

1. **Damp filament**

Dry the filament. For detailed steps, see [Filament Drying](#).

2. **Long travel distance and insufficient retraction length**

Increase the retraction length or speed appropriately to prevent molten filament from leaking during travel moves.

3. **Special model structure or improper plate arrangement**

Reduce the spacing between models and enable the Avoid crossing walls feature in Bambu Studio.

4. **Worn or oversized nozzle**

Ensure the actual nozzle matches the slicing settings. Check the nozzle condition and replace it if worn.

9.4.3 Gloss Difference

At the same temperature, lower print speeds produce smoother surfaces. At the same speed, higher temperatures produce smoother surfaces. If uneven gloss appears on the model surface during printing, it is usually caused by differences in material melting or cooling rate, which affect flow and lead to changes in surface roughness. This issue is more noticeable on highly reflective materials.



Possible Causes and Solutions

1. **Significant differences in print speed across different areas of the model, such as slowed overhang areas**

For large models, reduce the outer wall speed as needed. For small models, reduce the overall print speed. If necessary, disable Slow down for overhangs.

2. **High print speed when printing at a low layer height, such as 0.08 mm**

This may cause scale-like gloss differences on the model surface. Consider increasing the layer height, lowering print speed, or raising print temperature accordingly.

9.4.4 Seam

In FDM 3D printing, the start and end points of each layer naturally form a seam. This is normal. You can use the following methods to reduce seam visibility and improve the model's appearance.



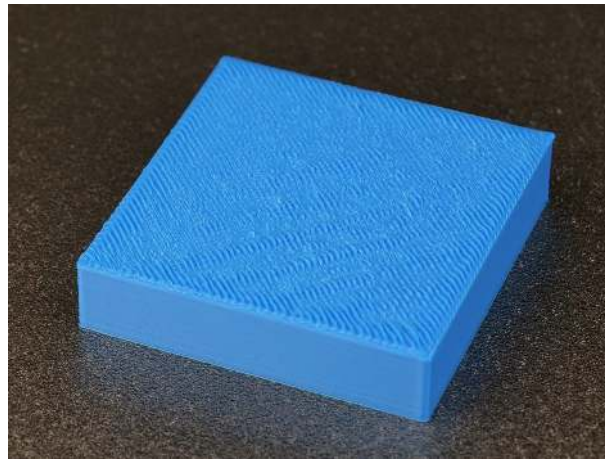
Optimization Methods

1. Set the wall loops to 3.
2. Print the model separately to avoid seam buildup caused by printing multiple models at the same time.
3. Increase the nozzle temperature appropriately and reduce the outer wall speed.
4. For ring-shaped or rotationally symmetric models, try enabling **Spiral vase** mode.

9.5 Top Layer Issues

9.5.1 Top Layer Overflow (Over-Extrusion)

When printing the top surface of a model, if the flow rate is too high, the nozzle is abnormal, or extrusion is unstable, more filament than expected may be extruded. This can cause excess material to build up on the top layer, resulting in an uneven surface, raised lines, and squeezed extrusion paths. Visible bumps or ridges may form, affecting the model's appearance and accuracy.



Possible Causes and Solutions

1. **Flow rate too high**

Recalibrate the flow rate on the Calibration page of Bambu Studio.

2. **Incorrect nozzle size**

Verify that the nozzle diameter set in the slicing software matches the actual nozzle.

9.5.2 Top Layer Gaps (Under-Extrusion)

When printing the model's top layer, if the flow rate is too low, the nozzle is abnormal, or extrusion is unstable, the top layer material may not fill the gaps between adjacent lines. This can cause visible gaps, an uneven surface, and sometimes exposed internal structure or supports, resulting in an incomplete or sunken top surface that affects appearance and flatness.



1. **Flow rate too low**

Recalibrate the flow rate on the Calibration page of Bambu Studio.

2. **Incorrect nozzle size**

Verify that the nozzle diameter set in the slicing software matches the actual nozzle.

3. **Filament extrusion blockage**

Clean and maintain the extruder, PTFE tube, and nozzle.

Chapter 10 Printer Issues and Troubleshooting

10.1 Toolhead Clog Troubleshooting

If errors such as “extruder motor overload” or “air printing” occur during printing, or if the toolhead moves normally but no or little filament comes out of the nozzle, the **main extruder** inside the toolhead or the **hotend** is clogged. Follow the steps below to troubleshoot.

Initial Check: Unload Filament

Step 1. On the printer screen Homepage, tap Stop to end the print job.

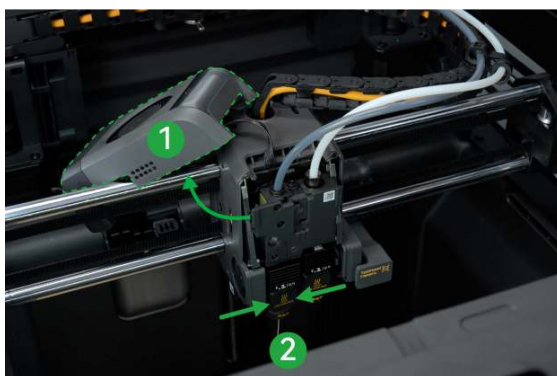
Step 2. On the  page, select the filament loaded in the main hotend and tap **Unload**.

NOTE

If unloading fails, **the main extruder is clogged, possibly along with the main hotend**. If the unloading works normally, proceed to **the next troubleshooting step**.

Further Check: Manual Extrusion

Step 3. Remove the toolhead front cover, silicone sock, and hotend.



Step 4. Press the black outer ring of the toolhead filament inlet and pull out the PTFE tube.



Step 5. Insert a piece of new filament into the toolhead filament inlet. On the printer screen, go to > **Nozzle & Extruder**, tap **Extrude**, and observe the extrusion.

NOTE

If extrusion is normal, **only the hotend** is clogged. If extrusion fails, **the extruder is clogged, possibly along with the hotend**.

Unclogging Method

- Extruder cleaning is complex. Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for “**X2D main extruder clog**” for detailed disassembly and cleaning instructions.
- See [Hotend Unclogging](#) for the next steps.

10.2 Hotend Unclogging

Hotend clogs typically occur in the hotend cold zone (①) or the nozzle (②). They may appear as clog error messages on the printer, or as clear under-extrusion in prints, such as gaps or layer separation.



Before unclogging, identify where the clog is located:

Clog Location	Possible Cause	Unclogging Method
Hotend (inlet and cold zone)	Filament diameter too large (> 1.8 mm) or inconsistent.	Unclog with Allen Key
	Filament softening or swelling caused by heat creep, such as high chamber temperature or printing with low-temperature and high-temperature filaments together.	
Nozzle	Nozzle temperature is set too low, causing the filament to melt slowly and accumulate in the nozzle.	Unclog by Manual Extrusion
	Filament contains particles, such as carbon fiber or glow-in-the-dark filament, or impurities are stuck inside the nozzle.	Unclog with Unclogging Pin Unclog by Cold Pull
	High-temperature and low-temperature filaments are used together or in succession, causing the residual filament to remain unmelted and unable to extrude.	

- Step 1. On the  page, select the corresponding filament, then tap **Unload**. If an error appears, ignore it.
- Step 2. **Remove the hotend.**
- Step 3. Check if the filament at the hotend inlet is swollen or jammed.
- Step 4. If the filament is stuck at the inlet, use an allen key to clear it. If the filament is not stuck, reinstall the hotend onto the toolhead, and follow the nozzle unclogging methods listed above.

10.2.1 Unclog by Manual Extrusion

Heat the nozzle to a higher temperature and extrude filament to clear the clog by increasing filament flow.

Step 1. On the printer screen, select  > **Nozzle & Extruder**, then choose the clogged nozzle.

Step 2. Set the nozzle temperature slightly above the average value, then tap **Confirm** to start heating.

TIPS

See [Filament Printing Conditions](#) for the recommended nozzle temperature range. For example, set PLA filament to 250 °C.

Step 3. After the nozzle heats up, tap  to extrude filament and check whether molten filament comes out of the nozzle.



CAUTION

When using TPU filament, tap the  extrude button no more than 3 times, and avoid rapid and continuous tapping.

If the filament cannot be extruded normally, or if the extruded filament is too thin and brittle, see [Unclog with an Unclogging Pin](#) for the next step.

10.2.2 Unclog with Unclogging Pin

Heat the nozzle to a higher temperature, then use a fine-tipped unclogging pin to clear the nozzle from bottom to top. This helps the molten filament inside the nozzle extrude smoothly.

Tools: heat-resistant gloves, unclogging pin (included in the toolbox).

TIPS

This method does not apply to nozzles smaller than 0.4 mm.

⚠ DANGER

Wear protective gloves when using the unclogging pin. Keep your head away from the printer chamber to avoid contact with molten filament that may eject from the nozzle.

- Step 1. On the printer screen, tap **⚙ > Nozzle & Extruder** to select the nozzle you want to unclog.
- Step 2. Set the nozzle temperature slightly above the average and tap **Confirm** to start heating.

i TIPS

See [Printing Conditions](#) for the recommended nozzle temperature range. For example, set to 250 °C for PLA filament.

- Step 3. After the nozzle heats up, insert the unclogging pin and move it up and down several times.



After that, tap **▶** to extrude filament. If the filament does not extrude normally, or if the extruded filament is too thin or breaks easily, see [Unclog by Cold Pull](#) for the next step.

10.2.3 Unclog by Cold Pull

Cold Pull is a common nozzle maintenance method. During the process, the nozzle is heated to soften the filament, then the filament is pulled out after it cools and partially solidifies. Repeat the cold pull several times to better remove clogs and residue inside the nozzle.

Due to the different structures of the printer's dual hotends, the cold pull procedure is slightly different. On the printer touchscreen, go to **⚙ > Toolbox > Nozzle Cold Pull Maintenance**, then follow the on-screen instructions.

Tool: Filament of the same type as the residual filament, but in a different color

Main Hotend Cold Pull

- Step 1. Select the nozzle and filament.

Step 2. Press the outer ring of the filament inlet and remove the PTFE tube connected to the main hotend toolhead filament inlet.

Step 3. Insert the filament. The printer will automatically run the cold pull procedure.

Step 4. Slowly pull out the filament and check the end for residue to decide whether to repeat the process.

Step 5. After the cold pull is complete, reinstall the PTFE tube on the toolhead.

Auxiliary Hotend Cold Pull

Step 1. Select the nozzle and filament.

Step 2. Press the outer ring of the auxiliary extruder PTFE tube bracket to remove the PTFE tube.

Step 3. Insert the filament. The printer will automatically run the cold pull procedure.

Step 4. Slowly pull out the filament and check the end for residue to decide whether to repeat the process.

Step 5. After the cold pull is complete, reconnect the PTFE tube.



First cold pull (top) and after multiple cold pulls (bottom)

10.2.4 Unclog with Allen Key

If a swollen filament is stuck inside the hotend and cannot be extruded or pulled out, insert a heated allen key into the filament to soften it and let it wrap around the key, then pull them out together.

Tools: Heat-resistant gloves, H1.5 allen key, pliers, lighter.

⚠ CAUTION

This method only applies to allen key H1.5.

⚠ DANGER

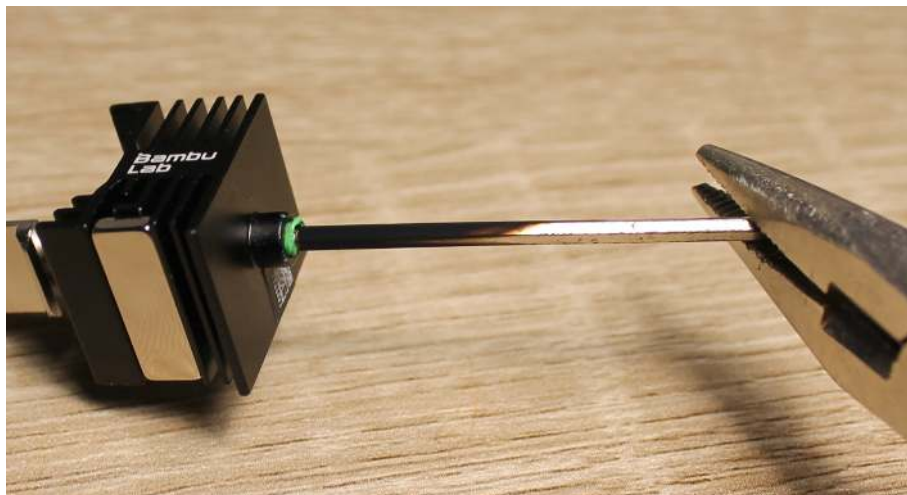
Always wear protective gloves while operating to prevent burns from dripping molten filament.

Step 1. **Remove the hotend.**

Step 2. Hold the allen key with pliers and heat its end for about 10 seconds. Be careful to avoid burns.



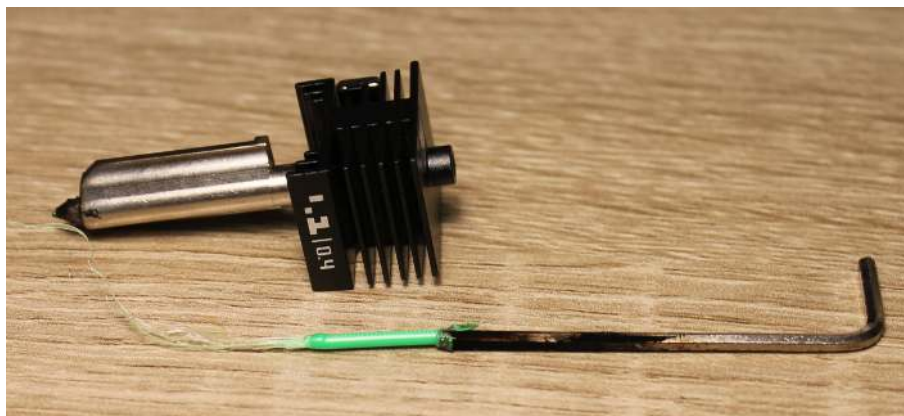
Step 3. Quickly insert the allen key into the hotend through the cold zone, as shown below, and leave it for 30 seconds.



Step 4. Heat the nozzle tip with a lighter for about 20 seconds. Slowly pull out the allen key to remove the filament and clog from inside the hotend.

⚠ DANGER

- Do not overheat the nozzle or use high-power butane torches. A regular gas lighter is recommended.
- The nozzle only needs to be hot enough to pull out the filament and allen key. Overheating the nozzle may cause the filament to drip or burst. Always keep the nozzle tip pointed away from yourself.



Step 5. Once finished, reinstall the hotend.

10.3 Loose Belt

Tool: Allen key H2.0

After long-term use, the printer belt, also known as the timing belt, may wear or loosen, causing print quality issues, such as circles printing as ovals, or HMS error messages. In this case, maintain and tension the belt.

⚠ CAUTION

Make sure the printer is powered off during maintenance.

10.3.1 XY Belt Tension

i TIPS

After completing all maintenance steps, run vibration compensation calibration.



- Step 1. Loosen the **4** tensioning screws by 1 to 2 turns.
- Step 2. Move the toolhead clockwise and counterclockwise along the printer frame for **3 to 5** cycles.
- Step 3. Retighten the 4 screws.

⚠ CAUTION

Do not overtighten the screws, as this may damage the threads.

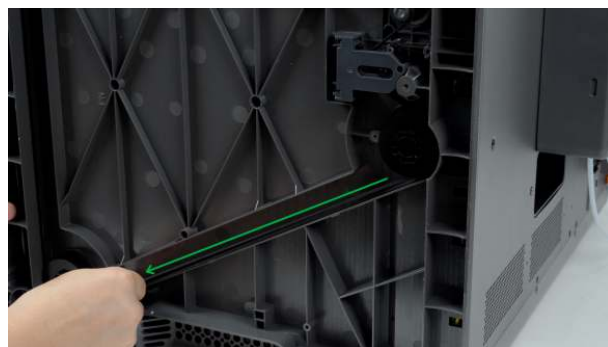
10.3.2 Z Belt Tensioning

⚠ CAUTION

- Make sure the printer is powered off during maintenance.
- The printer is heavy. Move it with two people if possible to avoid injury or printer damage.

i TIPS

After completing all maintenance steps, run vibration compensation calibration.



- Step 1. Remove the printer's top cover and lay the printer on its side.
- Step 2. Loosen the tensioning screw by 1 to 2 turns.
- Step 3. Pull the Z-axis belt through 3 to 5 cycles and make sure it moves smoothly.
- Step 4. Retighten the screw.
- Step 5. After these steps, place the printer back on a stable, level surface and reinstall the top cover.

Chapter 11 Regular Care and Maintenance

DANGER

- Before maintenance or disassembly, power off the printer and disconnect it from the power supply to avoid safety hazards.
- Before maintaining the printer or replacing parts, make sure the hotend and heatbed have cooled to room temperature. If you must work while they are hot, wear heat-resistant gloves to protect yourself.

11.1 Regular Maintenance

11.1.1 Maintenance Frequency

The printer can assess its cleanliness based on task type and print duration, and provide maintenance reminders. After receiving the printer, update the firmware to the latest version to enable this feature.

CAUTION

If you print high-temperature or engineering filaments continuously for long periods, or if the printer runs for more than 8 hours per day on average, increase the maintenance frequency:

- Parts maintained every three months should be **maintained monthly**.
- Parts maintained monthly should be **maintained weekly**.

DANGER

Clean and maintain all printer parts regularly as instructed. Failure to do so may damage the printer and create safety risks.

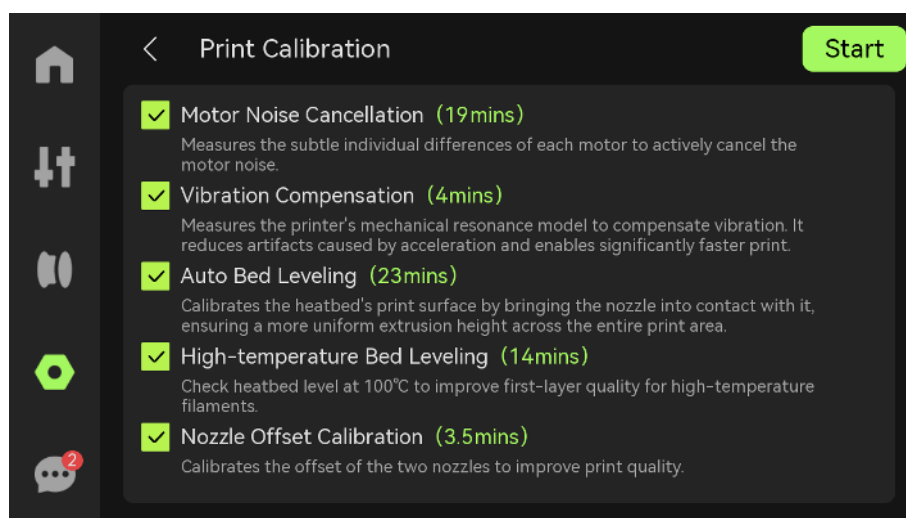
Component		Type	Frequency	Operating Steps
Printer	Printer system	Calibration	After transport or maintenance	On the printer screen, select  > Calibration > Print Calibration .
	Live view camera	Clean	1 month	Wipe with a cotton swab or non-woven cloth dampened with alcohol.
Printer Chamber	Build plate	Clean	1 week	Wash the surface with warm water and dish detergent, then wipe it dry.
	Air filter	Clean	3 months	Wipe the filter cover with a non-woven cloth dampened with alcohol, and replace the activated carbon filter regularly.

	Bottom and lining	Clean	1 month	Brush off filament debris and foreign objects, then wipe with a non-woven cloth dampened with alcohol.
XYZ axes	X-Axis	Clean and Lubricate	1 month	Wipe with a non-woven cloth dampened with alcohol, then apply lubricant grease to the lead screws and lubricant oil to the linear rods after cleaning.
	Y-Axis			
	Z-Axis		3 months	
Toolhead	Toolhead camera	Clean	1 month	Wipe with a cotton swab or non-woven cloth dampened with alcohol.
	Extruder	Clean and Lubricate		Remove internal debris and apply lubricant grease to the gears.
	Hotend	Clean		Cold pull.

11.1.2 Print Calibration

To ensure printing accuracy and stable operation, perform a full calibration after moving the printer or maintaining key components such as the XYZ axes, belts, and toolhead.

On the printer screen, tap  > **Calibration** > **Print Calibration**, then select the calibration task as needed.



TIPS

You can also start print calibration via Bambu Handy and Bambu Studio. See [Start Calibration](#).

11.1.3 Air Filter

Tools: non-woven cloth, alcohol, dust brush, and a new activated carbon filter.

Regularly clean dust from the air filter cover. If the filter surface is visibly dirty or saturated, replace the activated carbon filter.

- Step 1. On the printer touchscreen, tap  > **Motion** > **heatbed** ↓ to lower the heatbed to the bottom.
- Step 2. Remove the filter cover from the side clips. Use a dust brush to clean the surface, then wipe it with a non-woven cloth dampened with alcohol.

 CAUTION

If the cover is heavily soiled, you can rinse it directly with water. Make sure it is completely dry before reinstalling it, otherwise other electronic components may be affected.

- Step 3. Hold the filter handles and pull outward to remove it, then install a new filter.



11.1.4 XYZ Axes

 CAUTION

Make sure the printer is powered off during maintenance.

Clean and Lubricate the X-Axis

Tools: non-woven cloth, alcohol, lubricant oil.

- Step 1. Use a non-woven cloth dampened with alcohol to wipe the X-axis linear rods and X belts.
- Step 2. Move the toolhead to clean the remaining parts.
- Step 3. Apply lubricant oil dropwise onto the linear rod. Manually move the toolhead along the X-axis **slowly** 3 to 5 times to ensure even distribution.



Clean and Lubricate the Y-Axis

Tools: Non-woven cloth, alcohol, lubricant oil.

Step 1. Use a non-woven cloth dampened with alcohol to wipe the Y-axis linear rods on both sides.

Step 2. Move the toolhead to clean the remaining parts.

Step 3. Apply lubricant oil dropwise onto the linear rods. Manually move the toolhead along the Y-axis 3 to 5 times to ensure even distribution.



Clean and Lubricate the Z-Axis

Tools: Non-woven cloth, alcohol, lubricant oil.

The Z-axis includes three sets of lead screws and smooth rods: one at the left front, one at the right front, and one at the rear center. The front sets include both a lead screw and a smooth rod, while the rear set includes only a lead screw. During cleaning, raise the heatbed from the printer screen to access the lower sections.

⚠ CAUTION

- When wiping or lubricating the Z-axis, make sure the printer is powered off. Only power on the printer when raising the heatbed to clean the lower sections.
- Linear rods and lead screws use different lubricants. Do not mix them up.

Step 1. Use a non-woven cloth dampened with alcohol to wipe the lead screws and linear rods on both sides and at the rear.

Step 2. Apply lubricant oil to the linear rods shown with dashed lines and to the bearings at the bottom of the lead screws. Apply lubricant grease to the lead screw bodies shown with solid lines.

Step 3. Connect the power. On the printer screen, tap **⚙ > Motion**, then move the heatbed up and down 3 to 5 times to spread the lubricant evenly.



11.1.5 Heatbed

Tools: non-woven cloth, alcohol.

- Step 1. On the printer screen, tap **⚙ > Motion > ▲** to raise the heatbed. Clean any leftover filament underneath.
- Step 2. Spray alcohol evenly on the bottom of the chamber, then wipe clean with a non-woven cloth.
- Step 3. On the printer screen, lower the heatbed and remove the build plate. Use a non-woven cloth dampened with alcohol to wipe the heatbed surface.
- Step 4. After the alcohol has fully evaporated, place the build plate back properly.

⚠ CAUTION

Before placing the build plate, check and clean the heatbed surface to ensure no debris remains.

11.1.6 Build Plate

Tools: dish detergent, sponge or brush.

Wash the build plate with warm water and dish detergent. Dry it completely before attaching it to the heatbed for use.



11.1.7 Toolhead

Tools: pointed tweezers, H2.0 and H1.5 allen keys, lubricant grease.

The gear assembly inside the extruder may wear after prolonged use, causing printing issues. Regularly apply lubricant to ensure smooth printing.

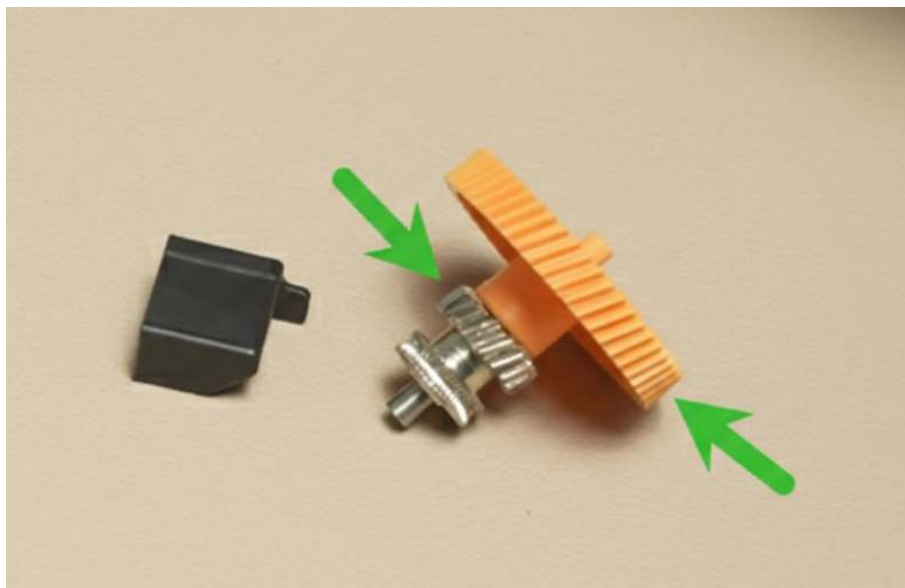
NOTE

To maintain the extruder, visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "Extruder Components Replacement Guide for the X2D" for detailed disassembly and assembly instructions.

CAUTION

Place the extruder on a clean surface during disassembly to prevent small parts from falling.

- Step 1. Remove the extruder, detach the Hall sensor assembly, then separate the extruder gear components.
- Step 2. Apply lubricant grease to the 2 gear locations shown in the illustration.



11.1.8 Camera

Tools: cotton swab (or non-woven cloth), alcohol

After prolonged use, volatile particles may build up on the surfaces of the live view camera and toolhead camera. This causes blurry video and reduces visual detection sensitivity.

Dip a cotton swab in a small amount of alcohol and wipe the camera surfaces.



Live view camera



Toolhead camera

11.2 Replace Accessories

Over time, wear or aging of certain printer accessories can affect overall printing performance. Regularly check the condition of accessories and replace them as needed. This chapter explains the replacement requirements and steps for common consumable parts. You can also visit Bambu Lab Wiki (wiki.bambulab.com/x2d) and see "Part Replacement Guide" for more tutorials.

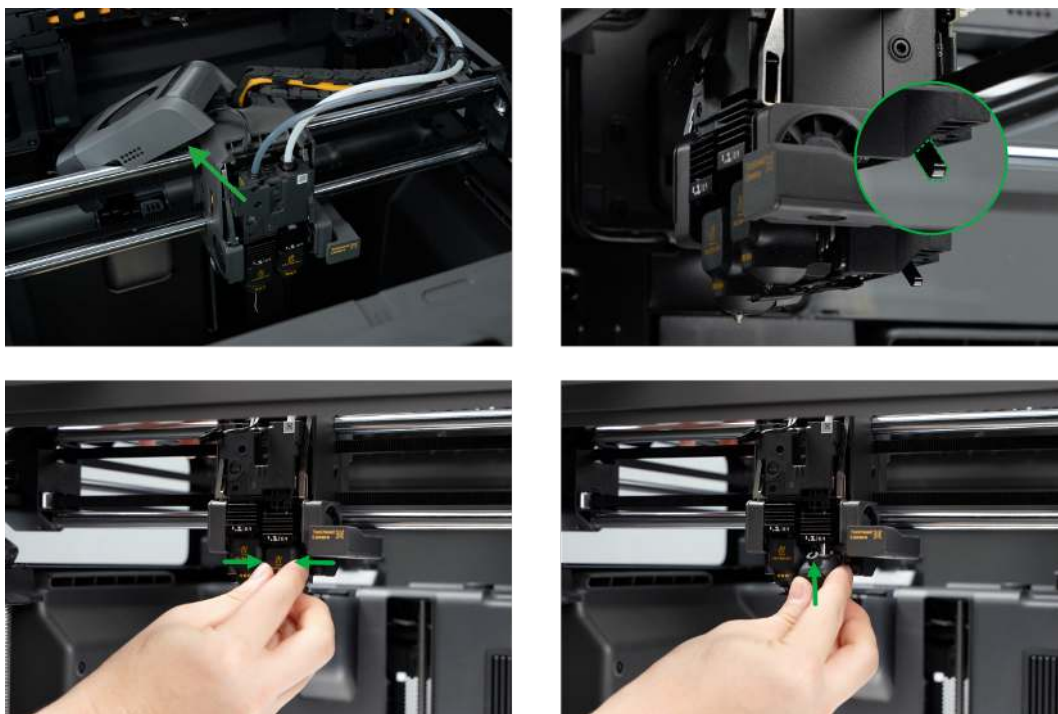
11.2.1 Hotend Silicone Sock

Tools: spare silicone sock (included in the toolbox).

The silicone sock is installed around the hotend nozzle to maintain a stable nozzle temperature. Replace it if it is damaged or no longer stays securely in place.

DANGER

Before replacing the silicone sock, ensure the nozzle temperature has cooled down to room temperature to prevent burns.



- Step 1. Remove the toolhead front cover and hang it aside.
- Step 2. Toggle the nozzle switching lever to position the flow blocker under the other hotend.
- Step 3. Pinch the top of the silicone sock and pull it down diagonally to remove.
- Step 4. Install the replacement silicone sock onto the hotend from bottom to top.
- Step 5. Gently pull on the silicone sock to ensure it fits properly, then snap the toolhead front cover back into place.

11.2.2 Hotend

Tools: replacement hotend, heat-resistant gloves.

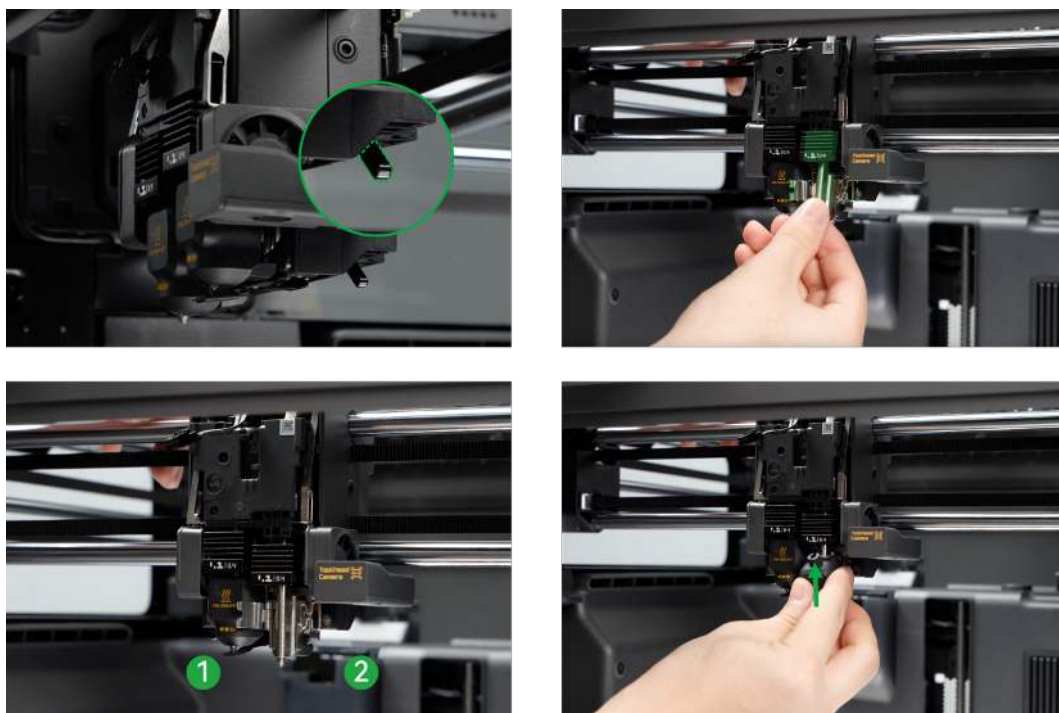
Replace the hotend when it is clogged or damaged and standard unclogging steps (see [Hotend Unclogging](#)) can no longer resolve the issue.

DANGER

Before replacement, make sure the nozzle has cooled to room temperature to avoid burns. If you must work while it is still hot, wear heat-resistant gloves for safety.

TIPS

Before replacement, go to the printer **touchscreen** > , select the corresponding filament icon and tap **Unload**.



- Step 1. Remove the toolhead front cover. Move the nozzle switching lever to position the flow blocker under the other hotend.
- Step 2. Remove the **hotend silicone sock**. Then open the hotend locking tabs, **right first and then left**, and remove the hotend.
- Step 3. Insert the replacement hotend. Secure the hotend locking tabs, **left first and then right**, ensuring they fit snugly.
- Step 4. Reinstall the silicone sock and the toolhead front cover.

 NOTE

If you replaced the hotend with a different material or diameter, tap  > **Nozzle & Extruder** on the printer screen and select the correct nozzle type.

11.2.3 Nozzle Wiping Pad

Tools: nozzle wiping pad (included in the accessory box).

The nozzle wiping pad is installed on the purge wiper and is used to remove residual waste material from the nozzle surface. Replace it when it is damaged or dislodged.

 TIPS

The nozzle wiping pad rarely comes loose. However, if the toolhead follows an abnormal path, such as due to a G-code error or firmware fault, the pad may be scraped off. Follow the steps below to reinstall it for normal use.



Step 1. Remove the old nozzle wiping pad from the purge wiper.

Step 2. Insert the spare nozzle wiping pad. Align the nozzle wiping pad with the groove on the purge wiper, then press down until it is installed securely.

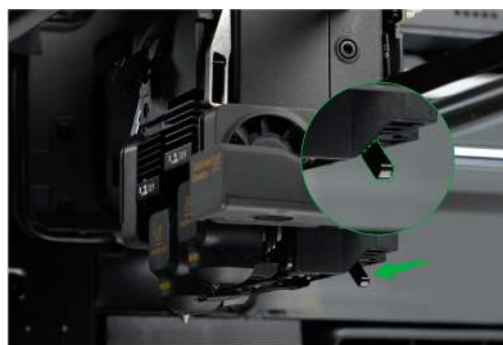
11.2.4 Flow Blocker

Tools: allen key H1.5, flow blocker (included in the toolbox).

The flow blocker blocks the idle nozzle to prevent filament leakage. Replace it if it is deformed and cannot be manually adjusted or repaired.

DANGER

Before replacement, ensure the nozzle temperature has cooled down to room temperature to prevent burns.



Step 1. Remove the toolhead front cover.

- Step 2. Move the nozzle switch lever to the left to position the flow blocker under the left-side nozzle.
- Step 3. Loosen the screw from the rear of the toolhead and remove the flow blocker.
- Step 4. Replace the flow blocker and tighten the screw securely.
- Step 5. Snap the toolhead front cover back into place.

11.2.5 Left and Right Filament Cutters

Tools: allen key H1.5, left and right filament cutters (included in the toolbox), needle-nose pliers, or tweezers.

The filament cutter is inside the toolhead and connected to the filament cutter lever. During filament unloading or changing, the cutter lever drives the cutter to cut the filament for the corresponding hotend. If unloading failures occur frequently when using AMS, check whether the blade has become dull first.

Visit Bambu Lab Wiki (wiki.bambulab.com/home) and search for "filament cutter replacement guide for X2D" for detailed replacement instructions.



DANGER

The blade edge is sharp and may cause cuts. Handle with care.

11.2.6 PTFE Tube Locking Nut

Tools: open-end wrench, PTFE tube locking nut (included in the toolbox).

The PTFE tube locking nut secures both ends of the PTFE tube between the auxiliary extruder and the toolhead filament inlet. Replace it with a spare nut if lost.

Use the wrench to tighten the nut clockwise and loosen it counterclockwise.



Enjoy!

The manual is subject to change without notice.
Visit the Bambu Lab website for a latest version.



bambulab.com/support/documentation